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The Routledge Handbook of Economic Expectations in Historical Perspective

Edited by Laetitia Lenel, Alexander Nützenadel,
Jochen Streb, and Ingo Köhler



THE ROUTLEDGE HANDBOOK OF ECONOMIC EXPECTATIONS IN HISTORICAL PERSPECTIVE

The Routledge Handbook of Economic Expectations in Historical Perspective offers a one-stop reference that distills and summarizes the recent scholarship on economic expectations. Investigating the dynamics, effects, and determinants of economic expectations from a global perspective since the seventeenth century, this book enhances the understanding of expectation formation across time and space.

Expectations drive economic decision-making and thus offer a fundamental key to understanding economic behavior. Given the centrality of economics to society, the historical study of economic expectations is a highly relevant endeavor, for which this volume provides an accessible starting point. Featuring 33 chapters written by leading scholars from fields ranging from anthropology to political science, this handbook provides a uniquely interdisciplinary perspective. Together, the collection of essays argues that the development of economic theory and empirical research on expectation formation has not taken place in a vacuum. Rather, it must be understood as one strand in a complex entanglement of knowledge production, experiences, and economic and political decision-making, which interacted with, challenged, and transformed each other.

With its broad scope, this handbook will be of interest to students and scholars across multiple disciplines, including economic history, economics, sociology, anthropology, psychology, and political science.

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Designed cover image: Teleprinters of Dresdner Bank AG at the Frankfurt Stock Exchange, October 1957. Hessisches Wirtschaftsarchiv (Economic Archive of Hesse), 115 Deutsche Börse AG Collection, No. 24535, photographer: Jack Hochscheid, Frankfurt/Main.

First published 2026
by Routledge
605 Third Avenue, New York, NY 10158

and by Routledge
4 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

Routledge is an imprint of the Taylor & Francis Group, an informa business

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The open access publication of this handbook has been supported by the University Library of Duisburg-Essen's Open Access Publication Fund, the University of Mannheim's Open Access Publication Fund, the Business Archives of Hesse, Darmstadt, and by UK Research and Innovation (UKRI).

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GPSR@taylorandfrancis.com. Taylor & Francis Verlag GmbH, Kaufingerstraße 24,
80331 München, Germany.

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ISBN 978-1-032-45860-1 (hbk)
ISBN 978-1-032-45861-8 (pbk)
ISBN 978-1-003-37901-0 (ebk)
DOI: 10.4324/9781003379010

Typeset in Sabon
by codeMantra

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INTRODUCTION

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Expectations matter. They are regarded as the basis for economic decision-making—and thus as key to understanding economic behavior and macroeconomic outcomes. Expectations, economists and social scientists agree, drive economic activity. “Isn’t all of Economics about expectations?” asked a group of economists recently (Bachmann, Topa, and Klaauw 2023, xxv). Indeed, expectations have become a central focus of economics and an important topic in the social sciences more generally.

From an historian’s viewpoint, this is a relatively recent development. Economists were pointing out the central importance of expectations as early as the 1920s and 1930s. In the wake of the Great Depression, companies, journals, and eventually social scientists began to conduct surveys with consumers and entrepreneurs to inquire about their expectations. In doing so, they produced new data that led to a gradual rethinking of economic expectations from the 1950s onward. And yet, it was not until the 1970s that economic expectations became a major focus of economic theory as well as of political decision-making. With the concept of rational expectations, economists pointed to the importance of policymaking for expectations and vice versa, thus catapulting expectations into the center of monetary policy discussions. Since the Great Recession of 2007–2009, the debate on economic expectations has gained new momentum, with a special focus on divergences from the full information rational expectations (FIRE) hypothesis. This research has been motivated not only by the crisis, but also by new data and, more recently, new technology. Clearly, both economic experiences and the practices of economic knowledge production have a huge impact on the debate and conceptualization of economic expectations.

But changing ideas about the formation and the significance of economic expectations also have far-reaching consequences for political and economic decision-making. Central banks’ turn toward transparency, for instance, has been a direct reaction to the rise of the rational expectations hypothesis in economics. Conversely, the experience of the sometimes rather weak effects of political decisions on people’s expectations also influences economic theory. Along these lines, current research on expectations highlights the limits of central bank communication, prompting new research on how to relax the rational expectations hypothesis.

But although expectations are nowadays ubiquitous in economics and policymaking, the entanglements between economic knowledge practices, economic contexts, economic theory, and political and economic decision-making have so far received little attention. Our handbook therefore pursues two aims. First, we want to map the fruitful debate that has emerged since the 1970s, and has continued to intensify since 2008, on economic expectations. Second, we want to bring together perspectives from economics, sociology, and historiography to highlight and unravel the complex entanglements between the various areas addressed, and in so doing, to contribute to an historically sound understanding of economic expectations, their changing theoretical conceptualization, and the implications for policymaking. We thereby distinguish three different historical phenomena, which have evolved interdependently, as the contributions in this handbook demonstrate: (1) the development of the economic theory of expectation formation, (2) changes, sometimes radical, in the economic environment with the specific economic experiences they brought about, and (3) the transformation of economic and political decision-making. All three took place in an interrelated manner, with complex repercussions and surprising consequences.¹

Economic Research on Expectations: A Short Overview

“Fifty years ago economists rather generally allowed themselves to ignore economic expectations by concentrating attention on the ‘static state’,” an economist explained in 1949. “Today we talk a great deal about economic expectations” (Working 1949, 150). Indeed, expectations had played an increasingly important role in economics since the 1920s (on earlier treatments, see, e.g., Evans and Honkapohja 2001a; Arena, Dal-Pont Legrand, and Guesnerie 2021). Economists such as Gunnar Myrdal (Myrdal 1927; see Trautwein 2021), Wesley Mitchell (Mitchell 1927), and John Hicks (Hicks [1932] 1939 1946; see Lenfant 2021) assigned them a central role in explaining economic dynamics (Shackle 1949; Arena, Dal-Pont Legrand, and Guesnerie 2021). Irving Fisher pointed out the effects of inflation expectations on financial markets and market interest rates (Fisher 1930). Expectations also commanded center stage in John Maynard Keynes’s *General Theory* of 1936. In Keynes’s framework, both the investment schedule and the liquidity preference function depend on expectations (Keynes [1936] 2013; see also Hoover 1997). Keynes also pointed to the role of psychological and emotional factors—which he dubbed “animal spirits”—in economic decision-making in times of uncertainty. This later became an important point of reference for behavioral economists.

At mid-century, expectations gained further prominence, as economists began to model expectations as adaptive. Under this premise, economic agents base their expectations on experience. More specifically, the adjustment of expectations for an arbitrary economic variable is driven by the difference between past expectations and the actual development of this variable. Thus, actors’ expectations are closely tied to past experiences. Popularized by Phillip Cagan (Cagan 1956) and Marc Nerlove (Nerlove 1958), the hypothesis of adaptive expectations also laid the basis for the Phillips curve (Phillips 1958; Lipsey 1960; Samuelson and Solow 1960), which postulated a stable and inverse relationship between inflation and unemployment. As the Phillips curve theory suggests, a monetary stimulus will prompt an increase in aggregate demand. This encourages firms to raise their prices. With higher revenues, they are also willing to employ more workers, which lowers unemployment. Ultimately, the price increases then lead to higher inflation—an effect, however, that agents do not anticipate. Consequently, workers are therefore unlikely to insist on immediate wage

increases; if they did so, this would make companies less likely to employ more staff. In this scenario, policymakers are thus able to lower unemployment at the cost of a higher inflation rate and reduce the inflation rate only by accepting a higher unemployment rate. This framework assumes that economic agents base their decisions solely on past experience. They do not anticipate the future impacts of current government decisions, that is, higher rates of price inflation and therefore lower real wages.

The economic data, however, generated through surveys of consumers, businesspeople, and economists since the late 1940s cast doubt on this assumption. As the comparison between survey data and actual outcomes has revealed, economic agents continuously modify and update their expectations in light of new information, including knowledge regarding the expectations of other agents (Lenel 2023). This realization proved to be central to the development of the concept of rational expectations that John F. Muth introduced at the beginning of the 1960s (Muth 1960, 1961; for antecedents, see Arrow 1951; Debreu 1959). As Muth concluded from studies of expectation data, each agent's expectation about the development of their own industry is, on average, more accurate than the models used to predict it, and actual expectations react much quicker to changes in the policy regime than previously theorized. Based on these observations, Muth suggested that economic models should assume a higher degree of rationality in the formation of agents' expectations, proposing that "expectations, since they are informed predictions of future events, are essentially the same as the predictions of the relevant economic theory" (Muth 1961, 316).

Robert Lucas applied Muth's notion to models of the aggregate economy. In doing so, he demonstrated the importance of rational expectations formation for the conduct of economic policy and the value of using the rational expectations hypothesis in econometric models to evaluate the effects of different policy measures. Lucas also showed why the Phillips curve relationship could only hold in the short run, a finding that gained special prominence in the context of the stagflation of the 1970s (see also Friedman 1968; Phelps 1968; Lucas 1972). As Lucas argued, any change in policy will alter the structure of the econometric model as people adjust their expectations to the new policy, thus altering price and wage formation. Policymakers could thus not systematically fool economic agents, as the Phillips curve based on the adaptive expectations framework had suggested.

It took time for the rational expectations hypothesis to gain acceptance. Then, however, it fundamentally changed the discipline (Chari 1999; Taylor 2001). The integration of economic theory into macroeconomics put the factor of changing expectations center stage and transformed the practice of policy evaluation in economics (Lucas 1976). Over the decades that followed, economists worked to refine the rational expectations assumption. Motivated by the belief that the latter attributed "too much information and rationality on the part of economic agents," they searched for means to account for learning and thus model transition behavior and dynamics (Honkapohja 1993, 587; Sargent 1993; Evans and Honkapohja 1999, 2001b). Drawing on the notion introduced by Herbert Simon, this behavior became known as "boundedly rational," as "economic agents use models that are misspecified while they are learning" and thus act outside the rational expectations equilibrium (Honkapohja 1993, 588; Sargent 1993; Honkapohja 1995). While most of this research assumes that agents' expectations will, over time, converge to rational expectations, behavioral economists pointed to systematic departures from rational behavior (Kahneman and Tversky 1973; Tversky and Kahneman 1973, 1974).

Over the past decades, and increasingly since the Great Recession of 2007–2009, economists have worked further to relax the hypothesis of rational expectations. Using

laboratory experiments and survey evidence, behavioral economists have highlighted the central importance of cognitive biases and emotions (Akerlof and Shiller 2009; Gennaioli, Shleifer, and Vishny 2015; Bordalo, Gennaioli, and Shleifer 2018; Bordalo et al. 2020). Economists have also pointed to limits to the information and computational capacities of economic agents (Sims 2003, 2006; Luo 2008; Maćkowiak and Wiederholt 2009; Woodford 2009; Van Nieuwerburgh and Veldkamp 2009, 2010; Maćkowiak and Wiederholt 2015; Gabaix 2019), to the importance of higher-order beliefs (Morris and Shin 2003; Allen, Morris, and Shin 2006; Angeletos and Lian 2016), and to the influence of memories of past experiences (Malmendier and Nagel 2011, 2016; Malmendier, Nagel, and Yan 2021). Others have referred to the vital role that herd behavior and narratives play in economic decision-making (Shiller 1995, 2019).

Pointing to the fundamental openness of the economic future, sociologists and anthropologists have investigated agents' strategies of sense-making in order to act despite the irreducible uncertainty of future developments. While one line of inquiry has focused on the use of imagination and invention to form expectations and enable economic decision-making (Beckert 2016; Beckert and Bronk 2018), others have investigated the use of narrative in economic expectation formation (Holmes 2013, 2018; Chong and Tuckett 2015; Tuckett 2018). In contrast to behavioral approaches, this literature does not consider the use of narratives as a random deviation from rational behavior, but as a core tool to cope with the uncertainty of economic life (Beckert and Bronk 2018; Tuckett et al. 2020; see also Svetlova 2022). Pointing out the limits of both the assumption of rational expectations and models of naïve expectation formation, Ekaterina Svetlova has discussed the expectation formation of AI agents which, in her view, “brings the contemporary theories of expectation formation into uncharted territory” (Svetlova 2022). In so doing, her research also emphasizes the role that technology plays in processes of expectation formation, an aspect often overlooked. This multitude of new perspectives has shed light on limits to rationality and led to a fruitful and exciting discussion about economic decision processes.

The Entanglements between Theories of Economic Expectations, Economic Experience, and Economic and Political Decision-Making

New perspectives on economic expectations—both recently and in the past—have been the result of new methods used to study expectations, but also of changing historical contexts and new economic data. The boom-bust cycle in housing prices and construction, or the Great Recession of 2007–2009, for instance, can hardly be reconciled with the rational expectations assumption. Rather, the observed underestimation of risk might point to systematic cognitive biases (Glaeser 2013; Gennaioli, Shleifer, and Vishny 2015; Glaeser and Nathanson 2017; Bordalo et al. 2020). Similarly, the heightened interest in anchoring inflation expectations as a tool of monetary policy has revived interest in the formation of inflation expectations—a line of research made possible also by the growing empirical basis of micro-level data from surveys of households, firms, and professionals. This literature emphasizes the importance of information rigidities to explain empirical evidence on the formation of inflation expectations (Coibion and Gorodnichenko 2012, 2015; Angeletos, Huo, and Sastry 2020; Coibion et al. 2020). Studying the relationship between inflation expectations and demographic characteristics of the respondents, other authors stress the crucial role of economic experiences, i.e. inflation experiences and daily life (Ehrmann and Tzamourani 2012; Malmendier and Nagel 2016; D'Acunto et al. 2021). As these and

earlier studies (and the times of their respective publication) suggest, both (the mechanics of) expectation formation and economic theory are context-bound.

The economic theory of expectation formation, in turn, also affects economic and political decision-making practices. New insights into the formation and revision of economic expectations have emphasized the importance of information in the forming of expectations—and in so doing stimulated new practices for the coordination and management of expectations (see Section 2). This has been reflected in the decision-making behavior of companies and policy institutions. A particularly prominent example of this effect is the changing policy of central banks, which in the 1990s began to use communication as a policy tool to manage and guide economic expectations. As part of their “march toward greater transparency” (Blinder et al. 2008, 911), central banks have also expanded their attempts to survey the expectations of households and firms—which has, in turn, provided economists with new empirical evidence on the formation of expectations.

Sociologists and historians have already interpreted central banks’ new communication practices as a step that made “the systematic formation of ‘intersubjectively shared expectations’ (Hall 2008, 188) possible in the first place” (Braun 2015, 371; see also Lenel 2023). Recent empirical evidence, however, casts doubt on the effectiveness of this communication. Both the experience of the financial crisis and the inflation surge in 2022–2023, and new survey data, point to deviations from the concept of (full information) rational expectations (see also Born, Enders, and Müller, Chapter 10 in this volume)—a development which might, once again, lead to a change in the economic theory of expectations and the practices of economic and political decision-making.

Aim and Scope of this Handbook

In 2023, Bachmann, Topa, and van de Klaauw published their *Handbook of Economic Expectations*, in which leading economists document the impressive progress economics has made over the last 30 years in the collection and processing of expectations data and in the development of expectations theories (Bachmann, Topa, and Klaauw 2023). So why do we need another handbook on expectations formation? We believe that our *Routledge Handbook of Economic Expectations in Historical Perspective* is a necessary complement to that of Bachmann, Topa, and van de Klaauw, in that it takes a more interdisciplinary approach than the latter, drawing on authors from different fields and deliberately written in such a way that it can also be understood by scholars outside the field of economics. In our opinion, communicating across subject boundaries facilitates the interdisciplinary quest for understanding the changing dynamics and determinants of expectation formation.² History plays a key role here. As we argue, the development of economic theory and empirical research on expectation formation has not taken place in a vacuum. Rather, it must be understood as one strand in a complex entanglement of economic knowledge production, economic experiences, and economic and political decision-making, which have interacted with, challenged, and transformed each other.

The entanglements between the theory of economic expectations, historical and economic context or personal experience, and economic and political decision-making are far-reaching. To do justice to these complex interdependencies without sacrificing clarity, we have structured the contributions along four themed sections. This sometimes results in artificial divisions, which are, however, bridged by the numerous cross-references in the individual chapters. The structure reflects the main arenas that we consider to be interdependent when

it comes to economic expectation formation: economic theory (Section 1), the historical context (Section 3) with a special focus on times of economic crisis (Section 4), and the economic and political practices of decision-making (Section 2), which have developed in response to economic theory and economic experience but are also continuously influencing both.

Section 1: Approaches and Debates

Section 1 explores the evolution and transformation of expectation theory during the past five decades. While for a long time economists could agree on a specific model of expectation formation (be it adaptive, as in the 1950s and 1960s, or rational, as in the 1980s and 1990s), the last two decades have seen a proliferation of different models of expectation formation. This diversification can be attributed to three primary factors. First, macroeconomic reality has become more complex, fragmented, and dynamic, making it more difficult to apply a universal model to all circumstances. Second, research in behavioral economics has highlighted the impact of individual beliefs, information resources, and cognitive limitations on economic expectations and decision-making. Third, the “empirical turn” has changed the way economists design research strategies. The starting point is not a specific model or theory, but rather an empirical problem that can be explained by different theories.

Pedro Garcia Duarte (Chapter 2) reconstructs the rise of the rational expectations hypothesis since the 1960s. As Duarte emphasizes, the “rational expectations revolution” was not as linear as often assumed. The rational expectations hypothesis met with strong resistance from the economic mainstream. In the early years, only a few academic institutions, such as the University of Minnesota, the University of Chicago, and Carnegie Mellon University, fostered the development of this new economic approach, which only entered the economic mainstream in the 1980s. From the beginning, collaboration with experts and political institutions played an important role. The group at the University of Minnesota, for example, collaborated closely with the Federal Reserve Bank of Minneapolis from the 1960s onward, which proved vital for the circulation of the rational expectations hypothesis in policymaking.

The rational expectations hypothesis assumes that economic expectations are formed in a model-consistent manner. As explained above, economists have long worked to refine this approach. Building on the adaptive expectations literature, models of adaptive learning were developed to allow agents to revise their model over time as new data become available. In their history of models of adaptive learning (Chapter 3), Stefano Eusepi and Bruce Preston trace how this approach emerged as part of the rational expectations revolution. As the authors point out, models of adaptive learning allow for new insights on how expectations are formed and revised, for instance in reaction to central bank communications policy, and are supported by recent empirical studies based on survey data.

The importance of evidence from survey data is also stressed by other chapters. Christian Conrad and Kajal Lahiri (Chapter 6) present research on expectations of professional forecasters, a group for which one might expect convergence of expectations due to their advanced forecasting techniques. However, the authors find evidence of a high level of disagreement among forecasters. Drawing on previous studies based on survey data as well as their own research based on the ZEW Financial Market Survey, Conrad and Lahiri discuss different sources of disagreement, with heterogeneity in prior beliefs playing a particularly important role.

The heterogeneity of actors' expectations is also emphasized by Francesco D'Acunto and Michael Weber (Chapter 7), who present studies based on survey data to show that households' inflation expectations vary considerably in the cross-section. The authors argue that this heterogeneity is not only due to demographic features such as different cognitive abilities. As D'Acunto and Weber point out, households also experience inflation differently because they buy different goods with different price increases. Empirical studies also show that, on average, households' inflation expectations are too pessimistic in that they are generally higher than the actual inflation rates later on. These subjective deviations in inflation expectations explain why the consumption and saving decisions of households often do not correspond to the predictions of the FIRE hypothesis.

Benjamin Born, Zeno Enders, and Gernot J. Müller (Chapter 10), too, discuss survey evidence that challenges the FIRE hypothesis. Drawing on recent research on the relation between forecast errors, forecast revisions, and news, the authors point out that most of these studies dismiss the FIRE hypothesis at various aggregate levels, confirming older critical accounts that have been widely ignored by the economic mainstream. As the authors suggest, the aftermath of the Great Recession of 2007–2009 prompted “a readiness to embrace new ideas,” which might have paved the way for a “second expectations revolution,” transforming, once again, the modeling of expectations in macroeconomics. Whether this revolution will persist and lead to a complete dismissal of FIRE is still an open question.

Ulrich Fritsche and Jörg Döpke (Chapter 9) discuss the methodological progress that economists have made in measuring expectations. These advances are not just about the ever-improving possibilities for processing mass data. Economists have also given up their resistance to empirical methods from other disciplines and now use surveys or experiments to generate new data about subjective expectations. The two authors conclude that the availability of more and better data diminishes the hope of a generally applicable method of forming expectations.

The empirical research on bounded rationality impressively demonstrates the influence of neighboring fields on economics, as stated by Fritsche and Döpke. Presenting evidence from psychology and experimental economics, Sebastian Schweighofer-Kodritsch (Chapter 4) points to the importance of biased beliefs and their effects on economic behavior. The psychological turn in economics prompted new approaches to the study and conceptualization of expectation formation in the face of actors' highly subjective reactions to uncertainty. This chapter reviews different approaches to modeling decision-making that consider biased beliefs and the elicitation of beliefs through framing effects.

Economic events since the Great Recession have drawn attention to the impact of narratives on economic decision-making. David Tuckett (Chapter 5) reflects on interdisciplinary research at the intersection of history, psychology, the social sciences, and neurobiology. Narratives, the author argues, play a key role in the way economic agents integrate evidence, expectations, and emotion-based preferences in order to make decisions. According to Tuckett, narratives are socially embedded, which explains why some narratives can circulate widely, driving economic activity. The author discusses the implications of “Conviction Narrative Theory” and provides examples of how to implement empirical research strategies.

Alexander Nützenadel and Jochen Streb (Chapter 8) introduce a model of “contingent expectations” that structures the different methods of expectation formation available to actors in different circumstances. As the authors suggest, the manner in which individuals form expectations depends on the cost of acquiring and processing additional information,

the variation in possible outcomes of the decision, and the degree of uncertainty associated with a given decision. In so doing, the authors aim to do justice to the high degree of heterogeneity of both actors and decision situations, while at the same time accounting for the rationality of economic agents in managing their cognitive resources.

Finally, Ekaterina Svetlova (Chapter 11) discusses recent contributions to expectation theory based on computational methods and in particular models of artificial intelligence. There are good reasons to believe that this approach will gain in importance in the coming years, as it allows the modeling of expectations formation with AI-based agents. Svetlova relates this research to existing “traditional” economic research and discusses the theoretical implications of AI-based expectations. Fundamental concepts such as temporality (the distinction between the past and the future) may become irrelevant in such a setting. Moreover, AI-based techniques may permit the restoration of notions of rationality in expectation processes, as agents will improve their abilities to process information, learn recursively, and model causality.

Section 2: Practices and Determinants of Expectation Management and Coordination

The chapters in Section 2 present economic, sociological, historical, and legal perspectives on the social dimension of economic expectation formation. Expectation formation does not take place in a vacuum but is a social process. Other agents’ decisions affect the economic future, which explains why economic agents try to gauge the expectations of others and their probable behavior. In this process, the communication and, at times, coordination of “imagined futures” play a central role. In the twentieth century, actors developed various techniques to estimate future developments and exchange views about them. Through their potential role as “sunspots,” these shared and often mediated imagined futures can affect economic expectations and thus economic decision-making. As a result, different economic actors try to communicate their respective imagined futures and thus lend them effectiveness. This can sometimes lead to conflicts over different versions of the economic future, which points to the “politics of expectations” (Beckert 2016).

The chapters in Section 2 therefore not only ask which different practices and techniques of expectation management and coordination have been developed over time and how they have affected the formation of expectations, but also which actors have come to play a central role in these processes. All the practices discussed in this section—from economic forecasting, market research, and consulting to central bank communication—have been introduced in contexts of economic crises and economic uncertainty. They have developed in reaction to economic ideas of expectation formation and decision-making and have, themselves, acted upon processes of expectation formation and economic sense-making. As such, the contributions in this section testify vividly to the entanglements discussed above.

Tiago Mata (Chapter 18) discusses the importance of economic statistics in the formation of economic expectations. As Mata points out through his investigation of the history and use of price index numbers, economic statistics can play three different roles in the formation of expectations. They can, first, inform expectations about future inflation, while expectations about inflation can also, second, condition the credibility of price index numbers as accurate representations of current inflation. Third, index prices can play a coordinating role by binding the behavior of actors.

In their chapter on “Economic Forecasting,” Laetitia Lenel and Werner Reichmann (Chapter 16) investigate the history, practices, and use of economic forecasting in the twentieth and twenty-first centuries. As Lenel and Reichmann argue, both the methods and the function of forecasting changed fundamentally throughout the twentieth century. While economic forecasting was originally devised as an “instrument of representation,” aiming to predict a future perceived to be independent from the forecast itself, forecasting increasingly turned into a “tool of coordination” to exchange, adjust, and shape economic expectations. As the authors demonstrate by zooming in on the forecasting practices at German institutes of business cycle research, this expectation-coordinating effect does not begin after the publication of forecasts, but also characterizes the production process of forecasts.

Ingo Köhler and Jan Logemann (Chapter 17) trace the history and use of market research as a prognostic tool. In so doing, their chapter explores the development of new practices of expectation formation in corporations. While corporations formerly relied on processes of individual, mostly adaptive expectation formation by a few decision-makers, market research introduced “broader systemic and collective patterns of information analysis.” Indeed, according to Köhler and Logemann, market research has developed into a “social technique” since the post-war period, which has allowed corporations to absorb and operationalize knowledge about the behavior and expectations of consumers and in so doing prompted new company-internal processes of expectation formation and decision legitimation.

Matthias Kipping and Sebastian Schöttler (Chapter 15) discuss the role of management consulting firms in shaping the expectations of their clients. They trace how management consultants came to attain this role after the Second World War, focusing on the strategies employed, the methods promoted, and the influence exerted by management consultant firms. As the authors argue, management consultants have used “fictional expectations” (Beckert 2016) to legitimize their own business. By trying to amplify feelings of uncertainty and regularly launching new narratives of future developments, they have attempted to increase the demand for their services. This, Kipping and Schöttler argue, points to the importance of legitimacy, credibility, and fashion in the “politics of expectations.”

In his chapter on “Civil Jurisdiction and Regulation,” Louis Pahlow (Chapter 14) studies how courts and regulatory authorities take into account, but also influence, the economic expectations of market participants. Examining the decision-making behavior of German and European merger control respectively in the 1970s and 1980s, Pahlow argues that this double function sometimes results in a dynamic negotiation process, with courts and regulatory authorities taking on an important role in the management of expectations. Drawing on the historical example, Pahlow argues that the framework of adaptive expectations and processes of learning can explain the evolution of these practices.

Central banks are now one of the most powerful players in the management and coordination of expectations. In the 1990s, central banks began to use communication to influence economic expectations. Lena Dräger (Chapter 12) surveys the literature on the role and effects of central bank communication with the public, looking in particular at the effects of central bank communication on inflation expectations. Drawing on empirical literature, Dräger argues that the persistence and large cross-scale heterogeneity of agents’ expectations can be explained with theories of expectation formation under rational inattention—a finding which points to the importance of the media in gaining the public’s attention.

Dräger mentions the importance of the media as “transmitter of central bank communication to the public.” Henrik Müller (Chapter 13) focuses on this process of transmission, of which the transformation of information into news is a central component. As he argues, by linking different pieces of information as well as possible consequences in a causal relationship, media narratives can influence expectations. Müller therefore emphasizes the active role of the media in the coordination of economic expectations, a role highlighted by the coverage of inflation by German newspapers in 2021–2022 and its effects. According to Müller, the attention cycles of the media could contribute to the stickiness of expectations, which might further complicate the influence of central bank communication.

Section 3: Expectation Formation across Time and Space

Our current theories about economic actors’ formation of expectations have been significantly shaped by a generation of American economists born in the 1930s and 1940s, among whom John F. Muth (1930–2005), Marc Nerlove (1933–2024), Robert E. Lucas (1937–2023), Christopher Sims (*1942), Thomas J. Sargent (*1943), and Robert J. Shiller (*1946) have played a prominent role. In view of this origin of ideas centered around the North American economy, the question arises as to whether the currently dominant concepts of expectation formation are specifically tailored to the conditions of liberal market economies in the Western hemisphere or whether they are universal concepts that can also describe processes of expectation formation in other time periods and regions of the world. The authors in the third section of our handbook address this question. Their task of exploring processes of expectation formation in pre-industrial times and non-Western areas is complicated by a lack of direct sources on individual expectations. The authors therefore often infer the underlying unobservable expectations from the observable strategies used to reduce uncertainty and risk.

In their contribution, Angela Huang and Mark Spoerer (Chapter 20) explicitly oppose the idea that people in the pre-modern era would not have formed sophisticated expectations about their economic future due to their supposed “alterity.” Instead, Huang and Spoerer argue that pre-modern actors shared a common, thoroughly complex idea of how the economy and society work and used this agreement to establish sensible, model-consistent strategies to combat threatening uncertainty, for example, in agriculture or long-distance trade. Frank Trentmann (Chapter 22) takes a similarly long-term perspective when he analyzes the development of (European) consumer culture since the early modern period. In his opinion, the expectation that future consumption would be richer and more varied than that of today, which has since been shared by most consumers, emerged at the beginning of this period, increasing people’s willingness to work hard to earn the income necessary to realize the increased level of consumption. However, according to Trentmann, this development of consumer culture led to an unexpected twist. The new opportunities for consumption quickly turned into social standards, the achievement of which became an obligation for consumers rather than an aspiration.

Marie Huber, Nina Kleinöder, and Jonathan Krautter (Chapter 25) use the example of entrepreneurial expectations in colonial and post-colonial Africa to argue that it can be misleading to draw on experiences from other geographical areas to form expectations. Both colonial railway construction in the former German colonies and the post-colonial

establishment of the multinational African airline Air Afrique were fueled by (overly) optimistic expectations that had been formed on the basis of positive experiences with similar projects on the North American continent. Another common feature of the colonial and post-colonial infrastructure investments in Africa is that they were not only motivated by economic expectations. The political actors involved in the decisions pursued specific political goals with these projects, which were not necessarily in line with economic considerations. This observation is also made by Moses Ochonu (Chapter 26), who argues that African entrepreneurs are more exposed than European entrepreneurs, for example, to social expectations that include political, religious, or social obligations and therefore give their economic activities a different direction, for example, away from making profits and toward securing as many jobs as possible for the community.

In their contribution on saving, Jan-Otmar Hesse, Sebastian Knake, and Sibylle Lehmann-Hasemeyer (Chapter 23) emphasize the often-neglected heterogeneity of individual actors. In their opinion, macroeconomic time series obscure the fact that individual savers have different motives, different information, and, depending on the place and time, different investment options, and may therefore make very different saving decisions even when confronted with the same inflation rate, for example.

Many of the articles in this third section of the handbook suggest that economic theory sometimes underestimates the major role that uncertainty plays in people's practical decision-making situations. Timothy Guinnane and Jochen Streb (Chapter 24) explain this assessment using the example of demography. Economic models of marriage and childbearing behavior (implicitly) assume that people who plan to marry and have children have precise long-term expectations about how their income and other economic variables will develop in the coming decades. In reality, however, couples are acting under great uncertainty. If this uncertainty is particularly high in times of crisis, many take the rational option of foregoing the realization of marriage plans and childbearing aspirations for the time being and waiting until the uncertainty subsides. Laura Magazzini, Alessandro Nuvoletti, and Michelangelo Vasta (Chapter 21) use the example of Italian patent holders of the late nineteenth century to illustrate that inventors do not initially know whether their innovation will be technically feasible and economically profitable. By comparing the planned and realized patent duration, the authors show that most Italian patent holders were too optimistic about the future prospects of their innovations. Eelke de Jong (Chapter 19) examines the question of varying tolerance of uncertainty in different countries in relation to the principle of "Uncertainty Avoidance." This has a direct impact on economic behavior. Cultures with a high acceptance of uncertainty may find it easier to venture social or economic innovations and, if successful, to profit from them. They may therefore see higher rates of economic growth than societies in which the fear of failure or negative technological consequences is greater.

As the contributions of the third section demonstrate, people in all the periods and parts of the world under consideration were aware that they had to make decisions today whose future consequences could not be predicted with sufficient certainty. Faced with this problem, they developed a variety of strategies to form and stabilize expectations. These strategies ranged, for example, from reputation mechanisms, which reduced the probability of other market participants' misbehavior, to various insurance mechanisms designed to provide a balance between good and bad future outcomes. As the crucial role of experiences demonstrates, however, these processes depend heavily on the respective context.

Section 4: Expectation Formation in Times of Crisis

Heightened uncertainty is a typical consequence of an economic crisis, but can also be its origin. Economic crises are characterized by the fact that unexpected short-term upheavals or unrecognized long-term change lead to the devaluation of existing experience and make it therefore more difficult to form expectations. That is why the confidence of economic agents in their ability to make competent decisions often dwindles during times of crisis. The search for fresh orientation begins, whether through compiling extended market information, observing the behavior of others, implementing new regulations, or an increased reliance on knowledge production. The historical analysis of economic behavior in times of crisis therefore allows for a closer look at the entanglements between economic and political expectation formation and decision-making, socio-economic crisis discourses, and theory formation. Not surprisingly, and as discussed above, the Great Depression, the stagflation of the 1970s, and the Great Recession of 2007–2009 all prompted new debates on economic expectation formation.

The chapters in Section 4 focus on past economic crises to explore the changing dynamics in the formation of expectations and their different determinants and effects. Mary O'Sullivan (Chapter 27) revisits influential interpretations of the Great Depression. As O'Sullivan argues, despite the central importance that these explanations assign to expectations, most of the interpretations of the Great Depression offer little conceptualization and evidence on how expectations are formed and influence behavior. Given these limitations, the author offers suggestions for exploiting new evidence on the role of expectations in the Great Depression, stressing the need to acknowledge actors' heterogeneous, highly subjective expectations, and their specific experiences. As O'Sullivan claims, taking into account new evidence may prove central if we are to better understand the formation of expectations and their impact on the course of the Great Depression.

The three following contributions deal with historical episodes of financial instability, systemic monetary shocks, and imminent debt crises from different perspectives. Laura Rischbieter (Chapter 28) analyzes how three international financial organizations—the International Monetary Fund, the Bank for International Settlements, and the Working Party 3 of the Organisation for Economic Co-operation and Development—have attempted to anticipate and counteract potential risks of sovereign debt crises since the 1960s. Her study demonstrates the importance that practices of adaptive expectation formation and behavioral routines have played for the expectation formation of these organizations. As Rischbieter argues, both factors were characterized by slow dynamics and medium-term stability, reflecting the international organizations' preferences for intervening as little as possible and for repeating the routine of debt rescheduling.

Jan-Otmar Hesse and Sebastian Teupe (Chapter 29) examine the influence of changing monetary regimes on companies' inflation expectations. Using the historical episodes of the gold standard at the end of the nineteenth century and the last years of the Bretton Woods system in the early 1970s, they show that companies lost their confidence in the established institutional settings when central banks seemed to have lost control over monetary policy. As Hesse and Teupe argue, it is therefore vital to interpret the formation of corporate expectations within the larger context of political uncertainty and contemporary perceptions.

The contribution by Sebastian Alvarez and Catherine Schenk (Chapter 30) takes a closer look at the phase of financial instability that followed the dissolution of the Bretton Woods system. Focusing on the Volcker shock of 1979 and the international debt crisis of 1982, the authors explore how actors engaged with and were influenced by new theoretical

developments in the field of economic expectations, noting that these reactions to economic theory have received surprisingly little attention in economics so far. Like O’Sullivan, Alvarez and Schenk argue that economists should focus more on the importance of historical experiences and contemporary economic theory for economic expectation formation.

The extent to which anticipatory political guidance can be effective in counteracting crises or provoking and deepening them is demonstrated by Konstantin A. Kholodilin, Sebastian Kohl, and Florian Müller (Chapter 31). Drawing on long-run price and rent data from 16 countries, they combine methods of econometric analysis with a detailed look at the historiographical framing of speculative house price bubbles to study the effects of different kinds of housing regulation. As the authors argue, government interventions have played a greater role for expectation formation and house prices than commonly assumed.

The essay by Florian Fastenrath, Christine Trampusch, and Agnes Janssen (Chapter 32) expands the prevailing focus on macro-political contexts by looking at municipal financing strategies in the context of the Great Recession. Based on two case studies from a US and a German city respectively, the authors study different policy responses to crisis situations that arose from the use of opaque financial instruments (swaps) at the local level and the resulting losses after 2007–2009. As the authors argue, the formation of expectations in the municipal context is dependent on the political negotiation of interests between financial experts and civil society actors, with both groups trying to influence policymakers’ expectations. Chapter 32 therefore points to the central importance of the “politics of expectations” for processes of expectation formation and decision-making in times of crisis and heightened uncertainty.

The final contribution in this section looks at the coronavirus pandemic, exploring its effects on economic expectation formation. Focusing on survey data, Jonas Dovern and Fabian Krüger (Chapter 33) study how the pandemic and policy responses affected economic expectations and decisions of firms and private households in Germany and the United States. The authors argue that the COVID-19 crisis presents a good example of how expectations, which can be sticky in normal times, can adapt very quickly in times of crisis. At the same time, the heterogeneity of expectations increased during this crisis. As Dovern and Krüger note, it is still unclear why this was the case. Perhaps, the authors speculate, some agents were leaning toward more narrative and sentiment-driven patterns of expectation formation, while others were sticking to rational expectation formation (subject to information friction).

A common element of the contributions in this section is that they address the bidirectional relationship between crises and expectations. On the one hand, crises change expectations; on the other hand, changing expectations can trigger crises. In summary, a complex picture of individual and collective economic expectation formation emerges. As the chapters in this section illustrate, the formation of expectations is embedded in institutional norms and practices, narratives, and learning processes, which can be challenged and changed through and during times of crisis.

Notes

- 1 We are grateful for the excellent support of our copy-editor Emily Richards, whose editorial work played an important role in the development of this volume, enriching the handbook conceptually and intellectually. We also owe particular debts to Christian Dayé, Roman Köster, Alfred Reckendrees, and Kirsten Wandschneider for their criticism and advice. We thank Ekaterina Svetlova for providing helpful comments on the introduction.

- 2 This handbook has benefited greatly from an interdisciplinary research endeavor (“Experience and Expectation. Historical Foundations of Economic Behavior”), which was funded by the German Research Foundation (DFG) from 2016 to 2024. In this program, more than 40 researchers from different disciplines, including economics, law, history, and sociology, collaborated to explore the complex interactions between experience and economic expectation formation in historical perspective.

References

- Akerlof, George A., and Robert J. Shiller. 2009. *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton, NJ: Princeton University Press.
- Allen, Franklin, Stephen Morris, and Hyun Song Shin. 2006. “Beauty Contests and Iterated Expectations in Asset Markets.” *Review of Financial Studies* 19, no. 3: 719–752. DOI: 10.1093/rfs/hhj036.
- Angeletos, George-Marios, Zhen Huo, and Karthik Sastry. 2020. “Imperfect Macroeconomic Expectations: Evidence and Theory.” NBER Working Paper No. 27308. DOI: 10.3386/w27308.
- Angeletos, George-Marios, and Chen Lian. 2016. “Incomplete Information in Macroeconomics.” In *Handbook of Macroeconomics*, Volume 2, edited by John B. Taylor, and Harald Uhlig, 1065–1240. Amsterdam et al.: Elsevier.
- Arena, Richard, Muriel Dal-Pont Legrand, and Roger Guesnerie. 2021. “Expectations in Past and Modern Economic Theory. Foreword.” *Revue d’économie politique* 131, no. 3: 323–332. DOI: 10.3917/redp.313.0005.
- Arrow, Kenneth J. 1951. “An Extension of the Basic Theorems of Classical Welfare Economics.” In *Proceedings of the Second Berkeley Symposium on Mathematical Statistics and Probability*, edited by Jerzy Neyman, 507–532. Berkeley, CA: University of California Press.
- Bachmann, Rüdiger, Giorgio Topa, and Wilbert van der Klaauw, eds. 2023. *Handbook of Economic Expectations*. London et al: Academic Press, Elsevier.
- Beckert, Jens. 2016. *Imagined Futures: Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Beckert, Jens, and Richard Bronk. 2018. “An Introduction to ‘Uncertain Futures’.” In *Uncertain Futures: Imaginaries, Narratives, and Calculation in the Economy*, edited by Jens Beckert and Richard Bronk, 1–36. Oxford: Oxford University Press.
- Blinder, Alan S., Michael Ehrmann, Marcel Fratzscher, Jakob De Haan, and David-Jan Jansen. 2008. “Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence.” *Journal of Economic Literature* 46, no. 4: 910–945. DOI: 10.1257/jel.46.4.910.
- Bordalo, Pedro, Nicola Gennaioli, Yueran Ma, and Andrei Shleifer. 2020. “Overreaction in Macroeconomic Expectations.” *American Economic Review* 110, no. 9: 2748–2782. DOI: 10.1257/aer.20181219.
- Bordalo, Pedro, Nicola Gennaioli, and Andrei Shleifer. 2018. “Diagnostic Expectations and Credit Cycles.” *The Journal of Finance* 73, no. 1: 199–227. DOI: 10.1111/jofi.12586.
- Braun, Benjamin. 2015. “Governing the Future: The European Central Bank’s Expectation Management During the Great Moderation.” *Economy and Society* 44, no. 3: 367–391. DOI: 10.1080/03085147.2015.1049447.
- Cagan, Phillip. 1956. “The Monetary Dynamics of Hyperinflation.” In *Studies in the Quantity Theory of Money*, edited by Milton Friedman, 25–117. Chicago, IL: The University of Chicago Press.
- Chari, Varadarajan V. 1999. “Nobel Laureate Robert E. Lucas, Jr.: Architect of Modern Macroeconomics.” *Federal Reserve Bank of Minneapolis, Quarterly Review* 23, no. 2: 2–12.
- Chong, Kimberly, and David Tuckett. 2015. “Constructing Conviction through Action and Narrative: How Money Managers Manage Uncertainty and the Consequence for Financial Market Functioning.” *Socio-Economic Review* 13, no. 2: 309–330. DOI: 10.1093/ser/mwu020.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2012. “What Can Survey Forecasts Tell Us about Information Rigidities?” *Journal of Political Economy* 120, no. 1: 116–159. DOI: 10.1086/665662.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2015. “Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts.” *American Economic Review* 105, no. 8: 2644–2678. DOI: 10.1257/aer.20110306.

- Coibion, Olivier, Yuriy Gorodnichenko, Saten Kumar, and Mathieu Pedemonte. 2020. "Inflation Expectations as a Policy Tool?" *Journal of International Economics* 124: 103297. DOI: 10.1016/j.jinteco.2020.103297.
- D'Acunto, Francesco, Ulrike Malmendier, Juan Ospina, and Michael Weber. 2021. "Exposure to Grocery Prices and Inflation Expectations." *Journal of Political Economy* 129, no. 5: 1615–1639. DOI: 10.1086/713192.
- Debreu, Gérard. 1959. *Theory of Value: An Axiomatic Analysis of Economic Equilibrium*. New Haven, CT: Yale University Press.
- Ehrmann, Michael, and Panagiota Tzamourani. 2012. "Memories of High Inflation." *European Journal of Political Economy* 28, no. 2: 174–191. DOI: 10.1016/j.ejpoleco.2011.11.005.
- Evans, George W., and Seppo Honkapohja. 1999. "Learning Dynamics." In *Handbook of Macroeconomics*, edited by John B. Taylor, and Michael Woodford, 1: 449–542. Amsterdam et al.: Elsevier.
- Evans, George W., and Seppo Honkapohja. 2001a. "Economics of Expectations." In *International Encyclopedia of the Social and Behavioral Sciences*, edited by Neil J. Smelser, and Paul B. Baltes, 5060–5067. Kidlington: Elsevier Science.
- Evans, George W., and Seppo Honkapohja. 2001b. *Learning and Expectations in Macroeconomics*. Princeton, NJ: Princeton University Press.
- Fisher, Irving. 1930. *The Theory of Interest*. New York: MacMillan Company.
- Friedman, Milton. 1968. "The Role of Monetary Policy." *American Economic Review* 58, no. 1: 1–17.
- Gabaix, Xavier. 2019. "Behavioral Inattention." In *Handbook of Behavioral Economics: Foundations and Applications* 2, edited by B. Douglas Bernheim, Stefano Della Vigna, and David Laibson, 261–343. Amsterdam: North-Holland, Elsevier. DOI: 10.1016/bs.hesbe.2018.11.001.
- Gennaioli, Nicola, Andrei Shleifer, and Robert Vishny. 2015. "Neglected Risks: The Psychology of Financial Crises." *American Economic Review* 105, no. 5: 310–314. DOI: 10.1257/aer.p20151091.
- Glaeser, Edward L. 2013. "A Nation of Gamblers: Real Estate Speculation and American History." *American Economic Review* 103, no. 3: 1–42. DOI: 10.1257/aer.103.3.1.
- Glaeser, Edward L., and Charles G. Nathanson. 2017. "An Extrapolative Model of House Price Dynamics." *Journal of Financial Economics* 126, no. 1: 147–170. DOI: 10.1016/j.jfineco.2017.06.012.
- Hall, Rodney Bruce. 2008. *Central Banking as Global Governance: Constructing Financial Credibility*. Cambridge: Cambridge University Press.
- Hicks, John R. 1932. *The Theory of Wages*. London: Macmillan & Co.
- Hicks, John R. (1939) 1946. *Value and Capital. An Inquiry into Some Fundamental Principles of Economic Theory*. Reprint, Oxford: Clarendon Press.
- Holmes, Douglas R. 2013. *Economy of Words: Communicative Imperatives in Central Banks*. Chicago, IL and London: The University of Chicago Press.
- Holmes, Douglas R. 2018. "A Tractable Future: Central Banks in Conversation with Their Publics." In *Uncertain Futures: Imaginaries, Narratives, and Calculation in the Economy*, edited by Jens Beckert, and Richard Bronk, 173–193. Oxford: Oxford University Press.
- Honkapohja, Seppo. 1993. "Adaptive Learning and Bounded Rationality." *European Economic Review* 37, no. 2–3: 587–594. DOI: 10.1016/0014–2921(93)90048-F.
- Honkapohja, Seppo. 1995. "Bounded Rationality in Macroeconomics: A Review Essay." *Journal of Monetary Economics* 35, no. 3: 509–518. DOI: 10.1016/0304–3932(95)01200-8.
- Hoover, Kevin D. 1997. "Is There a Place for Rational Expectations in Keynes's General Theory?" In *A 'Second Edition' of Keynes's General Theory*, edited by Geoffrey Harcourt and Peter A. Riach, 1: 219–237. London and New York: Routledge.
- Kahneman, Daniel, and Amos Tversky. 1973. "On the Psychology of Prediction." *Psychological Review* 80, no. 4: 237–251. DOI: 10.1037/h0034747.
- Keynes, John Maynard. (1936) 2013. *The Collected Writings of John Maynard Keynes. Vol. 7, The General Theory of Employment, Interest and Money*. Reprint, Cambridge: Cambridge University Press.
- Lenel, Laetitia. 2023. "Economic Narratives and Economic Crises." *Journal of Modern European History* 21, no. 4: 426–429.
- Lenfant, Jean-Sébastien. 2021. "Great Expectations. Hicks on Expectations from Theory of Wages [1932] to Value and Capital [1939]." *Revue d'économie politique* 131, no. 3: 403–448. DOI: 10.3917/redp.313.0085.

- Lipsey, Richard G. 1960. "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1862–1957: A Further Analysis." *Economica* 27, no. 105: 1–31. DOI: 10.2307/2551424.
- Lucas, Robert E. 1972. "Expectations and the Neutrality of Money." *Journal of Economic Theory* 4, no. 2: 103–24. DOI: 10.1016/0022-0531(72)90142-1.
- Lucas, Robert E. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 1: 19–46.
- Luo, Yulei. 2008. "Consumption Dynamics under Information Processing Constraints." *Review of Economic Dynamics* 11, no. 2: 366–385. DOI: 10.1016/j.red.2007.07.003.
- Maćkowiak, Bartosz, and Mirko Wiederholt. 2009. "Optimal Sticky Prices under Rational Inattention." *American Economic Review* 99, no. 3: 769–803. DOI: 10.1257/aer.99.3.769.
- Maćkowiak, Bartosz, and Mirko Wiederholt. 2015. "Business Cycle Dynamics under Rational Inattention." *The Review of Economic Studies* 82, no. 4: 1502–1532. DOI: 10.1093/restud/rdv027.
- Malmendier, Ulrike, and Stefan Nagel. 2011. "Depression Babies: Do Macroeconomic Experiences Affect Risk Taking?" *The Quarterly Journal of Economics* 126, no. 1: 373–416. DOI: 10.1093/qje/qjq004.
- Malmendier, Ulrike, and Stefan Nagel. 2016. "Learning from Inflation Experiences." *The Quarterly Journal of Economics* 131, no. 1: 53–87. DOI: 10.1093/qje/qjv037.
- Malmendier, Ulrike, Stefan Nagel, and Zhen Yan. 2021. "The Making of Hawks and Doves." *Journal of Monetary Economics* 117:19–42. DOI: 10.1016/j.jmoneco.2020.04.002.
- Mitchell, Wesley C. 1927. *Business Cycles. The Problem and Its Setting. Studies in Business Cycles*. New York: NBER.
- Morris, Stephen, and Hyun Song Shin. 2003. "Global Games: Theory and Applications." In *Advances in Economics and Econometrics*, edited by Mathias Dewatripont, Lars Peter Hansen, and Stephen J. Turnovsky, 56–114. Cambridge: Cambridge University Press.
- Muth, John F. 1960. "Optimal Properties of Exponentially Weighted Forecasts." *Journal of the American Statistical Association* 55, no. 290: 299–306.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica* 29, no. 3: 315–335.
- Myrdal, Gunnar. 1927. *Prisbildningsproblemet och föränderligheten* [Price Formation and Change]. Uppsala: Almqvist & Wiksell.
- Nerlove, Marc. 1958. "Adaptive Expectations and Cobweb Phenomena." *The Quarterly Journal of Economics* 72, no. 2: 227–240. DOI: 10.2307/1880597.
- Phelps, Edmund S. 1968. "Money-Wage Dynamics and Labor-Market Equilibrium." *Journal of Political Economy* 76, no. 4: 678–711. DOI: 10.1086/259438.
- Phillips, Alban W. 1958. "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957." *Economica* 25, no. 100: 283–299. DOI: 10.2307/2550759.
- Samuelson, Paul A., and Robert M. Solow. 1960. "Analytical Aspects of Anti-Inflation Policy." *American Economic Review* 50, no. 2: 177–194.
- Sargent, Thomas J. 1993. *Bounded Rationality on Macroeconomics*. Oxford: Clarendon Press.
- Shackle, George L. S. 1949. *Expectations in Economics*. Cambridge: Cambridge University Press.
- Shiller, Robert J. 1995. "Conversation, Information, and Herd Behavior." *American Economic Review* 85, no. 2: 181–185.
- Shiller, Robert J. 2019. *Narrative Economics: How Stories Go Viral & Drive Major Economic Events*. Princeton, NJ: Princeton University Press.
- Sims, Christopher A. 2003. "Implications of Rational Inattention." *Journal of Monetary Economics* 50, no. 3: 665–690. DOI: 10.1016/S0304-3932(03)00029-1.
- Sims, Christopher A. 2006. "Rational Inattention: Beyond the Linear-Quadratic Case." *American Economic Review* 96, no. 2: 158–163. DOI: 10.1257/000282806777212431.
- Svetlova, Ekaterina. 2022. "AI Meets Narratives: The State and Future of Research on Expectation Formation in Economics and Sociology." *Socio-Economic Review* 20, no. 2: 841–861. DOI: 10.1093/ser/mwab033.
- Taylor, John. 2001. "How the Rational Expectations Revolution Has Changed Macroeconomic Policy Research." In *Advances in Macroeconomic Theory*, edited by Jacques Drèze, 79–96. Basingstoke: Palgrave Macmillan.

- Trautwein, Hans-Michael. 2021. "Taking Expectations Seriously: A Leitmotif in Stockholm School Economics." *Revue d'économie politique* 131, no. 3: 333–369. DOI: 10.3917/redp.313.0015.
- Tuckett, David. 2018. "Conviction Narrative Theory and Understanding Decision-Making in Economics and Finance." In *Uncertain Futures: Imaginaries, Narratives, and Calculation in the Economy*, edited by Jens Beckert, and Richard Bronk, 62–82. Oxford: Oxford University Press.
- Tuckett, David, Douglas R. Holmes, Alice Pearson, and Graeme Chaplin. 2020. "Monetary Policy and the Management of Uncertainty: A Narrative Approach." *Staff Working Paper* No. 870. London: Bank of England.
- Tversky, Amos, and Daniel Kahneman. 1973. "Availability: A Heuristic for Judging Frequency and Probability." *Cognitive Psychology* 5, no. 2: 207–232. DOI: 10.1016/0010-0285(73)90033-9.
- Tversky, Amos, and Daniel Kahneman. 1974. "Judgment under Uncertainty: Heuristics and Biases." *Science* 185, no. 4157: 1124–1131. DOI: 10.1126/science.185.4157.1124.
- Van Nieuwerburgh, Stijn, and Laura Veldkamp. 2009. "Information Immobility and the Home Bias Puzzle." *The Journal of Finance* 64, no. 3: 1187–1215. DOI: 10.1111/j.1540-6261.2009.01462.x.
- Van Nieuwerburgh, Stijn, and Laura Veldkamp. 2010. "Information Acquisition and Under-Diversification." *Review of Economic Studies* 77, no. 2: 779–805. DOI: 10.1111/j.1467-937X.2009.00583.x.
- Woodford, Michael. 2009. "Information-Constrained State-Dependent Pricing." *Journal of Monetary Economics* 56, S1: 100–124. DOI: 10.1016/j.jmoneco.2009.06.014.
- Working, Holbrook. 1949. "The Investigation of Economic Expectations." *American Economic Review* 39, no. 3: 150–166.



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PART 1

Approaches and Debates



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2

THE RISE OF THE RATIONAL EXPECTATIONS HYPOTHESIS

Pedro Garcia Duarte

Understanding how expectations about the future affect the decisions of economic agents has been a concern in economics for quite some time. One possible view is that agents use in the best way the information available in order not to commit mistakes or not to persist in them. This is the general idea of rational expectations, which seems to describe how actual individuals decide. However, Robert Lucas adapted John Muth's original formulation to macroeconomic models, transforming it in a consistency axiom: agents in a model form expectations consistent with that model. Therefore, it has nothing to do with real-world agents and everything to do with particular mathematical properties of economic models.¹

The rational expectations hypothesis often earns recognition in the historical comments that macroeconomists make while advancing the research frontier. The reason for this is that Lucas's formulation of this hypothesis inaugurated the modern approach to macroeconomic models that became mainstream in the 1980s. This new macroeconomics wanted to put an end to a period when, allegedly, the norm was government intervention geared toward smoothing economic fluctuations (typically referred to as "Keynesian policies").

The rational expectations hypothesis conquered macroeconomics with very strong implications in a time of great economic turmoil, the 1970s. When he used rational expectations in his models, Lucas showed that the systematic macroeconomic policies have no effects on real output; only surprises could have real effects. This "policy ineffectiveness result" became the hallmark of the new macroeconomic models created in the 1970s, to the point that it went beyond academic debates and reached the specialized media which promoted it. On November 8, 1976, *Business Week* published an article titled "How Expectations Defeat Economic Policy." In it, the "controversial new theory called rational expectations" that "is sweeping through the economics profession (...) says that economic policy is impotent" because "the public (...) takes actions that offset [systematic policy changes]" (cited in Duarte 2012, 204).² Even the economist and acclaimed economic journalist Leonard Silk discussed rational expectations in his column in *The New York Times* on June 1977, presenting it as a new theory of the business cycle that was urgently needed after the 1973–1975 recession, and associating it with an anti-Keynesian view that restored business cycle ideas prevailing prior to the 1930s (Silk 1977; see also Silk 1980). The economic journalist David Warsh in his column in *The Boston Globe* of October 7, 1979 noticed that economics "is

being swept by an elegant but mystifying ‘theory of rational expectations’,” and that “the rational expectations school is pretty much the hottest thing in modern technical economics” that was gaining traction in the profession “because of its rigor, not its realism.” In 1979, the free-market economist and journalist Herbert Stein explained rational expectations in his column in *The New York Times*, “Verbal Windfall”:

This is the hottest thing in economics in 1979. It seems that people cannot rationally expect the success of a policy whose success depends on people’s not understanding the policy. The lady in the box cannot be fooled by the illusionist who pretends to saw her in half.³

While the rational expectations hypothesis was strongly connected from its beginning to a very concrete, real-world concern about the real effects of economic policies, and while the arguments put forward in favor of this hypothesis and against the then prevailing Keynesian models involved arguing that people are not stupid, Lucas insisted in his academic contributions that this was a hypothesis for the consistency of macroeconomic models, and not directly related to the actual behavior of individuals in the real world (thus Warsh’s very apt description that it was spreading because of its rigor, not its realism). This tension between the rational expectations hypothesis as a claim about agents in the real world or about agents in a model, and the implications derived from such models, made rational expectations very controversial early on.

In the academic debate, the reactions to the rational expectations hypothesis ranged from empirical disputes over its validity in the real world, to empirical discussions on the plausibility of the implications of macro models that incorporated rational expectations. Outside academia, the hypothesis was brought into close contact with policymaking decisions by the Federal Reserve Bank of Minneapolis in 1977–1980, when the bank’s president, Mark Willes, became an outspoken advocate of the rational expectations hypothesis. This chapter shows the origins of the rational expectations hypothesis in the 1960s and its subsequent spread in macroeconomics, not only in academic circles but also in policymaking. The chapter also discusses some initial resistance to the rational expectations hypothesis and closes with its dominance in the macroeconomics literature from the 1980s to the early 2000s.

The Rational Expectations Hypothesis: Its Origins and Its Implications

“The late 1960’s were good times to be a young macroeconomist. (...) [M]acroeconomic models were influential, big, and econometrically advanced. They incorporated increasingly sophisticated dynamics and attracted the efforts of the best economists.” This is Thomas Sargent’s (1996) view of the period when he was studying economics (obtaining a BA from Berkeley in 1964 and a PhD from Harvard in 1968). At that time, a common approach to modeling expectations was through the concept of *adaptive expectations*. According to the latter, individuals revise their expectations when they make a mistake in their expectations from the previous period. Take, for example, price as the variable under consideration by the agent. If the price that an agent expected for today differs from the effective current price, then the agent corrects his expectations for the price level for tomorrow. For instance, if prices today are higher than expected, this indicates to the agent that he has to raise his expectations for the price level of tomorrow. It is important to notice that here expectations

are formed on the basis of what happened in the past (i.e., expected prices for tomorrow depend on the prices of today).

Although it was an application of a mathematical theory very well-known in engineering (a geometric distributed lag), the use of adaptive expectations in economics became closely associated with Milton Friedman (1957) and his student Philip Cagan (1956)—but in fact it had been articulated a few years earlier by Marc Nerlove (1954) from earlier ideas by John R. Hicks (Young and Darity Jr. 2001, 774; see also Eusepi and Preston, Chapter 3 in this volume). One point of Friedman’s multilayered attack against Keynesian macroeconomics had to do with arguing that the estimated marginal propensity to consume (how much the consumption level responds to a small change in current income) is smaller than the typical values used in Keynesian models. A critical implication of this is that the real effects of fiscal policies would be smaller than those proposed by Keynesian models. Friedman’s criticism amounted to challenging the way dynamic models were estimated, and he used the adaptive expectations theory to represent statistically the permanent income hypothesis (the main determinant of consumption according to Friedman). In his turn, Cagan (1956) used adaptive expectations to represent expectation formation by agents in the context of hyperinflation. In both cases, the expected value of a given variable today is a weighted average of past values of that variable, with exponentially declining weights over time (i.e., adaptive expectations are a geometric distributed lag that make expectations “backward looking”).

Adaptive expectations were really the

first attempt to model systematic expectations revision in light of new information. (...) However, even though people with adaptive expectations were thought to use their own forecasting errors to derive their next forecasts, no widely accepted economic theory was offered to explain the magnitude of the adjustment parameter. Moreover, relying on mechanistic backward-looking extrapolative rules, adaptive expectations was criticized for overlooking the capacity of people to learn from experience.

(Sent 2002, 303)

And because agents partially correct their expectations when they make a forecasting error, they will carry those errors into future periods, making systematic mistakes.

The motivation behind the rational expectations hypothesis was to eliminate the possibility of systematic forecasting errors.⁴ John Muth was the first to develop the hypothesis. After publishing a paper (Muth 1960) in which he investigated the conditions under which Friedman’s and Cagan’s adaptive expectations are consistent with rational expectations, it was the paper published one year later that made his name in macroeconomics (Muth 1961). In his 1961 work, Muth started by recognizing that several economists had made the point that expectations matter for understanding “fluctuations in markets or in the economy,” but that the problem was that economic theories did not “include an explanation of the way expectations are formed” (Muth 1961, 315). Muth (1961, 316) then pointed to two “major conclusions from studies of expectations data”:

- 1) Averages of expectations in an industry are more accurate than naive models and as accurate as elaborate equation systems, although there are considerable cross-sectional differences of opinion;
- 2) Reported expectations generally underestimate the extent of changes that actually take place.

With this motivation of expectations formed by real-world people, Muth (1961, 316) argued:

In order to explain these phenomena, I should like to suggest that expectations, since they are informed predictions of future events, are essentially the same as the predictions of the relevant economic theory. At the risk of confusing this purely descriptive hypothesis with a pronouncement as to what firms ought to do, we call such expectations “rational.” (...)

The hypothesis can be rephrased a little more precisely as follows: that expectations of firms (or, more generally, the subjective probability distribution of outcomes) tend to be distributed, for the same information set, about the prediction of the theory (or the “objective” probability distributions of outcomes).

The hypothesis asserts three things: (1) Information is scarce, and the economic system generally does not waste it. (2) The way expectations are formed depends specifically on the structure of the relevant system describing the economy. (3) A “public prediction,” in the sense of Grunberg and Modigliani [1954], will have no substantial effect on the operation of the economic system (unless it is based on inside information).

While the first and the third paragraphs of this passage set up rational expectations in general terms, meaning that it could be applied both to microeconomic and to macroeconomic models, it is clear from the second paragraph and from the rest of Muth’s (1961) article that he developed the hypothesis for studying a microeconomic problem at the firm level (or at the level of an individual market). In contrast to Muth’s interests, the rational expectations hypothesis gained traction in economics when it was applied to macroeconomic models by Lucas and others, some ten years after its original formulation.

In addition to defining rational expectations, Muth (1961, 317) was clear about what it is not:

It does not assert that the scratch work of entrepreneurs resembles the system of equations in any way; nor does it state that predictions of entrepreneurs are perfect or that their expectations are all the same.

Muth developed his work as a graduate student at the Graduate School of Industrial Administration at the Carnegie Institute of Technology (nowadays Carnegie Mellon University) (Sent 2002). In his PhD, he had Herbert Simon as his official advisor, but received most help and guidance from Franco Modigliani, and he obtained a degree in industrial administration in 1962 (McCallum 2016, 343–344).⁵ Muth “was affiliated with Carnegie as a research associate from 1956 until 1959, as an assistant professor from 1959 until 1962, and as an untenured associate professor from 1962” until 1965, but on leave from Carnegie in 1964 to 1965 (Sent 2002, 295; see also McCallum 2016, 342). His research and interests were shaped more directly by key projects developed at Carnegie by Modigliani, Simon, and Charles Holt (PhD Chicago 1955), and by the works of other Carnegie affiliates such as Albert Ando (PhD in mathematical economics at Carnegie in 1959) and the mathematician A. Charnes. Over five years at Carnegie, Modigliani, Simon, and Holt, and several of their graduate students (including Muth and Ando), developed the research project “Planning

and Control of Industrial Operations” (1953–1958), contracted with the Office of Naval Research (Sent 2002; Duarte 2009; Rancan 2013). They studied a paint company in order to derive scientific decision rules that could replace the “prevailing rule-of-thumb and judgement procedures,” arguing that the resulting outcome would bring lower costs and higher profits. As the group announced in the headline of a *Harvard Business Review* article: “Here is another area where the new statistical techniques can subtract guesswork, add precision, divide risk, and multiply efficiency” (quoted in Duarte 2009, 20).

The Carnegie environment and research projects led to the development of two alternative views on human rationality: Simon’s bounded rationality and Muth’s rational expectations hypothesis. On the one hand, as Esther-Mirjam Sent (2002, 302) has argued, “Muth exposed the rationality hidden” in bounded rationality, seeing the satisficing behavior as a special case of rational decision-making under uncertainty. On the other hand, while discussing the rational expectations hypothesis, Muth (1961, 321–322) did expend considerable effort in showing important deviations from rationality:

Certain imperfections and biases in the expectations may also be analyzed with the methods of this paper. (...) We shall examine the effect of over-discounting current information and of differences in the information possessed by various firms in the industry. Whether such biases in expectations are empirically important remains to be seen. I wish only to emphasize that the methods are flexible enough to handle them.

While Muth pioneered the rational expectations hypothesis using it in a microeconomics context, this view of human rationality became a hot topic in economics when it was transposed to macroeconomic problems a few years later by Lucas, Edward Prescott, Sargent, and Neil Wallace, among others. These economists launched an attack on the then dominant Keynesianism from two main academic fortresses: Carnegie Mellon and the University of Minnesota (where the Keynesian economist Walter Heller was a distinguished member). Eventually, with Lucas’s move from Carnegie to the University of Chicago in 1974, the first fortress switched track and the rational expectations hypothesis started an enduring association with Chicago.

The origins of the use of rational expectations in macroeconomics are well-known (Hoover 1988, Chapter 2; Sent 1998; Young and Darity 2001; De Vroey 2016, Chapter 9; Silva 2017; Boumans 2020). In 1963, one year prior to receiving his PhD in economics from the University of Chicago, Lucas became a faculty member of the Graduate School in Industrial Administration (GSIA) at Carnegie Mellon where Muth was then an associate professor—with both of them overlapping at Carnegie until 1965 (McCallum 2016). In that same year, Prescott entered GSIA’s PhD program and took classes with Lucas, and the latter was also a member of his dissertation committee (Silva 2017, 149). In the late 1960s, Lucas developed his research agenda on the labor market together with Leonard Rapping; they resorted to the adaptive expectations hypothesis, even if Lucas wasn’t content with this formulation (Hoover 1988, 28). At that time Lucas had worked a model with static and rational expectations that received the collaboration of Prescott and was presented in a 1971 article in which they studied the determination of investment, output, and prices at the firm level (Lucas and Prescott 1971). After presenting an earlier draft at the 1968 meeting of the Econometric Society, when the rational expectations hypothesis and the implied perfect forecast in price distribution were criticized, Prescott worked to adapt Muth’s definition of

rational expectations to their model (Silva 2017, 150). In the published paper, Lucas and Prescott (1971, 660) assumed “that the actual and anticipated prices have the *same* probability distribution, or that price expectations are *rational*.” They then added a footnote where they explained the difference in their use of rational expectations from Muth’s:

This term is taken from Muth (1961), who applied it to the case where the expected and actual price (both random variables) have a common *mean value*. Since Muth’s discussion of this concept applies equally well to our assumption of a common *distribution* for these random variables, it seems natural to adopt the term here.

(Lucas and Prescott 1971, 660, *fn.* 4)⁶

Prescott was instrumental in the mathematical characterization of rational expectations in the model that he developed with Lucas. Using rational expectations in their model allowed them to “obtain an operational investment theory linking current investment to observable current and past explanatory variables, rather than to ‘expected’ future variables which must, in practice, be replaced by various ‘proxy variables’” (Lucas and Prescott 1971, 660). Besides delivering operational results, the rational expectations hypothesis was reasonable, “more plausible than any simple, adaptive scheme” (Lucas and Prescott 1971, 664, *fn.* 9). But as Silva (2017, 151) pointed out, “[i]n adopting the rational expectations hypothesis, Lucas and Prescott (1971, 660) intentionally avoid discussing the process by which firms translate information into price forecasts, a typical debate regarding adaptive expectation schemes.” Nonetheless, a rational agent for Lucas is an information-processing robot “without anthropocentric references to intentions, purposes, authority, or even ‘meaning’,” as Brockway McMillan characterized the new mathematics coming out of “the new domains of statistical theory of communication, the theory of feedback and control, the theory of games, and linear programming” (Boumans 2020, 146). In his works using rational expectations, Lucas brought to economics mathematical tools from the emerging field of information engineering (Boumans 2020).

The culmination of Lucas’s research agenda in the 1960s at Carnegie were the papers he produced in the early 1970s (Lucas [1972a] 1981, 1972b, 1973), leading to his 1975 article (Lucas 1975). In these, he articulated an equilibrium approach with rational expectations to understand the relationship between price changes and unemployment (the Phillips curve), the neutrality of money (which means that monetary changes do not affect real variables, being translated into general price level changes only), and the business cycle. For Lucas, the economy tends to operate at its equilibrium level, at the natural rate of unemployment (a positive unemployment rate explained by frictions in the labor market). In these later works, Lucas again brought a defense of rational expectations as a plausible hypothesis:

My concern in this paper will be to show that rational expectations can lead to workable, testable business cycle models. For the argument that this hypothesis is also plausible and consistent with a variety of evidence, the reader is referred to Muth (1961).

(Lucas 1972b, 96, *fn.* 7)

So although Lucas appealed to its reasonableness and operationality, the rational expectations hypothesis was a modeling choice, not something about how actual people behave: there were different ways of modeling expectation formation, and the rational expectations

hypothesis was more reasonable and operational than the alternatives. With it, Lucas constructed equilibrium models of the business cycle and derived testable implications about business cycle phenomena. So the empirical debate would be centered on those implications, and not on the realism of the rational expectations hypothesis *per se*.

Lucas was not alone in pushing the research agenda of rational expectations in macroeconomics. At the Minnesota fortress, Sargent made important contributions, alone or jointly with Wallace (Sargent 1972, 1973; Sargent and Wallace 1973, 1975). Out of all the earlier works on rational expectations, one important result emerged: that systematic policies (fiscal or monetary policies) do not affect the equilibrium value of the real variables (output and unemployment, for instance).⁷ The only way economic policies can have real effects is by surprising agents with unexpected policy shocks. But in this case, the real effects of unsystematic policies do not last long, and the economy returns to equilibrium. By implication, the Keynesian idea that government can stabilize the cyclical fluctuations with systematic policies is wrong. The initial view was that this policy ineffectiveness result came from the rational expectations hypothesis, as the media referenced in the introduction testify. According to this view, the real variables in the model are affected only by expectational errors, and systematic policies cannot generate such errors because they are incorporated into the expected values of variables:

In this system there is no sense in which the authority has the option to conduct countercyclical policy. To exploit the Phillips Curve, it must somehow trick the public. But by virtue of the assumption that expectations are rational, there is no feedback rule that the authority can employ and expect to be able systematically to fool the public. This means that the authority cannot expect to exploit the Phillips Curve even for one period.

(Sargent and Wallace 1976, 177–178)

Another very powerful implication of the collective research agenda developed at Carnegie (and Chicago after 1974) and Minnesota was the so-called “Lucas Critique” (Lucas 1976a). This was another criticism of the prevailing Keynesianism of the 1960s. At this period, economists were developing large, estimated macroeconomic models to study different issues and also to prescribe economic policies. Lucas (1976a) argued that the use of these large-scale macroeconometric models for comparing alternative policies was unwarranted. In such exercises, economists took an estimated model and simulated it for alternative policies. On the basis of such simulations and using an objective function that characterized the preferences of the policy authority, those economists comparing alternative policies with large-scale models could derive the best of those alternative policies. Typically, the preferences of the policy authority were represented by quadratic loss functions that had as arguments the square of the deviation of inflation from a target level, and the square of the deviation of the output (or unemployment) from its equilibrium or full employment level. This tells us that the policy authority dislikes inflation rates that differ from a target level, and dislikes output (or unemployment) that differs from its equilibrium or full employment levels. Through obtaining the simulated paths of economic variables for each of the alternative policies under consideration, those economists could compute the value of the loss function and choose the policy that delivered the lowest loss.⁸

The problem of this exercise, according to Lucas (1976a), was that the estimated parameters are taken to be invariant to the policy considered, i.e., the same set of parameters

was used to simulate the model for the different policies. However, not all macroeconomic relations in those large-scale macroeconometric models were structural, i.e., invariant to policy changes. One example of such relationship is the Phillips curve. Several economists, from Friedman to Edmund Phelps and Lucas, had argued that this curve is shifted by policy changes. Therefore, if the large-scale macroeconometric model had non-policy-invariant relationships (called “reduced-form relationships”) such as the Phillips curve, those exercises of choosing the policies that minimized the loss function are invalidated. For Lucas and Sargent (1979, 2), the difficulties of the Keynesian macroeconometric models were “*fatal*: that modern macroeconomic models are of *no* value in guiding policy and that this condition will not be remedied by modifications along any line which is currently being pursued.” Nonetheless, the large-scale macroeconometric models continued to be developed despite the Lucas critique (Goutsmedt et al. 2019).

So rational expectations came to macroeconomics in models aimed at countering the prevailing Keynesian models. The “rational expectations revolution” brought with it a controversial hypothesis that was linked to controversial results: that systematic policies have no effects on real variables, and that policy analysis based on estimated models was untenable. Not surprisingly, a heated debate started early on.

The Non-Academic Support for Rational Expectations

The Minnesota fortress of the rational expectations hypothesis turned out to be very strategic in securing this hypothesis a central place in macroeconomics. While the academic works written by Sargent and Wallace, in addition to those by Lucas and others, lent support to rational expectations, the splash that it made in the policy debate was also strategic in supporting the new models put forward at Minnesota, Carnegie Mellon, and Chicago. And in this regard, a key feature was the symbiosis eventually established between the University of Minnesota and the Federal Reserve Bank of Minneapolis (the “Minneapolis Fed”) in the 1960s.

By 1965, John Kareken (PhD MIT 1956 under Paul Samuelson; professor at the University of Minnesota for his entire career) was a consultant and economic adviser to the Federal Reserve Bank of Minneapolis, when its chairman was Hugh Galusha. Kareken also served for many years as a member to the Federal Open Market Committee (FOMC) of the Board of Governors of the Federal Reserve System. According to Wallace, Kareken wanted to build “a model of the macroeconomy that would be useful to policymakers” and he was instrumental in bringing two other Minnesota economists to the Minneapolis Fed (Clement 2013). In 1970 the Bank had

launched a major research program exploring how best the Federal Open Market Committee (FOMC) should make monetary policy. In 1970 and 1971, respectively, Neil Wallace and Thomas Sargent, professors of economics at the University of Minnesota, joined the Bank’s research department as economic advisors to assist in that program.

(Nelson 1978)⁹

By 1971, the Minneapolis Fed had a new chairman, Bruce K. MacLaury.

From this moment, the Minneapolis Fed and the University of Minnesota acted in very close collaboration. Conferences and publications sponsored by the Fed not only

fostered academic research, but also tried to influence policy decisions. This was possible, thanks to several reforms in the Federal Reserve System, as Michael Bordo and Prescott (2019) have argued. The Treasury–Fed Accord of 1951 gave the Federal Reserve monetary independence because it ended the years of pegging interest rates for war financing, and it made William McChesney Martin the Fed’s ninth chairman. However, the role of the regional banks was minor; the FOMC met irregularly and decisions were taken by a committee made up mainly of members of the New York Fed. But in the mid-1950s, Chairman Martin reformed the FOMC and made monetary policy a decision for the entire committee, giving more power to regional banks other than that of New York. Additionally, from the late 1950s onward, there was an increasing professionalization of the Fed, with a growing number of economists in the leadership throughout the system. According to Bordo and Prescott (2019), these changes encouraged regional banks to innovate with monetary policy. The first successful case was the St. Louis Fed, which became known as a promulgator of monetarist ideas (of economists such as Karl Brunner, Friedman, Allan Meltzer, and Anna Schwartz).

The second successful case was the Minneapolis Fed and the dissemination of rational expectations ideas in policymaking debates. The results of Wallace’s and Sargent’s work during their time as its employees led to the Fed sponsoring a conference in 1974 on “Rational Expectations and Macroeconomic Policy” (Toma and Toma 1985, 183). At this conference, Sargent and Wallace presented an earlier version of a paper that two years later appeared in a leading academic journal, the *Journal of Monetary Economics*, popularizing the then recent macroeconomics work on rational expectations (Sargent and Wallace 1976; the working paper was released in 1974). This was just the beginning of a regular research partnership between the Minneapolis Fed and the University of Minnesota. In 1975, the Fed conducted a series of seminars on FOMC policymaking, and another working paper by Sargent and Wallace was produced. In this same year Sargent also presented his research first as a working paper and then in a leading journal, this time the *Journal of Political Economy* (Sargent 1976). And a large conference was organized in 1978 by Kareken and Wallace titled “Models of Monetary Economies.” For Kareken and Wallace, it was not an accident that the Minneapolis Fed organized this conference: it sponsored it

precisely because some of its research staff were so doubtful about macroeconomic models, or about the monetary and fiscal policy implications of those models. The hope was that the Bank might, by financing the conference, help in the development of more satisfactory models.

(Kareken and Wallace 1980, 1)

The year of 1974 also marked an important change in the Minneapolis Fed’s publications. As Toma and Toma (1985, 183) explained,

it began publishing its *Ninth District Quarterly*. Instead of statistical reports [as typical of this Fed’s prior publications], some articles in this journal addressed monetary policy issues. The *Quarterly* cited the rational expectations literature for the first time in a paper, “Monetary Policy in Uncharted Waters,” that represented remarks from a speech by Minneapolis Reserve President Bruce Maclaury in September 1975. (...) In 1977 the Minneapolis Fed appointed a new President, Mark Willes, and introduced a new periodical, *The Quarterly Review*, which contained an editorial statement

declaring “the new publication will primarily present economic research aimed at improving policymaking by the Federal Reserve System and other governmental authorities.”

Willes became famous at the time for being an outspoken defender of rational expectations in policy circles. Having obtained a PhD from Columbia University in 1967 (with a doctoral dissertation titled “The Inside Lags of Monetary Policy,” under Giulio Pontecorvo), he became an assistant professor at the University of Pennsylvania’s Wharton School and soon after a consultant for the research department at the Federal Reserve Bank in Philadelphia (becoming its director in 1970). In 1971, at the age of 30, he became its first vice-president (a post in charge of the operations of the Fed, not related to the research department). Six years later, in April 1977, he became the youngest ever chairman of a regional bank, at the Minneapolis Fed. He arrived there when the research program of Wallace and Sargent, under Kareken, was at its peak, and he became fascinated by the new theory of rational expectations. He not only supported its further development at the research department but also brought it to policy debate and to FOMC decisions at Washington, DC, in 1978–1979.¹⁰ In October 1978, the Minneapolis newspaper *Star Tribune* characterized Willes and his defense of rational expectations this way:

Mark Willes, the soft-spoken young president of the Minneapolis Federal Reserve Bank, hardly fits the image of a rebel. (...) He is an aura, in short, of conventional reserve.

But Willes, ignoring the traditional notion that regional reserve bank presidents should be seen and not heard, is making waves tall enough for him to be identified in major national business publications as one of the leading critics of federal reserve monetary policy.

(Youngblood 1978, 13C)

Willes was not only vocal in supporting the controversial theory of rational expectations, he became known also for being a recurrent dissenter from the majority of the FOMC in votes of the Board (seven times in his one year term; see also Sparsam and Pahl 2022). Besides, he wasn’t shy in using the academy/policymaking nexus to promote rational expectations theory in different networks, including academic ones. He wrote a couple of articles in the Minneapolis Fed *Quarterly Review*, discussed rational expectations in his speeches, including a lecture in November 1977 at the University of Minnesota (“Effective Economic Policy: Some Key Requirements”), and in a paper titled “The Future of Monetary Policy,” delivered in December 1979 at the Allied Social Science Association Annual Meeting (the main economics meeting in the United States).¹¹ In the 1977 lecture, he used an argument that seems to echo Lucas’s (1976b, 62) “view of economic decision making in which our fellow citizens also take an informed part”:

In a democracy like we have in the United States, it is clear that the economic policies that are followed must have the support of the majority of the citizens. No matter how “correct” a particular economic policy may be from a theoretical point of view, if it does not have the general support of the people, it will not work.

(Willes 1977, 3)

He concluded that:

Policies based on [Keynes's] theories cannot deal effectively with today's economic conditions. Somehow the monetarist view of Milton Friedman doesn't seem completely convincing either. Perhaps the rational expectationists here at the University of Minnesota have the ultimate answer. At this point only Heaven, Neil Wallace, and Tom Sargent know for sure. I must say I am very impressed with their work; they have made a substantial—and stimulating—contribution to research being done at the Minneapolis Fed. I only hope that it receives the benefit of open and genuine debate so that it is either confirmed and extended or is replaced by something better.
(*Willes 1977, 9*)

It was in this environment of strong symbiosis that yet another paper was written and widely circulated: Lucas and Sargent's (1979) "After Keynesian Macroeconomics." Sargent wrote a paper titled "Is Keynesian Economics a Dead End?" for the November 1977 meeting of the Minnesota Economics Association—an association created in 1961 comprising the Minneapolis Fed and several Minnesota universities. Lucas and Sargent reframed the argument and produced their joint paper for the 1978 conference "After the Phillips Curve: Persistence of High Inflation and High Unemployment," sponsored by the Federal Reserve Bank of Boston. The same text by Lucas and Sargent was then reprinted in 1979 by the Minneapolis Fed (Lucas and Sargent 1979). This paper animated the debate about rational expectations in academic and policymaking circles. One year later, Willes left the Minneapolis Fed to join the food giant General Mills, Inc. By then stagflation (economic recession accompanied by high inflation) had worsened worldwide and the Fed had a new chairman, Paul Volcker, who shared Willes's view that inflation was the nation's number one economic bogeyman. But it was not only in policymaking circles that the rational expectations hypothesis was debated, and there were important criticisms raised in the 1970s by academic economists.

Some Early Academic Reactions to the Rational Expectations Hypothesis

As reported by De Vroey (2016, 212, fn. 11), in 1968, after Lucas presented his research with Prescott that led to their 1971 paper, Lucas narrated in a letter to Prescott what had happened at the seminar:

The rest of the time was spent on the assumption of rational expectations: what does it mean, is it reasonable, and so on. On the whole, I think I won very few converts to our view on this: most people felt it was an unreasonable assumption—and that we somewhat "cheated" in postulating equilibrium at each point in time.

Two years later, Lucas presented an earlier version of his 1972 paper (Lucas [1972a] 1981) at a conference organized by the Consultants Committee for Price Research of the Board of Governors of the Federal Reserve System and the Social Science Research Council's Committee on Economic Stability, titled "The Econometrics of Price Determination" (the proceedings of which were published as Eckstein 1972). At that conference, Lucas's rational expectations hypothesis was challenged. The Yale economist James Tobin (1972, 13) argued that rational expectations was a very strong assumption, and that actual decision-makers

in real economies are not capable of making sophisticated calculations on which to base their decisions:

The participants [of the economy] not only must receive the correct information about the structure [of the economy] but also must use all of the data correctly in estimating prices and in making quantitative decisions. These participants must be better econometricians than any of us at the Conference.

The idea that survey data on expectations by agents in the real world could be used to test the rational expectations hypothesis was later on firmly rejected by Prescott (1977, 30; emphasis in the original):

The rational expectations paradigm may be considered in the same spirit as the maximizing assumption, once the subject of much debate in economics, but now considered to be fundamental. The rational expectations assumption augmented the maximizing assumption by hypothesizing that agents use their information sets efficiently when maximizing. Like utility, expectations are not observed, and surveys cannot be used to test the rational expectations hypothesis. One can only test if some theory, whether it incorporates rational expectations or, for the matter, irrational expectations, is or is not consistent with observations.

At that same 1970 conference, the MIT economics professor Franklin M. Fisher argued that in cases when an implemented policy remains the same for a long period, it could be reasonable to expect that agents have on average correct expectations, but this wouldn't be the case in the short run after a policy change:

A proper view of rational expectations seems to me to be that the limit of the expected value of the expected prices is the same as the limit of the expected value of actual prices given that there are no policy shifts. I see no reason, however, why the two expected values should be equal at every moment in time.

(Fisher 1972, 113)

Later on, the same criticisms as Tobin's were voiced by Robert Shiller (1978) and Benjamin Friedman (1979)—who talked about the extreme information assumptions of the rational expectations models (see De Vroey 2016, 212–213). For Friedman (1979), there were two possible ways to interpret rational expectations. In the first (the weak interpretation), agents are assumed to use efficiently the information available. In the second (the strong one), agents use the model structure to form their expectations. The problem, according to Friedman (1979), was that nothing is said about how agents learn about the structure of the economy (see Dräger, Chapter 12 and Müller, Chapter 13 in this volume).

In a different vein, Modigliani (1977), commenting on a paper by Prescott (1977), argued that while rational expectations can describe well some particular markets, such as the speculative markets, the theory is more doubtful for other markets such as the labor market. Therefore, the broad relevance of the hypothesis for macroeconomic and policy analyses is unwarranted.

Most of these reactions against rational expectations ended up being about visions of how the economic world works, how to model these visions, and how agents decide in the

real world. There were a few empirical facts brought to the table, such as “the high serial correlation in unemployment or in the deviations of output from ‘full employment’,” as Modigliani (1977, 89) wrote. On the defense side, Lucas and Sargent (1979, 1) used the stagflation of the 1970s as an argument against the Keynesian consensus to be replaced by the new theory they were proposing. According to them, in that period the government had “massive budget deficits and high rates of monetary expansion” yet these did not cause economic growth and low unemployment rates: “That these predictions were wildly incorrect and that the doctrine on which they were based is fundamentally flawed are now simple matters of fact involving no novelties in economic theory.”

Another important empirical discussion was about the shape of the Phillips curve: a vertical curve was the one consistent with the rational expectations models. Here, we see more formal econometric tests being developed, as Lucas (1973) himself initiated, showing that international data indicated that no trade-off between inflation and output existed (i.e., the Phillips curve would be vertical).

Yet another econometric discussion centered on the policy ineffectiveness result, a core implication of the rational expectations models from the early 1970s. Sargent (1976, 236) used a rational expectations model and performed empirical tests that showed support for the claim that economic-policy variables “do not cause unemployment or the interest rate.” Robert Barro (1978) also argued that the empirical evidence is that only non-anticipated changes in monetary policy have real effects. Such findings were questioned by other empirical works: John Boschen and Herschel Grossman (1982) and Frederic Mishkin (1982), among others, performed empirical tests which indicated that anticipated monetary policy changes affect real economic variables.

The empirical debate on rational expectations models continued over the years, with new econometric techniques (such as unit root tests and vector autoregression models of time series econometrics) coming to shape it. But this happened when the rational expectations hypothesis was no longer contested and had become used by anti-Keynesian and Keynesian economists alike.

Mainstreaming Rational Expectations

The fate of the rational expectations hypothesis was entangled with the controversial results attached to it that were promoted both academically and in policymaking circles: the policy ineffectiveness result and the Lucas critique. But by the second half of the 1970s, the policy ineffectiveness result had already become detached from the rational expectations hypothesis: this result depended instead on the equilibrium with price flexibility which came together with rational expectations in the works of Lucas, Sargent, Wallace and others. This scission allowed economists who understood that systematic policies have real effects to also adopt the rational expectations hypothesis. Alan Blinder (quoted in Duarte 2012, 205–206) nicely summarized this:

It took a while, and some help from Fischer (1977) and Phelps and Taylor (1977), for the profession to get clear that rational expectations (RE) is an assumption about behavior which may be right or wrong but which is logically disconnected from the hypothesis that prices move instantly to clear markets. It is more from the latter than from the former that the new classical economics (...) derives its distinctive implications [such as the policy ineffectiveness result].

Separating those two ideas helped spread the RE gospel, since formal econometric tests of the joint hypothesis of RE and market clearing almost always rejected it. Most economists had a strong suspicion that the market-clearing hypothesis was the weak link in the partnership.

As a result, both anti-Keynesian and Keynesian economists embraced the rational expectations hypothesis that became a central reference point in macroeconomics from the 1980s onward (Duarte 2012; De Vroey 2016). On the one hand, the so-called Real Business Cycle models, developed by Prescott (at Minnesota), Fin Kydland, and others, continued Lucas's, Sargent's, and Wallace's agenda of understanding short-run economic fluctuations as resulting from the optimal choices of agents with rational expectations and in equilibrium, in an environment of flexible prices and stochastic shocks. On the other hand, a younger cohort of Keynesian economists, called New Keynesians and mostly located at coastal universities in the United States that had a Keynesian influence (MIT, Harvard, UC Berkeley), also adopted the rational expectations hypothesis but in models of rigid prices in which the government can implement welfare-improving policies. This view appeared in works of such economists as Stanley Fischer, Joseph Stiglitz, Janet Yellen, George Akerlof, John Taylor, Olivier Blanchard, N. Gregory Mankiw, and Laurence Ball, among many others (several of whom held PhDs from MIT).

Both groups—RBC and New Keynesian macroeconomists—are followers of Lucas not only because they developed models with rational expectations, but also because they took the Lucas critique as a methodological requirement in formulating economic models: for them, if the modeler builds macroeconomic relationships from individual agent's choices, then the macroeconomic models will have microfoundations that allegedly make these models immune to the Lucas critique—in general terms, when comparing alternative policies, agents will take those policies into consideration and adjust their behavior accordingly, avoiding the problem of using reduced form macroeconomic relationships that Lucas (1976a) criticized (see Goutsmedt et al. 2019). And rational expectations became integral to this microfoundation requirement, which has shaped modern mainstream macroeconomics with its dynamic stochastic general equilibrium (DSGE) models of the present day. These have been developed since the 1990s through the merging of models of those two groups, and are best represented in Michael Woodford's monumental book *Interest and Prices* (2003). The DSGE approach sailed tranquil waters from the late 1990s up to the 2007–2008 financial crisis, when macroeconomics entered an era of turmoil again.¹²

Saying that rational expectations became dominant does not mean that no alternatives to it existed in macroeconomics. Certainly this was, and is, a much contested hypothesis by several macroeconomists. However, this hypothesis became central to mainstream macroeconomics, a benchmark taught to all graduate students in leading universities worldwide. In its turn, this does not imply that mainstream macroeconomists did not develop models with bounded and limited rationality over the years. Two areas received increased attention, especially after the 2008 financial crisis: experimental and behavioral macroeconomics. The first is a sub-field of experimental economics using controlled laboratory methods to study aggregate economic phenomena and to test assumptions and implications of macroeconomic models. The second is a large area that considers non-rational behaviors in macroeconomic models, including agents with limited cognitive abilities, learning processes, agent-based models that specify the network of interactions among heterogeneous agents

and the resulting aggregate outcomes, among other things. In both cases, the rational expectations hypothesis is contested either because it is not an empirically adequate description of decision-making in the real world, or because dispensing with it allows macroeconomic models to better describe important facts from the real world, a duality that has accompanied this hypothesis since its inception in macroeconomics.

Notes

- 1 I thank the National Council for Scientific and Technological Development—CNPq (306408/2022–8) and INSPer (2023/300207) for financial support.
- 2 Also in 1976 *Der Spiegel* (November 29, no. 49) discussed rational expectations and policy ineffectiveness. The *Fort Worth Star-Telegram* dedicated its editorial on November 8, 1976, titled “Why Don’t Economic Remedies Work?” to the new theory of rational expectations. On June 26, 1978, *Newsweek* announced “The New Economists,” including Thomas Sargent, Neil Wallace, and Lucas, and linked rational expectations to the policy ineffectiveness result. It quoted Sargent explaining that economic policies “would work if people were stupid” (...) “But we say that they are not, that they catch on, that investors make their own plans according to what they think the government is up to—and all you have is a game in which each party is trying to outguess the other” (Sheils and Thomas 1978, 60).
- 3 Stein’s goal in his column was explained as: “Reporting of economics in the press has greatly increased in volume and sophistication, but the economic literacy of readers, even of *The New York Times*, has not kept pace. Therefore the public may not be getting the full benefit of the economic wisdom being spread before it. As a contribution to remedying this situation, I present here definitions of some words and terms most commonly encountered in current discussions.”
- 4 Warren Young and William Darity Jr. (2001) show that the adaptive expectations approach was challenged by two alternative expectations hypotheses: Muth’s rational expectations and E.S. Mills’s “implicit expectations” (which proposed that the prediction error was not correlated with the actual realization). See their article for further details.
- 5 Bennett McCallum (2016, 343) explains that Muth “completed his PhD thesis several years before the degree was awarded. (...) Muth’s degree was delayed by a number of years because he refused, as a matter of principle, to take an examination in German, as was at the time required for PhD degrees at GSIA.” McCallum presents evidence that Muth’s thesis was finished in 1956. He then “spent the 1957–58 academic year as a visiting lecturer at the University of Chicago [when Lucas was still an undergraduate student in history] (...), and the 1961–62 academic year at the Cowles Foundation at Yale University” (Sent 2002, 295).
- 6 Marcel Boumans (2020, 157) points out that Lucas and Prescott’s interpretation of rational expectations is not different from Muth’s—contrary to what they claimed.
- 7 See David Begg (1982) and Richard Sheffrin (1983) for early surveys on rational expectations.
- 8 See Duarte (2009) for a historical account of the development of a quadratic loss function in macroeconomics.
- 9 Wallace obtained his PhD at Chicago in 1964 (being a classmate of Lucas) and had been a professor at Minnesota since 1964. Sargent had been a research associate at Carnegie Mellon in 1967 and became an associate professor at Minnesota in September 1971.
- 10 Bringing rational expectations to policy decisions was really a novelty of Wiles. His predecessor, Bruce MacLaury, later discussed his views on rational expectations in an interview: “I thought it was a very interesting set of ideas, and I tried to encourage the research department at that time to work on these ideas, but I never saw those ideas of rational expectation, as determining how I should vote or work within the deliberations of the Open Market Committee. Now, I think one of my successors, Mark Wiles, who came in as president after I left, was very intrigued with this line of reasoning within the research department at the Federal Reserve in Minneapolis and made it more of an official policy line of this bank, a symbol, if you will, of this bank within the Federal Reserve System” (Fogerty 1992).
- 11 All Wille’s speeches are available online at <https://fraser.stlouisfed.org/title/statements-speeches-mark-h-wiles-1115?browse=1970s>.
- 12 Duarte (2012) provides a detailed account of the rise of the DSGE models.

References

- Barro, Robert. 1978. "Unanticipated Money, Output, and the Price Level in the United States." *Journal of Political Economy* 86, no. 4: 549–580. DOI: 10.1086/260699.
- Begg, David K. H. 1982. *The Rational Expectations Revolution in Macroeconomics: Theories and Evidence*. Baltimore, MD: The Johns Hopkins University Press.
- Bordo, Michael, and Edward Prescott. 2019. "Federal Reserve Structure, Economic Ideas, and Monetary and Fiscal Policy." NBER Working Paper WP26098. DOI: 10.3386/w26098.
- Boschen, John, and Herschel Grossman. 1982. "Tests of Equilibrium Macroeconomics Using Contemporaneous Monetary Data." *Journal of Monetary Economics* 10, no. 3: 309–333. DOI: 10.1016/0304-3932(82)90031-9.
- Boumans, Marcel. 2020. "The Engineering Tools That Shaped the Rational Expectations Revolution." *History of Political Economy* 52 (annual suppl.): 143–167. DOI: 10.1215/00182702-8717960.
- Cagan, Phillip. 1956. "The Monetary Dynamics of Hyperinflation." In *Studies in the Quantity of Money*, edited by Milton Friedman, 25–120. Chicago, IL: University of Chicago Press.
- Clement, Douglas. 2013. "Interview with Neil Wallace." *The Region*, Federal Reserve Bank of Minneapolis. URL: <https://www.minneapolisfed.org/article/2013/interview-with-neil-wallace>.
- De Vroey, Michel. 2016. *A History of Macroeconomics from Keynes to Lucas and Beyond*. New York: Cambridge University Press. DOI: 10.1017/CBO9780511843617.
- Duarte, Pedro G. 2009. "A Feasible and Objective Concept of Optimal Monetary Policy: The Quadratic Loss Function in the Postwar Period." *History of Political Economy* 41, no. 1: 1–55. DOI: 10.1215/00182702-2008-036.
- Duarte, Pedro G. 2012. "Not Going Away? Microfoundations in the Making of a New Consensus in Macroeconomics". In *Microfoundations Reconsidered: the Relationship of Micro and Macroeconomics in Historical Perspective*, edited by Pedro G. Duarte, and Gilberto Tadeu Lima, 190–237. Cheltenham: Edward Elgar Publishing. DOI: 10.4337/9781781004104.00013.
- Eckstein, Otto, ed. 1972. *The Econometrics of Price Determination Conference*. Washington, DC: Board of Governors of the Federal Reserve System and Social Science Research Council.
- Fischer, Stanley. 1977. "Long-Term Contracts, Rational Expectations, and the Optimal Money Supply Rule." *Journal of Political Economy* 85, no. 1: 191–205. DOI: 10.1086/260551.
- Fisher, Franklin. 1972. "Discussion of Papers in Session I." In *The Econometrics of Price Determination Conference*, edited by Otto Eckstein, 113–115. Washington, DC: Board of Governors of the Federal Reserve System and Social Science Research Council.
- Fogerty, James. 1992. "Interview with Bruce K. MacLaury." Oral history interviews of the Federal Reserve Bank of Minneapolis Oral History Project, 1991–1992. Minnesota Historical Society. URL: <https://collections.mnhs.org/cms/display.php?irn=10468860>.
- Fort Worth Star-Telegram. 1976. "Why Don't Economic Remedies Work?" November 8, 1976.
- Friedman, Benjamin. 1979. "Optimal Expectations and the Extreme Information Assumptions of 'Rational Expectations' Macromodels." *Journal of Monetary Economics* 5, no. 1: 23–41. DOI: 10.1016/0304-3932(79)90022-9.
- Friedman, Milton. 1957. *A Theory of the Consumption Function*. Princeton, NJ: Princeton University Press.
- Goutsmedt, Aurélien, Erich Pinzón-Fuchs, Matthieu Renault, and Francesco Sergi. 2019. "Reacting to the Lucas Critique: The Keynesians' Replies." *History of Political Economy* 51, no. 3: 535–556. DOI: 10.1215/00182702-7551912.
- Grunberg, Emile, and Franco Modigliani. 1954. "The Predictability of Social Events." *Journal of Political Economy* 62, no. 6: 465–478. DOI: 10.1086/257604.
- Hoover, Kevin. 1988. *The New Classical Macroeconomics*. Oxford: Basil Blackwell.
- Kareken, John, and Neil Wallace, eds. 1980. *Models of Monetary Economies*. Minneapolis: Federal Reserve Bank of Minneapolis.
- Lucas, Robert E., Jr. (1972a) 1981. "Econometric Testing of the Natural Rate Hypothesis." In *Studies in Business-Cycle Theory*, edited by Robert Lucas, 90–103. Oxford: Basil Blackwell.
- Lucas, Robert E., Jr. 1972b. "Expectations and the Neutrality of Money." *Journal of Economic Theory* 4, no. 2: 103–124. DOI: 10.1016/0022-0531(72)90142-1.
- Lucas, Robert E., Jr. 1973. "Some International Evidence on Output-Inflation Tradeoffs." *American Economic Review* 63, no. 3: 326–334.

- Lucas, Robert E., Jr. 1975. "An Equilibrium Model of the Business Cycle." *Journal of Political Economy* 83, no. 6: 1113–1144. DOI: 10.1086/260386.
- Lucas, Robert E., Jr. 1976a. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 11: 19–46. DOI: 10.1016/S0167–2231(76)80003-6.
- Lucas, Robert E., Jr. 1976b. "Reply." *Carnegie-Rochester Conference Series on Public Policy* 11: 62. DOI: 10.1016/S0167–2231(76)80005-X.
- Lucas, Robert E., Jr., and Edward Prescott. 1971. "Investment under Uncertainty." *Econometrica* 39, no. 5: 659–681. DOI: 10.2307/1909571.
- Lucas, Robert E., Jr., and Thomas Sargent. 1979. "After Keynesian Macroeconomics." *The Federal Reserve Bank of Minneapolis Quarterly Review* 3, no. 2: 1–16. DOI: 10.21034/qv.321
- McCallum, Bennett. 2016. "John F. Muth and the Creation of Rational Expectations: Amendments, Corrections, and Extensions." *History of Political Economy* 48, no. 2: 341–347. DOI: 10.1215/00182702–3494156.
- Mishkin, Frederic. 1982. "Does Anticipated Monetary Policy Matter? An Econometric Investigation." *Journal of Political Economy* 90, no. 1: 22–51. DOI: 10.1086/261038.
- Modigliani, Franco. 1977. "Should Control Theory Be Used for Economic Stabilization?: A Comment." *Carnegie-Rochester Conference Series on Public Policy* 7: 85–91. DOI: 10.1016/0167–2231(77)90019-7.
- Muth, John F. 1960. "Optimal Properties of Exponentially Weighted Forecasts." *Journal of the American Statistical Association* 55, no. 290: 299–306. DOI: 10.2307/2281742.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica*, 29, no. 3: 315–335. DOI: 10.2307/1909635.
- Nelson, Clarence W. 1978. "Rational Expectations—Fresh Ideas that Challenge Some Established Views on Monetary Policy." Federal Reserve Bank of Minneapolis Annual Report. URL: <https://www.minneapolisfed.org/article/1978/rational-expectations-fresh-ideas-that-challenge-some-established-views-of-policy-making>.
- Phelps, Edmund, and John Taylor. 1977. "Stabilizing Powers of Monetary Policy under Rational Expectations." *Journal of Political Economy* 85, no. 1: 163–190. DOI: 10.1086/260550.
- Prescott, Edward. 1977. "Should Control Theory Be Used for Economic Stabilization?" *Carnegie-Rochester Conference Series on Public Policy* 7: 13–38. DOI: 10.1016/0167–2231(77)90017-3.
- Rancan, Antonella. 2013. "Modigliani's and Simon's Early Contributions to Uncertainty (1952–61)." *History of Political Economy* 45, no. 1: 1–38. DOI: 10.1215/00182702–1965177.
- Sargent, Thomas. 1972. "Rational Expectations and the Term Structure of Interest Rates." *Journal of Money, Credit and Banking* 4, no. 1: 74–97. DOI: 10.2307/1991403.
- Sargent, Thomas. 1973. "Rational Expectations, the Real Rate of Interest, and the Natural Rate of Unemployment." *Brookings Papers on Economic Activity* 1973, no. 2: 429–480. DOI: 10.2307/2534097.
- Sargent, Thomas. 1976. "A Classical Macroeconometric Model for the United States." *Journal of Political Economy* 84, no. 2: 207–238. DOI: 10.1086/260429.
- Sargent, Thomas. 1996. "Expectations and the Nonneutrality of Lucas." *Journal of Monetary Economics* 37, no. 3: 535–548. DOI: 10.1016/0304–3932(96)01256-1.
- Sargent, Thomas, and Neil Wallace. 1973. "Rational Expectations and the Dynamics of Hyperinflation." *International Economic Review* 14, no. 2: 328–350. DOI: 10.2307/2525924.
- Sargent, Thomas, and Neil Wallace. 1975. "'Rational' Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule." *Journal of Political Economy* 83, no. 2: 241–254. DOI: 10.1086/260321.
- Sargent, Thomas, and Neil Wallace. 1976. "Rational Expectations and the Theory of Economic Policy." *Journal of Monetary Economics* 2, no. 2: 169–183. DOI: 10.1016/0304–3932(76)90032-5.
- Sent, Esther-Mirjam. 1998. *The Evolving Rationality of Rational Expectations—An Assessment of Thomas Sargent's Achievements*. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9780511528514.
- Sent, Esther-Mirjam. 2002. "How (Not) to Influence People: The Contrary Tale of John F. Muth." *History of Political Economy* 34, no. 2: 291–319. DOI: 10.1215/00182702–34-2–291.
- Sheffrin, Steven M. 1983. *Rational Expectations*. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9781139174367

- Sheils, Merrill, and Rich Thomas. 1978. "The New Economists." *Newsweek* (US edition), June 26, 1978.
- Shiller, Robert. 1978. "Rational Expectations and the Dynamic Structure of Macroeconomic Models: A Critical Review." *Journal of Monetary Economics* 4, no. 1: 1–44. DOI: 10.1016/0304-3932(78)90032-6.
- Silk, Leonard. 1977. "A Prescription for the World's Economy—or a Placebo?" *The New York Times*, June 16, 1977.
- Silk, Leonard. 1980. "Finding a Quick End to Inflation." *The New York Times*, November 26, 1980.
- Silva, Danilo F. R. 2017. "Lucas's Research in the Late 1960s and the Natural Rate of Unemployment." *History of Political Economy* 49, no. 1: 137–159. DOI: 10.1215/00182702-3777194.
- Simon, Herbert. 1959. "Theories of Decision-Making in Economics." *American Economic Review* 49, no. 3: 223–283.
- Sparsam, Jan, and Hanno Pahl. 2022. "Macroeconomics and Monetary Policy as Autonomous Domains of Knowledge and Power: Rational Expectations, Monetarism and the Federal Reserve." In *Power and Influence of Economists*, edited by Jens Maesse, Stephan Pühlinger, Thierry Rossier, and Pierre Benz, 36–52. London: Routledge. DOI: 10.4324/9780367817084-4.
- Stein, Herbert. 1979. "Verbal Windfall." *The New York Times*, September 9, 1979.
- Tobin, James. 1972. "The Wage-Price Mechanism: Overview of the Conference." In *The Econometrics of Price Determination Conference*, edited by Otto Eckstein, 5–15. Washington, DC: Board of Governors of the Federal Reserve System and Social Science Research Council.
- Toma, Eugenia, and Mark Toma. 1985. "Research Activities and Budget Allocations among Federal Reserve Banks." *Public Choice* 45, no. 2: 175–191. DOI: 10.1007/BF00215063
- Warsh, David. 1979. "In Pursuit of Rational Expectations—You Can't Fool Most of the People Even Some of the Time." *The Boston Globe*, October 7, 1979.
- Willes, Mark. 1977. "Effective Economic Policy: Some Key Requirements." Lecture at the University of Minnesota, Nov. 17, 1977. URL: <https://fraser.stlouisfed.org/title/statements-speeches-mark-h-willes-1115/effective-economic-policy-key-requirements-1475>.
- Woodford, Michael. 2003. *Interest and Prices—Foundations of a Theory of Monetary Policy*. Princeton, NJ: Princeton University Press.
- Young, Warren, and William Darity Jr. 2001. "The Early History of Rational and Implicit Expectations." *History of Political Economy* 33, no. 4: 773–813. DOI: 10.1215/00182702-33-4-773.
- Youngblood, Dick. 1978. "Mark Willes Has Reservations About Fed Policy." *Star Tribune*, October 1, 1978.

3

A SHORT HISTORY IN DEFENSE OF ADAPTIVE LEARNING

Stefano Eusepi and Bruce Preston

Contemporary discussions of adaptive learning are framed by the “totally victorious” rational expectations revolution.¹ In modern macroeconomic models, rational expectations equilibrium is premised on two stipulations: optimization and mutual consistency of beliefs, the idea that subjective and objective beliefs coincide, so that expectations are consistent with the relevant economic theory. Adaptive learning is then cast as a retreat from this second stipulation, a reversion to the adaptive expectations of old and therefore subject to familiar criticism.²

But the story of adaptive learning is as much about building theories of expectations that move people’s expectations closer to rational expectations as they are about moving further away. Having antecedents in the adaptive expectations literature, the adaptive learning literature crystallized as part of the rational expectations revolution. While presenting an elegant solution to the problem of expectations modeling in intertemporal economic models, rational expectations also raised questions of its own. To be plausible, surely we must explain how people come to hold such expectations? And because rational expectations theory was rife with equilibrium indeterminacy, surely we must explain how people coordinate on one particular equilibrium. By providing a behavioral theory of expectations formation, adaptive learning models offered a possible justification of rational expectations equilibrium and also an equilibrium selection mechanism. But it also held the promise to deliver much more in the form of an economic theory of transition. How do people come to understand the consequences of new policies and significant structural changes to the economy?

To varying degrees, this literature made progress on these and other questions. Perhaps to the detriment of its own success, the answers were not decisively in favor of rational expectations equilibrium being the natural outcome of some adaptive learning process. The problem was not so much that people could not learn a rational expectations equilibrium—though this was certainly true of some models—but that learning did not always provide a clear equilibrium selection criterion. Models predicted that learning could converge to sunspot equilibria and even cycles between such equilibria. And while modern models for monetary policy analysis are less susceptible to these concerns—as policy can be chosen appropriately to ensure convergence to desirable equilibria—there was a sense that anything was possible.

Over time, perhaps because of the absence of a compelling and unifying theory of how a specific rational expectations equilibrium would arise, the urgency to understand the knowledge foundations of rational expectations diminished, and in some intellectual quarters completely vanished. And as the learning literature branched out to explore quantitative and empirical problems, the criticisms of adaptive expectations were applied anew: that beliefs were not “optimal”; there are too many degrees of freedom making the theory untestable; that rational people would never make systematic forecast errors; that such beliefs fail to predict how expectations change given changes in policy. But these criticisms, aside from being misplaced, misunderstand the intent of the adaptive learning literature. The approach is as much concerned with placing a lower bound on rationality as it is about placing an upper bound in acknowledgment of the complexity of economic decision-making.

At the heart of new theories of adaptive learning is the question of what it means to be rational. In addressing this issue, Benjamin Friedman (1979, 23) cites John Rawls in his *Theory of Justice*:

One might reply that the rationality of a person's choice does not depend upon how much he knows, but only upon how well he reasons from whatever information he has, however incomplete. Our decision is perfectly rational provided that we face up to our circumstances and do the best we can.

Adaptive agents make optimal decisions and process their information efficiently, just like econometricians would do. But their subjective beliefs need not coincide with objective beliefs, as their forecasting models are based on incomplete knowledge about a complex economic environment that is constantly changing.

The critical task of adaptive learning research then is to discipline deviations from the full rationality benchmark placing a lower bound on rationality. One approach chooses learning mechanisms that, in equilibrium, respect pre-defined bounds to rationality. The idea being that “large” discrepancies between subjective and objective expectations would induce individual agents to deviate from the proposed equilibrium. A second, possibly complementary approach uses observed expectations from surveys to identify learning mechanisms and to measure the discrepancy between subjective and objective beliefs. Growing data availability over the past 30 years has given rise to a large literature using survey data from professional forecasters, households, firms, and policymakers to test rationality of expectations and select alternative expectations mechanisms. The evidence challenges the full information rational expectations paradigm. And despite an active debate about alternative theories of information frictions, a new dominant paradigm has yet to emerge. This short history “makes the case” for models of adaptive learning both on theoretical and empirical grounds.

This essay is organized as follows. The second section develops a short history of adaptive learning, starting from contributions in the early 1950s, covering the rational expectations revolution and subsequent adaptive learning literature. The third section discusses recent methodological advances which permit modeling adaptive learning with optimal decision-making. The fourth section provides three examples which demonstrate that optimal decision-making under adaptive learning provides a compelling framework to answer a range of economic questions, particularly those relating to policy uncertainty and regime

change. The fifth section briefly discusses empirical work using survey data on expectations that adduce clear evidence in support of models of adaptive learning. The sixth section concludes.

A Short History of Adaptive Learning

This is the story of adaptive learning. As an organizing framework, we focus on inflation dynamics and the so-called Phillips curve, which as a theory of inflation determination was central to the development of many of the ideas we cover.

Adaptive Expectations: 1950s

Our journey commences with Arrow and Nerlove's (1958) reinterpretation of Hick's (1939) definition of the "elasticity of expectations":

$$\hat{E}_t \pi_{t+1} = \hat{E}_{t-1} \pi_t + g(\pi_t - \hat{E}_{t-1} \pi_t) \quad (3.1)$$

where the operator $\hat{E}_t$ denotes expectations of future inflation π_{t+1} formed in period t ; and the parameter g , the elasticity, determines the degree to which expectations are adjusted in response to the discrepancy between the actual and expected state of affairs, formally the forecast error. When $g = 1$, the current inflation rate is taken as the expectation of future inflation, sometimes called static expectations; when $g = 0$ current inflation has no effect on expected inflation. Intermediate values permit more general relationships between forecast errors and the adjustment of expectations.

This theory of belief formation is called adaptive expectations. The theory was central to concerns about the dynamic stability of economies. Kaldor (1934) used static expectations to establish the "cobweb theorem." More general applications followed, including Cagan's (1956) study of hyperinflation; Friedman's (1957) study of permanent income theory; and Nerlove's (1958) study of agricultural cycles.

For the time being, we will take the elasticity as given, consistent with this research. We later show that modern analysis of real-time adaptive learning predicts the elasticity to be the Kalman gain from a statistical inference problem. Solving recursively backward

$$\hat{E}_t \pi_{t+1} = g \sum_{j=0}^{\infty} (1-g)^j \pi_{t-j}$$

reveals expectations are a distributed lag of current and past inflation rates, with geometrically declining weights, so that lower values of g increase dependence on past inflation.

What are the implications of adaptive expectations for inflation dynamics? We take the Phillips curve, essentially Cagan's model of hyperinflation,

$$\pi_t = \kappa x_t + \beta \hat{E}_t \pi_{t+1} \quad (3.2)$$

as a primitive structural equation for analysis. Inflation depends on the current output gap and next-period expected inflation. The parameter β measures the importance of inflation expectations for current inflation, which, together with how expectations are

formed, determines the dynamic stability of inflation. Substitution for expectations in (2) gives

$$\pi_t = \frac{\beta g}{1 - \beta g} \sum_{j=1}^{\infty} (1 - g)^j \pi_{t-j} + \frac{\kappa}{1 - \beta g} x_t.$$

For a given path of the output gap, inflation inherits the distributed lag from expectations.

The learning parameter g regulates the volatility and persistence of inflation. Substituting (2) into the adaptive expectations rule (1) gives

$$\hat{E}_t \pi_{t+1} = \frac{1 - g}{1 - g\beta} \hat{E}_{t-1} \pi_t + \frac{g\kappa}{1 - g\beta} x_t.$$

For $g = 0$, expectations are constant and inflation only reflects movements in the output gap. As the elasticity of expectations rises, expectations become progressively less anchored to past expectations and increasingly more sensitive to current inflation. As a result, the volatility of expectations rises. And for $\beta \rightarrow 1$, expectations and inflation become less stable, displaying near-random-walk behavior.³

Forecast errors

$$\pi_t - \hat{E}_{t-1} \pi_t = -\frac{g(1 - \beta)}{(1 - \beta g)(1 - g)} \sum_{j=1}^{\infty} (1 - g)^j \pi_{t-j} + \frac{\kappa}{1 - \beta g} x_t$$

also depend on past inflation. That forecast errors are predictable and correlated over time ultimately led to adaptive expectations falling out of favor. Indeed, Muth (1961) argued that “information is scarce, and the economic system generally does not waste it.” Because adaptive expectations led to predictable forecast errors, available information is wasted. His hypothesis for expectations was based on the principle that predictions of future economic outcomes should be consistent with the relevant economic theory. This idea was to become known as the rational expectations hypothesis and was forcefully advanced by Thomas Sargent and Robert Lucas in the early 1970s.

Rational Expectations: 1970s

The rational expectations hypothesis states that expectations are given by the mathematical expectations implied by the economic theory. That is $\hat{E}_t \pi_{t+1} = E_t \pi_{t+1}$ where the operator E_t denotes mathematical expectations and the subscript t now implicitly includes the information available when making predictions. In this simple model the information set includes the history of the endogenous inflation rate and the exogenous output gaps up to and including the current period.

This expression defines a first-order linear rational expectations difference equation for inflation. To determine inflation today requires an expectation of next-period inflation. But next-period inflation, in turn, depends on expectations of inflation two periods hence—and so on into the indefinite future. For this reason, the economic behavior of such models attracted the label “forward-looking.” To formulate plans today requires anticipating

economic conditions into the future. Mathematically this logic is represented by the recursive forward substitution of Equation (3.2) to give

$$\pi_t = \lim_{T \rightarrow \infty} E_t \beta^{T-t} \pi_T + \kappa E_t \sum_{T=t}^{\infty} \beta^{T-t} x_T.$$

Current inflation depends on expected discounted long-run inflation plus current and all future expected output gaps.

If $0 < \beta < 1$ the model has a unique bounded solution of the form

$$\pi_t = \frac{\kappa}{1 - \beta\rho} x_t = \frac{\kappa\rho}{1 - \beta\rho} x_{t-1} + \frac{\kappa}{1 - \beta\rho} \varepsilon_t \quad (3.3)$$

assuming the output gap is a first-order process with ρ the autoregressive coefficient and ε_t an *i.i.d.* mean-zero Gaussian innovation.⁴ Inflation inherits the statistical properties of the output gap. It follows that

$$E_t \pi_{t+1} = \frac{\kappa\rho}{1 - \beta\rho} x_t.$$

Compared with adaptive expectations, the persistence of expected inflation is tied directly to the persistence of the exogenously given output gap. The parameter β only affects volatility because it regulates the rate at which firms discount future output gaps. Forecast errors

$$\pi_t - E_{t-1} \pi_t = \frac{\kappa\rho}{1 - \beta\rho} \varepsilon_t,$$

are both unforecastable and uncorrelated over time. Price setters make efficient use of available information.

While very much accepted in modern macroeconomics, at the time the rational expectations hypothesis raised several questions. One concern related to the question of how people would come to hold rational expectations. After all, the rational expectations hypothesis is not a behavioral hypothesis. Rather it simply asserts that people form expectations consistent with the relevant economic theory. How then do people get a handle on complex economic interactions that underlie market outcomes and, importantly, coordinate with others on this equilibrium? Another related concern was that many rational expectations models predicted a multiplicity of equilibria. Which equilibrium will be reflected in actual economic outcomes? Both considerations gave impetus to further research on the behavioral foundations of expectations formation; partly to resolve indeterminacies of existing theory, but partly also, and importantly, to grant plausibility to the rational expectations hypothesis itself.

Lucas (1976) raises further questions of this kind, despite being advanced and frequently cited as a terminal critique of adaptive expectations. Lucas argued that economic models using adaptive expectations were useless for policy analysis. Because actual real-world expectations would surely adjust to incorporate knowledge of the consequences of announced policy changes, macroeconomic models based on historical patterns in data would be misleading. According to this view, a policy change that alters the persistence of

the output gap should immediately imply an identical change in the persistence of aggregate inflation. But considerable ground must be covered in moving from the notion of incorporating knowledge of a new policy when forming expectations, to understanding fully the resulting general equilibrium implications in a complex market economy. Later, Lucas (1986, 402) concedes as much, writing

I think of economics as studying decision rules that are steady states of some adaptive process, decision rules that are found to work over a range of situations and hence are no longer revised appreciably as more experience accumulates.

The introduction to Sargent's Arne Ryde Lectures (Sargent 1993) emphasizes this point, arguing that macroeconomics has "given us theories of dynamics that have their best chance of applying when people are in recurrent situations that they have experienced often before." Economists armed with such theory can provide advice about "how to expect a system to operate after it has fully adjusted to a new and coherent set of rules and expectations, but with virtually no theory of the transition itself," going on to say "we might have prejudices and anecdotes (...) but no empirically confirmed formal theories" of transitions. We are left then to make judgments about when situations and policies are to be considered familiar and when they are not.

Against this intellectual backdrop, and the concerns about the plausibility and uniqueness of rational expectations equilibrium, the adaptive learning literature was born. Critical of rational expectations, Friedman (1979, 29) articulates the intellectual challenge:

If a model depends crucially on people's ability to make predictions which possess the error orthogonality property [of rational expectations] (...), it must explain how they come to have the necessary knowledge for this task.

In Benjamin Friedman's view, much of the confusion about rational expectations—and therefore, in our view, alternative conceptions of expectations formation—stems from "failure to distinguish" the efficient use of information from the "specific assumption[s] identifying the available information set."⁵ The latter endows people with the knowledge to infer general equilibrium consequences of market economies. While most economists would not dispute efficiency, there are various reasons to doubt the knowledge assumptions required for rational expectations. Like Sargent, Friedman was concerned that the underlying behavior of the economy is subject to change because of "new institutional or regulatory or macroeconomic policy" arrangements; that data was subject to measurement problems; and that agents had "finite and imperfect" memory. People grapple with these complexities by using models that are good approximations of the true model over some range of economic outcomes. Indeed, having scrutinized the required knowledge assumptions for rational expectations, Roman Frydman concludes "the formulation of individual forecasting behaviour in the rational expectations literature appears to be *ad hoc*" (Frydman 1982, 653).⁶

Of course, rational expectations researchers sought their own approach to questions of economic transition. Regime-switching models assume change across regimes is represented by some Markov process. This permitted study of structural change and the consequences

of different policies. But as argued by Frydman and Phelps (2013), the progress embodied in this research is more apparent than real,

because they fully specify both the process governing change and the post-change representation of outcomes in advance, these models share a key property with their time-invariant counterparts: they describe change with an overarching probability distribution in which the set of outcomes and their associated probabilities are fully predetermined in all time periods—past, present and future.

(Frydman and Phelps 2013, 5)

People therefore have complete knowledge of the stochastic processes describing equilibrium outcomes within each regime and the likelihood of each regime occurring. The criticism that regime-switching models were intended to address magnifies the problem to a grander scale.

Adaptive Learning: 1980s

Two strands of research emerged out of this work effort exploring departures from full information rational expectations. The first was on models of rational learning. Decision-makers have the correct model of the economy and make model-consistent forecasts—that is, they know the pricing functions determined by equilibrium—but face information frictions about certain parameters or the state of the economy.⁷ The second was on models of adaptive learning. Decision-makers act like econometricians when constructing forecasts relevant to their decision problems. In contrast to rational learning, the mapping between observed state variables and general equilibrium outcomes is unknown—that is, decision-makers don't know the pricing functions characterizing equilibrium outcomes. As new data becomes available, they revise their forecasting model using standard statistical tools, such as ordinary least squares. The dependence on realized data gave rise to the label “real-time learning.” The remainder of this chapter is devoted to this second strand of research.

Bray (1982), Bray and Savin (1986), Fourgeaud, Gourieroux, and Pradel (1986) and others explored the following environment. Observing that rational expectations equilibrium in Cagan's model predicts inflation is a linear function of the exogenous output gap disturbances, assume that decision-makers forecast future inflation using a regression of past inflation on past output gaps. For an outside observer attempting to uncover the dynamics of rational expectations equilibrium, this model is well specified. However, for a decision-maker inside the economic model, the model is misspecified. This is because outside of the rational expectations equilibrium, inflation depends on the estimates of the decision-maker's forecasting model, making inflation a time-varying parameter model. Their collective actions change the data-generating process, making the constant coefficient model misspecified. Marcet and Sargent (1989b) were later to call the property of continual interplay between beliefs and the data-generating process “self-referentiality.”

Formally, decision-makers adopt the econometric model

$$\pi_t = a_t + b_t x_{t-1} + u_t \tag{3.4}$$

where u_t is a regression error term. This is the decision-maker's subjective beliefs about the economic environment. The beliefs nest the rational expectations equilibrium (3). Given estimates of the parameters $\{a_p, b_t\}$, a forecast of future inflation can be constructed as

$$\hat{E}_t \pi_{t+1} = a_t + b_t x_t$$

which assumes people understand the stochastic process for the output gap. When constructing forecasts of future outcomes, decision-makers assume that the parameters of the forecasting model are constants, not to be revised; even though the statistical model that is used to capture historical patterns in data treats them as uncertain and systematically revised as new data become available. Sargent (1993, 1999) and Kreps (1998) call this approach to formulating decisions "anticipated utility." Evaluating expectations in the Phillips curve gives

$$\pi_t = \beta a_t + (\kappa + \beta b_t) x_t \quad (3.5)$$

which is the true data-generating process for inflation. We will call this equation the *objective beliefs equation*, because they would be the correct beliefs for an outside observer of the model who understands the structural determinants of aggregate supply and expectations. The misspecification of the subjective forecasting model is immediate. Decisions based on the belief that the parameters $\{a_p, b_t\}$ are constants induce time-varying parameters $\{\beta a_t, (\kappa + \beta b_t)\rho\}$ through the learning process. This mapping from subjective to objective beliefs is called the T-map and is a central object in the modern analysis of adaptive learning models.

Following this early literature, agents estimate model parameters using ordinary least squares and the available history of data. In the applications in Bray (1982) and Bray and Savin (1986), decision-makers understood the constant intercept in the above regression to be equal to zero. The regression then took the form

$$b_t = \left(\sum_{j=1}^{t-1} x_{j-1} x_{j-1} \right)^{-1} \sum_{j=1}^{t-1} x_{j-1} \pi_j \quad (3.6)$$

which can be written recursively as

$$b_t = b_{t-1} + t^{-1} R_t^{-1} x_{t-2} (\pi_{t-1} - b_{t-1} x_{t-2}) \quad (3.7)$$

$$R_t = R_{t-1} + t^{-1} (x_{t-2} x_{t-2} - R_{t-1}). \quad (3.8)$$

Ordinary least squares gives rise to an elasticity of expectations that is time-varying, and declining over time.⁸ Together, the equations (3.5), (3.7), and (3.8) completely characterize model dynamics. The central question was: under what conditions does the parameter estimate b_t converge to the rational expectations equilibrium $\bar{b}$? That is, under what conditions are the subjective beliefs (4) a consistent estimator, delivering convergence to rational expectations equilibrium?

The contribution of Bray (1982) and Bray and Savin (1986) was to show that for maintained parameter values, there was convergence with probability one. This class of result

was important, not only because it gave some justification of rational expectations as the natural outcome of a learning process. It also provided confidence that small expectational errors, relative to rational expectations equilibrium, need not be destabilizing. Because dynamics under least-squares learning are stable, errors would be eliminated over time.

The 1980s closed with a series of papers from Thomas Sargent and Albert Marcet that unified and considerably extended the class of stability results for models of adaptive learning. Marcet and Sargent (1989b) demonstrated that a broad class of econometric learning procedures were examples of stochastic approximation algorithms. And as such, the convergence theorems of Ljung (1977) apply. Under regularity conditions, the stability of the adaptive learning models is given by an associated ordinary differential equation

$$\frac{\partial \phi}{\partial \tau} = T(\phi) - \phi$$

where ϕ represents subjective beliefs and $T(\phi)$ the objective beliefs implied by the true data-generating process.⁹ Rational expectations equilibria are stationary points of this difference equation and are the only possible limit points of convergence. Local stability then requires the eigenvalues of the Jacobian $T'(\phi) - I$ to have negative real parts when evaluated at the rational expectations equilibrium of interest.

Adaptive Learning: 1990s

The 1990s witnessed further applications of stochastic approximation algorithms to refine and extend results on expectations stability. By considering a richer class of economic models and implied stochastic processes, researchers uncovered a broader set of convergence and non-convergence results. In linear and non-linear models with a multiplicity of equilibrium and sunspots, adaptive learning was found to permit convergence to a range of equilibria, even cycles, leaving doubt that behavioral theories of expectations formation could justify the coordination of beliefs on one particular equilibrium. Research also showed that learning might never predict convergence to rational expectations equilibrium but nonetheless imply beliefs remain close to rational expectations values, with the average trajectory of beliefs being given by the associated ordinary differential equation. Results also characterized departures of beliefs from these mean dynamics, so-called large deviations theory.

Evans and Honkapohja (1994a) offer a nice illustration of this work effort. They provide a comprehensive treatment of multiplicity of equilibria and sunspots in linear rational expectations models. In the context of our inflation model, when $\beta > 1$, there are a continuum of equilibria of the form

$$\pi = \beta^{-1}\pi_{t-1} + \gamma x_t + v_t - \beta^{-1}\kappa x_{t-1}, \quad (3.9)$$

where γ is an arbitrary constant and v_t an arbitrary statistical process. With additional forward-looking expectations, such as $E_t \pi_{t+2}$ in the Phillips curve, the class of solutions in (9) generalize to include the lags in v_{t-1} and x_{t-2} . Should people employ statistical models which condition on these lagged variables, beliefs can converge to sunspot equilibria. There is no reason to have confidence that beliefs should coordinate on even minimum state variable equilibria. Woodford (1990) and Evans and Honkapohja (1994b, 1995) explore related ideas, showing that in non-linear models adaptive learning can converge to sunspot equilibria and cycles.

Together with Paul Romer, these authors also highlight that learning need not provide an effective equilibrium selection criterion in a non-linear growth model. Evans, Honkapohja, and Romer (1998) built a model that, because of monopolistic competition and complementarities in different types of capital goods, leads to multiple perfect foresight equilibria with high and low growth. They show that a rational expectations equilibrium with growth cycles exists, and that this equilibrium is locally stable under learning. This chapter was the apotheosis of a sequence of related papers. For example, Evans and Honkapohja (1993) consider a model with multiple steady states because of local increasing returns in production. In an innovative analysis of policy management of expectations, they show that government spending and seigniorage policy could eliminate certain equilibria.

In other work, Bullard (1992) argued that perhaps we should not expect convergence to a rational expectations equilibrium. If people are alert to the fact that the true model has time-varying parameters they can employ appropriate statistical methods. For example, Bullard considers the use of both random walk coefficient and return to normality models to estimate the parameter b_t in the inflation model. Intuitively in the random coefficients model, people suspect economic conditions might change, warranting a different parameter. There is no convergence to rational expectations.

In the context of our regression model, modify equations (3.7) and (3.8) to have a constant gain, with $g > 0$ replacing t^{-1} . In contrast to recursive least squares, which weights all observations equally, this estimator discounts past observations at the rate g . While constant-gain algorithms do not converge, the estimated parameters are related to the underlying rational expectation equilibrium. Evans and Honkapohja (2001) show that, for small gain parameters, estimates are normally distributed with mean equal to the rational expectations equilibrium and variance proportional to the gain. This and the ability to track structural change made constant-gain algorithms a popular choice in later empirical and quantitative analysis.

There also emerged an interest in the role of policy in delivering convergence to rational expectations equilibrium. Bookending the decade, two pieces of research stand out. At the beginning, Howitt (1992) formally addressed Milton Friedman's critique of interest-rate control to implement monetary policy. Friedman (1968) argued that even small implementation errors of an interest-rate peg by a central bank, would inevitably lead to accelerating inflation or deflation. For example, given inflation expectations, if nominal interest rates were set too low real interest rates would fall relative to the natural rate, leading to an expansion in economic activity and higher inflation. As people marked up their inflation expectations, further real interest-rate declines would lead to even higher demand and accelerating inflation. This dynamic was called a Wicksellian cumulative process.

Interpreting the dynamics of beliefs as a general class of adaptive learning algorithms, Howitt (1992) confirmed Friedman's reasoning that an interest-rate peg would lead to instability: such monetary policy rules are inconsistent with convergence to rational expectations equilibrium. The result is the analogue to the Sargent and Wallace (1975) finding that interest-rate pegs lead to indeterminacy of rational expectations equilibrium. While itself interesting, Howitt went further, demonstrating interest-rate rules that respond to inflation were consistent with convergence to rational expectations equilibrium. In contrast to the interest-rate peg, having nominal interest rates respond to endogenous developments in the right way would ensure real interest rates rose in response to inflation pressure. This generalized insights from McCallum (1983) under rational expectations and represents the first statement of the so-called Taylor principle that nominal interest rates should move

more than proportionately to inflation. Howitt's work anticipated much analysis that was to be developed almost a decade later as part of the new Keynesian agenda and stands as a vital and enduring, though under-appreciated, contribution to monetary economics.

At the end of the decade, Thomas Sargent shifted the focus from household and firm learning about market conditions, to a policymaker learning about structural economic relationships. Sargent (1999) considered a government that recursively estimated a Phillips curve model. He showed that the model's mean dynamics drove the government to implement the suboptimal time-consistent inflation rate, a self-confirming equilibrium of the model; but that "escape dynamics" recurrently pushed the system away from this equilibrium toward the optimal time-inconsistent inflation rate. These escapes were given clear economic content, with the government temporarily learning a version of the natural rate hypothesis—with no exploitable trade-off in the Phillips curve, the optimal inflation rate was zero. Sargent initially developed these ideas informally, but they were later given formal characterization by Cho, Williams, and Sargent (2002) who showed that, like the mean dynamics, the escape dynamics satisfied a certain ordinary differential equation.¹⁰

Adaptive Learning: 2000s and beyond

Learning researchers increasingly turned their attention to questions relating to macroeconomic policy. In part, this reflected the new Keynesian synthesis which afforded a coherent model for the analysis of inflation policy. According to this theory, good policy was predicated on the precise management of expectations—leading naturally to assessments of how sensitive policy advice was to the rational expectations assumption which permits tight control of expectations, and in other part, the increasing interest among policymakers themselves in analyses that concerned behavioral theories of expectations formation and their practical consequences.¹¹

The new Keynesian model drops the assumption that output is exogenously determined and appends to our Phillips curve two additional equations

$$x_t = E_t x_{t+1} - \sigma (R_t - E_t \pi_{t+1} - r_t) \quad (3.10)$$

$$R_t = \phi_\pi \pi_t + \phi_x x_t \quad (3.11)$$

where R_t is the nominal interest rate, the instrument of monetary policy; r_t the natural real rate of interest an exogenous process; $\sigma > 0$ the household's elasticity of intertemporal substitution; and $\phi_\pi, \phi_x > 0$ policy parameters. The model determines the equilibrium paths of output, inflation and nominal interest rates.

The first equation describes how interest rates determine demand, providing a theory of the transmission mechanism of monetary policy. It can be derived as the aggregate implication of household intertemporal allocation of consumption and leisure under rational expectations. The second is a monetary policy rule of the kind proposed by Taylor (1993). If the policy parameters satisfy

$$\kappa(\phi_\pi - 1) + (1 - \beta)\phi_x > 0,$$

then real interest rates will rise in response to an increase in inflation.¹² On the theoretical front, seminal work by Bullard and Mitra (2002, 2007) extended and confirmed the

insights of Howitt to the new Keynesian environment. On the empirical front, Orphanides and Williams (2004), Milani (2007), and Slobodyan and Wouters (2012) jump-started the effort to bring new Keynesian models with adaptive learning to the data, with implications for policy analysis. For example, Orphanides and Williams (2004) underscored the quantitative importance of effective management of expectations outside rational expectations. Taylor rules chosen to maximize welfare were more aggressive in response to inflation under constant-gain learning than under rational expectations. Limiting drift in expectations under learning was particularly desirable, because shifting inflation expectations worsen the short-run trade-off between inflation and real economic activity. A now massive literature evolved evaluating theoretical and empirical implications of this model—see Eusepi and Preston (2018b) and Evans (2021).¹³

A second important development during this period concerned the evaluation of different theories of belief formation. This included reduced-form and structural empirical models of survey measures of expectations and also laboratory experiments. We later discuss survey expectations at length because they speak directly to a class of models we discuss next. Building on the seminal paper by Brock and Hommes (1997), Cars Hommes emerged as a central figure of a prodigious work program using laboratory experiments to understand how people form expectations and whether rational expectations equilibria can be learned. In comprehensive reviews of the literature, Hommes (2013) and more recently Bao, Hommes, and Pei (2021) discuss how the economic environment, and in particular the nature of feedback from aggregate expectations to the economy, determines equilibrium stability. This research also documents pervasive heterogeneity in peoples' expectations. Observed forecasts are best described by a process where decision-makers switch among different forecasting rules in response to their relative performance, as modeled in Brock and Hommes (1997). Hommes (2021) and Branch and McGough (2018) address the implications of heterogeneous adaptive expectations in macroeconomics and finance, including the new Keynesian framework.

Optimal Decisions with Arbitrary Beliefs

But this agenda was not without its critics. In modern macroeconomic models, rational expectations equilibrium is premised on two stipulations: (i) individual optimization; and (ii) mutual consistency of beliefs—that is, subjective and objective beliefs coincide. Sargent's (1993) masterful lectures argued for the learning literature to be understood as relaxing the second requirement. Much of the early monetary policy and learning research unwittingly abandoned both.

Preston (2005) showed that studying recursive representations of economic dynamics implied by rational expectations analysis—aggregate Euler equations—was inconsistent with individual optimal decision-making under arbitrary beliefs. To understand this point we need an economic model of decision-making. Assume that there is a continuum of monopolistically competitive firms that produce differentiated goods using labor as the only input to production. When setting their price to maximize profits, there is a probability α^{T-t} that the firm will not get to change its price in the subsequent $T - t$ periods. The optimal reset price of a firm in period t is

$$p_t(j) = \hat{E}_t^j \sum_{T=t}^{\infty} (\alpha\beta)^{T-t} [(1 - \alpha\beta)\hat{w}_T + \alpha\beta\pi_{T+1}], \quad (3.12)$$

where $\hat{w}_t$ is the real wage, equivalent to marginal costs, and $\hat{E}_t^j$ the expectations of firm j .¹⁴ Because firms care about the average markup during the period for which the price is anticipated to be fixed, the optimal price depends on anticipated marginal costs into the indefinite future. The firm is also concerned about average inflation because of strategic complementarity: prices that are too far from the aggregate level of prices are undesirable, leading to a loss of market share.

If firms hold the same expectations, $\hat{E}_t^j = \hat{E}_t$ for all j , then those firms re-setting prices in period t face the same optimization problem and therefore choose the same price $p_t^* = p_t^*(j)$.

Accounting for the temporal effects of staggered price setting, the optimal price and inflation are related by $(1 - \alpha)\hat{p}_t^* = \alpha\pi_t$. Combining with the optimal decision rule determines aggregate inflation as

$$\pi_t = \hat{E}_t \sum_{T=t}^{\infty} (\alpha\beta)^{T-t} [\kappa x_T + (1 - \alpha)\beta\pi_{T+1}]$$

where $\kappa = (1 - \alpha\beta)(1 - \alpha)/\alpha$ and the output gap satisfies $x_t = \hat{w}_t$.

The above-discussed literature proceeded implicitly making rational expectations assumptions. To be explicit, these calculations are:

$$\begin{aligned} \pi_t &= E_t \sum_{T=t}^{\infty} (\alpha\beta)^{T-t} [\kappa x_T + (1 - \alpha)\beta\pi_{T+1}] \\ &= \kappa x_t + (1 - \alpha)\beta E_t \pi_{t+1} + E_t E_{t+1} \sum_{T=t+1}^{\infty} (\alpha\beta)^{T-t} [\kappa x_T + (1 - \alpha)\beta\pi_{T+1}] \\ &= \kappa x_t + (1 - \alpha)\beta E_t \pi_{t+1} + E_t \sum_{T=t+1}^{\infty} (\alpha\beta)^{T-t} [\kappa x_T + (1 - \alpha)\beta\pi_{T+1}] \\ &= \kappa x_t + \beta E_t \pi_{t+1} \end{aligned} \tag{3.13}$$

where the third equality invokes the law of iterated expectations in the aggregate probability distribution and the fourth equality makes use of the first line shifted one-period ahead.

The difficulty is that under arbitrary beliefs individual firms do not know the aggregate probability laws. If they did, it is difficult to understand how we are not back at a rational expectations equilibrium, which explains the choice of notation. Firms understand their own objectives and constraints. They have their own forecasting model. While it is true that in the model all firms are the same, firms do not know this to be true. Indeed, analysis of a symmetric equilibrium is a matter of convenience for us as analysts of the model. But there is no presumption that firms within the model have such a sophisticated understanding.¹⁵ In practice firms will be different, having different marginal cost structures and different views of the future. The assumption of symmetry nonetheless captures a critical feature of these more general environments: how aggregate inflation is determined by market equilibrium. The approach of this earlier tradition then is to mechanically replace the mathematical expectations operator—in the equation defined by the final equality—with an alternative belief assumption.

An analogous discussion applies to models of aggregate demand that are based on intertemporal theories of household consumption. Standard models predict optimal consumption decision rules of the form

$$c_t(i) = (1 - \beta)\beta^{-1}b_{t-1}(i) + \hat{E}_t^i \sum_{T=t}^{\infty} \beta^{T-t} \left[(1 - \beta)\hat{w}_T - \sigma\beta(R_T - \pi_{T+1}) \right] \quad (3.14)$$

where $c_t(i)$ is household i 's consumption and $b_{t-1}(i)$ holdings of available financial assets, here assumed to be debt in zero net supply. This expression is an example of permanent income theory. The optimal consumption depends on current asset holdings plus the present discounted value of future wages. Aggregating across the continuum of households, and imposing market-clearing conditions, gives the aggregate demand equation

$$x_t = \hat{E}_t \sum_{T=t}^{\infty} \beta^{T-t} \left[(1 - \beta)x_{T+1} - \sigma(R_T - \pi_{T+1} - r_t^n) \right]. \quad (3.15)$$

Only under rational expectations is this expression reducible to equation (3.10).¹⁶

The two approaches share the same *learning rule* and thus the same methodology to evaluate the convergence properties of learning dynamics. Where they differ is in the assumed *decision rules* used by households and firms to make spending and pricing decisions. Under rational expectations the two decision rules yield the same optimal decisions. However, in general the economics of each framework are fundamentally different.

The following considerations justify the use of the “infinite horizon” framework. First, by construction the approach is consistent with the underlying model microfoundations. This is not the case for decision rules adopted under the Euler equation approach. The optimal decision rule framework therefore retains interpretability being consistent with solving infinite horizon intertemporal decision problems which depend on long-term beliefs about policy and macroeconomic fundamentals ignored by the Euler equation approach. For example, the Euler equation approach is inconsistent with the standard characterization of the transmission mechanism of monetary policy embedded in new Keynesian models. The micro-foundations stipulate that not only the current interest rate, but also the entire future sequence of expected one-period rates affect spending plans today. Furthermore, in the case that assets, such as public debt, are in positive supply, the Euler equation approach fails to account for the wealth effects on consumption demand through the intertemporal budget constraint. Differences such as these engender different conclusions on various dimensions of policy design.

Second, the anticipated utility approach has the useful property that if the econometric model used by agents to produce forecasts is correctly specified—that is, contains those variables appearing in the minimum-state-variable solution under rational expectations—then the resulting individual behavior is *asymptotically* optimal. That is, behavior under the learning algorithm differs from what would be optimal behavior under the true probability laws by an amount that is eventually arbitrarily small. Since the optimal decision rule is a continuous function of the coefficients of the agents' forecasting rule, beliefs that are arbitrarily close to the correct ones imply behavior that is arbitrarily close to being optimal. This is not a property of the Euler equation approach.¹⁷

None of this is to say that the Euler equation approach does not represent the optimal decision rules for some other decision problem or even, for that matter, is a better description of reality—rather, only that it has little to do with the microfoundations of modern macroeconomic models it is asserted to represent.¹⁸ Importantly, this matters: the two approaches can give starkly different policy advice and quantitative predictions. Eusepi and Preston (2018b) provides a comprehensive review of the lessons for policy design.

Anticipated Utility and Internal Rationality

The anticipated utility solution implies agents do not take into account revisions of future estimates when formulating intertemporal optimal plans. This form of “irrationality” is a common assumption and has made for tractability in many applications. Cogley and Sargent (2008) discuss the implications of anticipated utility in a simple example where the fully Bayesian optimal decision can be computed, concluding the anticipated utility solution well approximates fully optimal decisions. A closely related solution concept was proposed by Adam and Marcet (2011) which defines fully optimal decisions as “internally rational.” In their approach, the subjective probability distribution for variables outside the control of decision-makers may differ from the true data-generating process but still implies a dynamically consistent set of beliefs and therefore fully optimal decisions. To clarify, simplify inflation beliefs in equation (3.2) to

$$\pi_t = a + u_t \quad (3.16)$$

so that inflation depends only on an unknown constant mean a and u_t denotes an *i.i.d.* innovation with known variance σ_u^2 .¹⁹ Firms recursively estimate the inflation mean using Bayesian learning. The unknown mean is treated as a random variable. In the initial period, prior uncertainty about “ a ” is

$$a \sim N(a_0, v_0^{-1} \sigma_u^2), \quad (3.17)$$

a Normal distribution with mean a_0 and variance proportional to the volatility of innovations, with $v_0 > 0$ scaling the dispersion of initial beliefs. After observing inflation π_t , the posterior distribution is

$$\begin{aligned} a_{t+1} &= a_t + \frac{1}{v_t + 1} (\pi_t - a_t) \\ v_{t+1} &= v_t + 1, \end{aligned}$$

which describes the law of motion of beliefs, where $g_t \equiv \frac{1}{v_t + 1}$ is a decreasing gain. The

estimator corresponds to recursive ordinary least squares described above. This then provides a microfoundation for the adaptive learning approach, at least in this simple case. Decision-makers correctly forecast the future evolution of their own beliefs at every horizon, as $E_t a_T = a_t$ for $T > t$. Evaluating expectations in the pricing rule (12) delivers the optimal decision, conditional on their dynamically consistent beliefs.

What if firms believe the mean of inflation is shifting over time? One parsimonious way to capture this variation is to assume the mean of inflation, now denoted $\bar{a}_t$, is approximated by a random-walk

$$\bar{a}_{t+1} = \bar{a}_t + \epsilon_t^a \quad (3.18)$$

where the innovation has variance σ_a^2 . The evolution of the optimal mean estimate of $\bar{a}_t$ can be obtained with the Kalman filter

$$a_{t+1} = a_t + g(\pi_t - a_t) \quad (3.19)$$

where $g \equiv \sigma_a^2 / \sigma_u^2$ defines the Kalman gain, a function of the signal-to-noise ratio. Again this model provides a dynamically consistent system of beliefs. For asset pricing applications, see Adam, Marcet, and Nicolini (2016) and Adam, Marcet, and Beutel (2017). For an application to a New Keynesian model, see Eusepi, Giannoni, and Preston (2023b). Sargent and Williams (2005) show more general constant-gain algorithms can be approximated by Kalman filter recursions, although their dynamics can be quite different in small samples.

The two learning algorithms introduce free parameters. In the model with a constant inflation mean, the free parameter is the initial belief a_0 . In the random walk model, the free parameter is the Kalman gain, corresponding to beliefs about the relative volatility of innovations. The latter is harder to pin down, as it is interpreted as an immutable prior about the economic environment. Agents could estimate these parameters over time. However, the recursive updating of these parameters is more complex to model, especially if we retain the assumption of Bayesian updating.²⁰

Another approach is to select such parameters according to an optimality criterion. However, such criteria require some degree of “external rationality.” For example, bounds to rationality can be measured by studying the wedge between subjective and objective beliefs that occurs in equilibrium. We discuss these in the following section.

Optimality and External Rationality

Once we depart from rational expectations, what is meant by optimality becomes elusive: it depends on the equilibrium being studied and therefore on the preferences, technologies, and expectations of others. Indeed, some, such as Woodford (1990), argue, “there is no unequivocal meaning for the postulate of “rational” behavior outside of an equilibrium.” While we may not want to insist that subjective beliefs coincide with objective beliefs in all situations, so that there is some upper bound on rationality, we may nonetheless desire that expectations satisfy some lower bound on rationality—else we become seduced by the “wilderness of bounded rationality” in which anything is possible.

Marcet and Nicolini (2003) provide one possible approach. A lower bound on rationality should satisfy three principles: (i) beliefs should be asymptotically optimal and converge to rational expectations equilibrium; (ii) during transition dynamics, forecast errors should not be “too large”; and (iii) beliefs are optimal in the sense that conditional on all other agents having these beliefs, it is optimal to also hold the same beliefs. To evaluate, let alone satisfy, these three criteria require some degree of *external rationality*, a restriction on how much subjective and objective beliefs can differ. Like rational expectations, these criteria

come from outside the model. For learning to converge to rational expectations, people must be endowed with the “right” model—requiring knowledge of the equilibrium from the outset!

Of course, we might insist that people test their models in real time like statisticians do, using only information available to them: such an approach requires no assumptions about external rationality. For example, Bray and Savin (1986) explore whether people can detect correlation in forecast errors using a Durbin-Watson test in transition. However, Marcet and Sargent (1995), Evans et al. (2013), and Cho and Kasa (2015, 2017) demonstrate that standard asymptotic statistical results cannot be applied to self-referential learning models.

Moving beyond the simple regression model, decision-makers might have different forecasting models, each better suited to certain conditions.²¹ For example, ordinary least squares is appropriate in stationary environments, but constant-gain algorithms are better suited to periods of structural change. How do people choose among competing models? For many researchers, Bayesian model averaging would be a natural basis for discriminating across models. But Evans et al. (2013) and Cho and Kasa (2017) show this procedure can place unit probability weight on the constant-gain model, even when the decreasing-gain model spans the true model of the economy. Brock and Hommes (1997) also show that the optimal choices of forecasting models based on past prediction performance can lead to instability in equilibrium.

To handle these difficulties, Marcet and Nicolini (2003) and Cho and Kasa (2015) propose model selection criteria which lead to selection of the forecasting model spanning the truth with probability one. That the optimality of a particular selection criterion depends on the model and equilibrium being considered is proof that an external rationality criterion is needed to evaluate specific learning algorithms.

In an economy with constant-gain learning, Evans and Honkapohja (1993) show how external rationality can deliver an optimal gain. In this model, agents choose their gain optimally, in the sense that they minimize forecast errors, given the data, which depends on the learning gain chosen by other agents. The optimal gain is then part of the equilibrium of the model and depends on other structural parameters, such as alternative policy rules. Adopting a similar approach to the New Keynesian model, Lansing (2009) shows the optimal learning gain depends on the volatility and persistence of the output gap process. Marcet and Nicolini (2003) and Carvalho et al. (2023a) extend this approach to environments where agents must choose not only the parameters but also the appropriate forecasting model and show how specific economic policies alter these choices.

So What? Three Examples

This section presents three examples which underscore that models of adaptive learning under optimal decision-making provide an intellectual framework to address questions which rational expectations is unable to or for which rational expectations generate puzzles. The final section adduces empirical evidence supporting this approach.

Monetary Policy

By assumption, rational expectations equilibrium ensures people hold beliefs that are consistent with monetary policy strategy, in the short and long run. Such models cannot be used to evaluate central bank communications policy; to evaluate how to anchor long-term

inflation expectations; to evaluate under what circumstances inflation expectations would become unanchored; and to address what the answers to these questions collectively imply for inflation policy. Adaptive learning models can do all these things (see Preston 2006; Eusepi and Preston 2010, 2012; Carvalho et al. 2023).

That long-term expectations are tightly controlled in rational expectations policy analysis has strong implications for policy advice. Adaptive learning models, by relaxing the precision with which expectations can be managed, permit the evaluation of the sensitivity of rational expectations policy advice. In general, unstable long-term inflation and nominal interest-rate expectations place constraints on the efficacy of stabilization policy. Not only is aggressive short-run aggregate demand management of the kind proscribed by rational expectations analysis infeasible, but the optimal long-run inflation rate will tend to be higher the more unstable are expectations (Eusepi, Giannoni, and Preston 2018, 2023b). And when the nominal interest rate is constrained by the effective lower bound, forward guidance policy is far less effective at stabilizing the macroeconomy. Relative to rational expectations, learning fundamentally alters wealth effects associated with interest-rate policy, which confronts central banks with new trade-offs (Eusepi, Gibbs, and Preston 2022). Eusepi and Preston (2018b) provide a comprehensive review of the consequences of adaptive learning for monetary policy.

Models of adaptive learning assist in understanding historical episodes in US monetary history. Eusepi, Giannoni, and Preston (2023b) show such models can explain the high level of long-term interest-rate expectations in the late 1970s, despite the steady decline in the Fed policy rate observed in the following decade. Just like professional forecasters at the time, decision-makers in the model fail to anticipate the successful Volcker disinflation and the subsequent formal adoption of an inflation target some 30 years later. Carvalho et al. (2023b) explain the stabilization of long-run inflation expectations in the late 1990s as increased inflation predictability, which lead to an increase in confidence about long-run price stability and the subsequent anchoring of expectations (and consequently, the gradual decline in the learning gain).

Policy Uncertainty and Regime Change

Adaptive learning models resolve the Frydman-Phelps critique of Markov regime-switching models. Because beliefs are adapted to observed patterns in data, learning models obviate the requirement that all policy regimes, including their likelihood and dynamic properties, are known to decision-makers. People can hold beliefs about the probability distribution of future outcomes that are in principle consistent with the current policy regime, while also being equally consistent with infinitely many other regimes and allowing adaptation to regime change by continuously testing their forecasting models. Crucially, the approach permits the study of entirely new regimes. It is this property that permits the study of communication and the anchoring of expectations.

But the implications are broader. For example, from Leeper (1991), we know that for central banks to be able to control inflation requires fiscal policy to be conducted in a very specific way. But this fiscal backing of monetary policy assumes that people expect the present discounted value of taxes to be exactly equal to the real market value of outstanding public debt. Analyses of monetary policy under rational expectations almost always assume this condition holds, giving rise to the prediction that debt has no monetary consequences and that central banks can control inflation without explicit concerns about fiscal policy.

But if decision-makers are uncertain about future tax policy, there will be departures from Ricardian equivalence. Fiscal policy will have monetary consequences even when monetary and fiscal policy are consistent with implementing a Ricardian equilibrium under rational expectations (Eusepi and Preston 2012; Evans, Honkapohja, and Mitra 2012). Fiscal uncertainty breaks the clean separation between Ricardian and non-Ricardian equilibria, with the result that the scale and maturity structure of public debt matter for inflation, complicating stabilization policy. Such models have been used to evaluate the fiscal foundations of trend inflation (Eusepi and Preston 2012, 2018a). Models of this kind predict that monetary policy will be less effective in periods of high government debt levels and high interest rates. Recent economic developments permit evaluating these ideas, with many countries sustaining unprecedented increases in debt in the aftermath of the 2020 pandemic as well as elevated interest rates because of high inflation. Whether elevated debt levels will compromise inflation policy going forward is an open question and an opportunity for further research.

This approach to regime uncertainty extends immediately to models of regime change. For example, Marcet and Nicolini (2003) study how hyperinflations can arise from agents abandoning inflation beliefs consistent with a stable nominal anchor. Similarly, they show that beliefs can change abruptly under adaptive learning in the presence of policy change when agents have multiple models.

Puzzles in Asset Pricing

Rational expectations asset pricing theory base delivers a range of “puzzles,” failing to capture the observed volatility of returns and the mean, persistence, and predictability of excess returns. Adam, Marcet, and Nicolini (2016) and Adam, Marcet, and Beutel (2017) show that a standard Lucas (1978) asset pricing model with learning can match these empirical regularities.²²

Forecasting expected returns using realized returns, investors become optimistic about the stock market when they observe positive returns, consistent with survey-based expectations. Waves of optimism and pessimism drive stock market fluctuations, so that observed price volatility far exceeds that of expected stock dividends. The model also successfully generates the positive co-movement between asset prices and return expectations that we observe in the data. Branch and Evans (2010) show that abandoning the common assumption of a representative investor can lead to additional empirical gains. A simple asset-pricing model with heterogeneous adaptive expectations can match observed regime-switching in asset returns and volatility. Adaptive learning is the source of empirical success.

Adaptive learning models with optimal decisions also permit more fruitful analysis of the interaction between asset prices and the macroeconomy (Adam and Merkel 2019; Winkler 2020; Du, Eusepi, and Preston 2021; Eusepi, Giannoni, and Preston 2023a). Economic models commonly used for macroeconomic analysis make stark predictions about asset prices. Macroeconomic variables of interest can be studied without any knowledge of asset prices. And when asset prices are determined, they are functions of those same fundamentals that determine equilibrium in the macroeconomy. These properties have given rise to various puzzles relating to both the excess volatility of asset prices given relatively stable fundamentals, and the large real economic effects that appear to be associated with some asset price movements. In models of adaptive learning, macroeconomic outcomes and asset prices are strongly interdependent. This allows the addressing of issues such as whether

central banks should respond to asset prices—see, for example, Winkler (2020)—and how asset market developments affect the transmission mechanism of monetary policy. The limited work that has been done on these questions suggests a promising future research agenda.

Empirical Implications and Lessons

The past 30 years have witnessed an explosion of empirical work using survey-based measures of expectations to test rationality and to evaluate alternative models of expectation formation. This work complements theoretical developments, providing further insight into the plausibility of rational expectations as well as possible foundations of behavioral theories of beliefs. Three central lessons emerge from this empirical work. First, the data reject rational expectations. Understanding that all models are false, this is perhaps unsurprising and unhelpful—rational expectations afforded many advantages for macroeconomic modeling, particularly in the absence of clear alternative approaches to modeling beliefs. But the remaining lessons identify a compelling path forward. Second, unobserved components models explain the term structure of expectations of inflation, output growth, and interest rates exceptionally well. Moreover, models of the joint evolution of these variables perform better than single equation models, suggesting a degree of sophistication in forecasts. Third, long-term expectations exhibit considerable variation that is correlated with short-run forecast errors. These findings are consistent with models of optimal decision-making under adaptive learning.

How Rational Are Survey-Based Expectations?

Survey data on expectations have been used in empirical work since the early 1970s. Most studies test whether observed expectations are consistent with rational expectations. In its strongest form, this consistency requires that subjective beliefs must be the same as the true data-generation process. A weaker implication is that forecast revisions should only incorporate new information: forecast errors should be uncorrelated with past available information—see Friedman (1979) and Nordhaus (1987) for discussion. Observable measures of expectations, even subject to measurement error, allow direct tests of this prediction.

Early work emphasized inflation expectations, in part because of data availability, but also because, as a component of the Phillips curve, they were central to policy debate. Using *consensus* measures of inflation expectations, inflation forecast errors were serially autocorrelated and predictable based on old information—see Roberts (1997) and references therein.²³ Other studies find similar results for an expanded set of macroeconomic variables, including short-term interest rates, GDP growth, and unemployment—see Friedman (1979), Croushore (1998), Eusepi and Preston (2011), and Farmer, Nakamura, and Steinsson (2021). While these results are at odds with the assumption of full-information rational expectations, they are not necessarily inconsistent with agents processing information optimally. Incomplete knowledge about the true data-generating process, perhaps because of structural change or imperfect information about model structural parameters, can result in ex post correlated forecast errors even if agents learn optimally given available information—see Friedman (1980), Caskey (1985), and Lewis (1989).

An influential example of such composition effects is Coibion and Gorodnichenko (2012), which shows that in an economy with many rational *individual* forecasters

processing idiosyncratic noisy signals about unobserved inflation, *consensus* measures of inflation expectations under-react to new information relative to full information rational expectations. Finding inefficient consensus forecasts is not necessarily a rejection of rational expectations at the individual level. However, recent research finds deviations from rationality at the level of *individual forecasters*. (Bordalo et al. 2020) use data on individual forecasters to show that they generally over-react to new information relative to rational expectations. Such findings are inconsistent with the rational expectations hypothesis.

Other empirical work shows that survey data on expectations are broadly consistent with professionals forecasting in the same way as econometricians would. Statistical models that are updated according to optimality criteria, such as minimization of expected forecast errors, can track the evolution of observed expectations very well. Crump, Eusepi, and Moench (2022) shows a model of this class fits closely the entire term structure of forecasts for inflation, output growth, and the short-term nominal interest rate for the US. Angeletos, Huo, and Sastry (2020) study the dynamic adjustment of survey-based forecasts to a business cycle shock. Compared to rational expectations, observed expectations initially under-react to the shock, but tend to over-react in later periods. These results are consistent with subjective expectations differing from the objective probability distribution of the variables they forecast, consistent with the predictions of adaptive learning models.

Even if we grant deviations from strict definitions of rationality, it is important to investigate the *size* of these deviations. Survey data permit this, so informing the bounds to rationality that we impose on models of adaptive learning.

Bounds to Rationality

Empirical analysis finds forecasters are quite sophisticated. New Keynesian models predict agents must *jointly* forecast variables such as inflation, the output gap, and the policy rate to make their consumption, saving, labor supply, and pricing decisions. The data suggest forecasters take some economic linkages into account. Mullineaux (1980), Gramlich (1983), and Caskey (1985), for example, show that survey-based inflation expectations are informed not only by past inflation, as predicted by the simplest model of adaptive expectations, but also by money growth and other macroeconomic variables, consistent with the predictions of macroeconomic models.

These earlier contributions also show that models with time-varying coefficients better capture the relation between observed expectations and forecast inputs—see Mullineaux (1980) and Branch and Evans (2006). Recent literature provides further evidence that professional forecasts are based on models capturing the joint evolution of macroeconomic variables. Andrade and Le Bihan (2013), Andrade et al. (2016), Crump, Eusepi, and Moench (2022), and Crump et al. (2022) provide evidence that multivariate models provide a better fit for the joint behavior of output growth, inflation, and short-term interest-rate expectations. For example, Crump, Eusepi, and Moench (2022) show that information contained in inflation and output growth expectations improves substantially our ability to explain expectations of short-term interest rates. This is consistent with agents accounting for the central bank’s reaction function.

More generally, survey data can be used to directly elicit bounds on external rationality from observed expectations. Models of adaptive learning estimated using survey data allow joint inference of the parameters governing the learning process and the possibly

time-varying wedge between subjective and objective beliefs. Eusepi, Giannoni, and Preston (2023b) estimate a New Keynesian model with learning using a wealth of survey expectations for inflation and the policy rate, at both short- and long-term maturities.²⁴ The model characterizes the wedge between subjective and objective expectations and which economic shocks determine this wedge.

Long-Term Expectations

Macroeconomic models imply agents are forward-looking and therefore that long-run expectations matter for their economic decisions. Standard models with rational expectations assume market participants live in a well-understood stationary environment. Long-term expectations are constant and play no important role in the dynamic behavior of the economy. This assumption flies in the face of empirical evidence from survey forecasts. Long-term survey forecasts from households, firms, professional forecasters, and also central banks display considerable variability, as market participants revise their long-run estimates of labor productivity, output growth, inflation, and interest rates in response to forecast errors—see discussion and references in Crump et al. (2022).

Forecasters disagree sharply about long-term outcomes, for some variables like the short-term interest rate even more than in the short run.²⁵ These observations provide additional evidence against the full-information rational expectations assumption. Market participants are aware of a changing economic environment and appear to track regime changes by responding to new information. Recent work shows that the entire term structure of forecasts, from the short run to the very long run, can be captured by a simple model with unobserved trend and cycle components.²⁶ Forecasters update their long-term forecasts in response to short-term forecast errors, consistent with the type of statistical learning described in this survey. Moreover, the relationship between forecast errors and long-run expectations revisions changes over time. The learning gain—the elasticity of expectations—is time-varying and state-dependent.²⁷

Conclusion

This chapter traces the history of models of adaptive learning. From modest beginnings in the adaptive expectations literature, models of adaptive learning emerged as part of the rational expectations revolution to address questions relating to indeterminacy and the plausibility of rational expectations equilibrium. While perhaps failing to deliver a compelling theory of coordination and equilibrium selection for rational expectations, such models have provided invaluable insight about what it means to be rational and how expectations are formed in practice. Moreover, the approach allows us to address questions that rational expectations analysis cannot. Importantly, recent empirical work using survey data adduces evidence that supports a model of optimal intertemporal decision-making with adaptive learning.

Notes

1 See the interview with Robert Lucas in Bowmaker (2012).

2 The authors particularly thank David Byrne, Chris Gibbs, Greg Kaplan, Alexander Nützenadel, Michael Woodford, and an anonymous referee for comments. Bruce Preston acknowledges

research support from the Australian Research Council in the grant DP210103427. The usual caveat applies.

- 3 For $\beta > 1$ the system becomes unstable, with self-sustaining hyper-inflations and deflations.
- 4 The requirement of a bounded equilibrium ensures $\lim_{T \rightarrow \infty} E_t \beta^{T-t} \pi_T = 0$.
- 5 Where efficiency here is used in the Rawlsian sense.
- 6 On a practical note, it is unclear that the Lucas critique ever gained much traction in policy circles. For example, in a summary of the state of affairs in the late 1970s appearing in his recent history of monetary and fiscal policy in the US, Alan Blinder writes, “Academic economists were madly in love with rational expectations, barely recognizing that the term really meant ‘model consistent’ expectations, no matter how silly the model was” (Blinder 2022, 103). Elsewhere he argues that the expectational effects of policy announcements are quantitatively unimportant.
- 7 See, for example, Frydman (1982), Brav and Heaton (2015), Bray and Kreps (1987), and Angelatos and Lian (2023) for a survey of the literature.
- 8 Here we further refine Hick’s definition of the elasticity of expectations to relate to the parameters of the forecast function, as opposed to the forecasts themselves.
- 9 See Marcet and Sargent (1989a) and Evans and Honkapohja (2001) for a detailed discussion of the required regularity conditions.
- 10 The central technical results were based on Noah Williams’ dissertation research at the University of Chicago and ultimately published as Williams (2019).
- 11 See, for example, the 2007 speech by Ben S. Bernanke, chairman of the Board of Governors of the Federal Reserve System, on “Inflation Expectations and Inflation Forecasting” at the Monetary Economics Workshop of the National Bureau of Economic Research Summer Institute, Cambridge, Massachusetts, July 10, 2007. <https://www.federalreserve.gov/newsevents/speech/bernanke20070710a.htm>.
- 12 Woodford (2003) coined the name of this property as the “Taylor principle.”
- 13 For textbook rational expectations treatments see the elegant Galí (2008) and the magisterial Woodford (2003).
- 14 Formally this is a simplified version of the supply block of the canonical New Keynesian model. See Preston (2005) for details.
- 15 The idea that it is implausible for each firm to have full knowledge of the cross-sectional behavior and expectations of all other firms is also central to Frydman’s (1982) non-convergence to rational expectations results under rational learning. The presumption that firms would have such knowledge he labeled *ad hoc*.
- 16 As an aside, people often describe learning models as “backward-looking.” This nomenclature, which sought to differentiate “forward-looking” rational expectations from “backward-looking” adaptive expectations modeling, is somewhat inaccurate when applied to modern microfounded models of economic behavior with adaptive learning. Intertemporal decision-making is inherently forward-looking, independently of the specific theory of expectations formation.
- 17 Suppose one half of households have positive wealth which is lent to the other half of households whom are otherwise identical. Then the Euler equation approach stipulates that when beliefs converge creditors permanently underconsume, and debtors overconsume, relative to what is optimal.
- 18 Though, as we make clear later in the chapter, only the optimal decision approach can explain salient features of survey data on the term structure of expectations.
- 19 This can be relaxed. Given priors for this parameter, agents can update their estimate over time. We omit this discussion as it does not play a role in our linear examples.
- 20 It is generally hard to characterize analytically the evolution of the posterior distribution of such parameters.
- 21 See Evans and Honkapohja (2009), Eusepi and Preston (2018b), and Evans and McGough (2020) for a more detailed discussion of model selection and their applications.
- 22 See also Branch and Evans (2011) for an alternative modeling framework.
- 23 The term “consensus” corresponds to the average inflation forecast across survey participants at any given point in time.
- 24 See Milani (2023) for a recent survey on dynamic general equilibrium models estimated using survey data on expectations.

- 25 Andrade et al. (2016).
- 26 See Crump, Eusepi, and Moench (2022) and Crump et al. (2022).
- 27 See Carvalho et al. (2023a); Cieslak (2018) for a similar result using short-horizon forecasts; and Piazzesi, Salamao, and Schneider (2015) for expected bond yields.

References

- Adam, Klaus, and Albert Marcet. 2011. "Internal Rationality, Imperfect Market Knowledge and Asset Prices." *Journal of Economic Theory* 146: 1224–1252.
- Adam, Klaus, Albert Marcet, and Johannes Beutel. 2017. "Stock Price Booms and Expected Capital Gains." *American Economic Review* 107, no. 8: 2352–2408.
- Adam, Klaus, Albert Marcet, and Juan Pablo Nicolini. 2016. "Stock Market Volatility and Learning." *Journal of Finance* 71, no. 1: 33–82.
- Adam, Klaus, and Sebastian Merkel. 2019. "Stock Price Cycles and Business Cycles." CRC TR 224 Discussion Paper Series. University of Bonn and University of Mannheim, Germany.
- Andrade, Philippe, Richard K. Crump, Stefano Eusepi, and Emanuel Moench. 2016. "Fundamental Disagreement." *Journal of Monetary Economics* 83, no. 1: 106–128.
- Andrade, Philippe, and Hervé Le Bihan. 2013. "Inattentive Professional Forecasters." *Journal of Monetary Economics* 60, no. 8: 967–982.
- Angeletos, George-Marios, Zhen Huo, and Karthik A. Sastry. 2020. "Imperfect Macroeconomic Expectations: Evidence and Theory." In *NBER Macroeconomics Annual 2020: 35*, edited by Martin Eichenbaum, and Erik Hurst, 1–86. Chicago, IL: National Bureau of Economic Research, Inc.
- Angeletos, George-Marios, and Chen Lian. 2023. "Dampening General Equilibrium: Incomplete Information and Bounded Rationality." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 613–645. Amsterdam: Elsevier.
- Bao, Te, Cars Hommes, and Jiaoying Pei. 2021. "Expectation Formation in Finance and Macroeconomics: A Review of New Experimental Evidence." *Journal of Behavioral and Experimental Finance* 32: 100591.
- Blinder, Alan S. 2022. *A Monetary and Fiscal History of the United States, 1961–2021*. Princeton, NJ: Princeton University Press.
- Bordalo, Pedro, Nicola Gennaioli, Yueran Ma, and Andrei Shleifer. 2020. "Overreaction in Macroeconomic Expectations." *American Economic Review* 110, no. 9: 2748–2782.
- Bowmaker, Simon W. 2012. *The Art and Practice of Economics Research: Lessons from Leading Minds*. Cheltenham and Northampton, MA: Edward Elgar Publishing.
- Branch, William A., and George W. Evans. 2006. "A Simple Recursive Forecasting Model." *Economics Letters* 91: 158–166.
- Branch, William A., and George W. Evans. 2010. "Asset Return Dynamics and Learning." *The Review of Financial Studies* 23, no. 4: 1651–1680.
- Branch, William A., and George W. Evans. 2011. "Learning about Risk and Return: A Simple Model of Bubbles and Crashes." *American Economic Journal: Macroeconomics* 3, no. 3: 159–191.
- Branch, William A., and Bruce McGough. 2018. "Heterogeneous Expectations and Micro Foundations in Macroeconomics." In *Handbook of Computational Economics*, edited by Cars Hommes, and Blake LeBaron, 4: 3–62. Amsterdam: Elsevier.
- Brav, Alon, and J. B. Heaton. 2015. "Competing Theories of Financial Anomalies." *The Review of Financial Studies* 15, no. 2: 575–606.
- Bray, Margaret. 1982. "Learning, Estimation and the Stability of Rational Expectations." *Journal of Economic Theory* 26: 318–339.
- Bray, Margaret, and David M. Kreps. 1987. "Rational Learning and Rational Expectations." In *Arrow and the Ascent of Modern Economic Theory*, edited by George R. Feiwel, 597–625. London: Palgrave Macmillan.
- Bray, Margaret, and Nathan E. Savin. 1986. "Rational Expectations Equilibria, Learning, and Model Specification." *Econometrica* 54, no. 5: 1129–1160.
- Brock, William A., and Cars H. Hommes. 1997. "A Rational Route to Randomness." *Econometrica* 65, no. 5: 1059–1095.

- Bullard, James. 1992. "Time-Varying Parameters and Nonconvergence to Rational Expectations under Least Square Learning." *Economics Letters* 40: 159–166.
- Bullard, James, and Kaushik Mitra. 2002. "Learning about Monetary Policy Rules." *Journal of Monetary Economics* 49, no. 6: 1105–1129.
- Bullard, James, and Kaushik Mitra. 2007. "Determinacy, Learnability and Monetary Policy Inertia." *Journal of Money, Credit and Banking* 39: 1177–1212.
- Cagan, Philip. 1956. "The Monetary Dynamics of Hyperinflation". Milton Friedman (ed.), *Studies in the Quantity Theory of Money*. University of Chicago Press.
- Carvalho, Carlos, Stefano Eusepi, Emanuel Moench, and Bruce Preston. 2023. "Anchored Inflation Expectations." *American Economic Journal: Macroeconomics* 15, no. 1: 1–47.
- Caskey, John. 1985. "Modeling the Formation of Price Expectations: A Bayesian Approach." *The American Economic Review* 75 no. 4: 768–776.
- Cho, In-Koo, and Kenneth Kasa. 2015. "Learning and Model Validation." *Review of Economic Studies* 82, no. 1: 45–82.
- Cho, In-Koo, and Kenneth Kasa. 2017. "Gresham's Law of Model Averaging." *American Economic Review* 107, no. 11: 3589–3616.
- Cho, In-Koo, Noah Williams, and Thomas J. Sargent. 2002. "Escaping Nash Inflation." *Review of Economic Studies* 69, no. 1: 1–40.
- Cieslak, Anna. 2018. "Short-Rate Expectations and Unexpected Returns in Treasury Bonds." *The Review of Financial Studies* 31, no. 9: 3265–3306.
- Cogley, Timothy, and Thomas J. Sargent. 2008. "Anticipated Utility and Rational Expectations as Approximations of Bayesian Decision Making." *International Economic Review* 49, no. 1: 185–221.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2012. "What Can Survey Forecasts Tell Us about Information Rigidities?" *Journal of Political Economy* 120, no. 1: 116–159.
- Croushore, Dean. 1998. "Evaluating Inflation Forecasts." Federal Reserve Bank of Philadelphia Working Paper No. 98-14. URL: <https://econpapers.repec.org/RePEc:fip:fedwp:98-14>.
- Crump, Richard, Stefano Eusepi, and Emanuel Moench. 2022. "The Term Structure of Expectations and Bond Yields." Staff Report 775, Federal Reserve Bank of New York. URL: <https://ideas.repec.org/p/fip/fednsr/775.html>.
- Crump, Richard, Stefano Eusepi, Emanuel Moench, and Bruce Preston. 2022. "The Term Structure of Expectations." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 507–540. Amsterdam: Elsevier.
- Du, Qingyuan, Stefano Eusepi, and Bruce Preston. 2021. "Non-Rational Beliefs in an Open Economy." *Review of Economic Dynamics* 41: 174–204.
- Eusepi, Stefano, Marc P. Giannoni, and Bruce Preston. 2018. "Some Implications of Learning for Price Stability." *European Economic Review* 106: 1–20.
- Eusepi, Stefano, Marc P. Giannoni, and Bruce Preston. 2023a. "Distorted Beliefs, Asset Pricing and Monetary Policy." Unpublished manuscript, University of Texas, Austin.
- Eusepi, Stefano, Marc P. Giannoni, and Bruce Preston. 2023b. "On the Limits of Monetary Policy." Unpublished manuscript, University of Texas, Austin.
- Eusepi, Stefano, Christopher Gibbs, and Bruce Preston. 2022. "Monetary Policy Trade-offs at the Zero Lower Bound." CAMA Working Papers 2022–26, Centre for Applied Macroeconomic Analysis, Crawford School of Public Policy, The Australian National University. URL: https://cama.crawford.anu.edu.au/sites/default/files/publication/cama_crawford_anu_eduau/2022-03/26_2022_eusepi_gibbs_preston.pdf.
- Eusepi, Stefano, and Bruce Preston. 2010. "Central Bank Communication and Macroeconomic Stabilization." *American Economic Journal: Macroeconomics* 2: 235–271.
- Eusepi, Stefano, and Bruce Preston. 2011. "Expectations, Learning and Business Cycle Fluctuations." *American Economic Review* 101, no. 6: 2844–2872.
- Eusepi, Stefano, and Bruce Preston. 2012. "Debt, Policy Uncertainty and Expectations Stabilization." *Journal of the European Economics Association* 10, no. 4: 860–886.
- Eusepi, Stefano, and Bruce Preston. 2018a. "Fiscal Foundations of Inflation: Imperfect Knowledge." *American Economic Review* 108, no. 9: 2551–2589.
- Eusepi, Stefano, and Bruce Preston. 2018b. "The Science of Monetary Policy: An Imperfect Knowledge Perspective." *Journal of Economic Literature* 56, no. 1: 3–61.

- Evans, George W. 2021. "Theories of Learning and Economic Policy." *Revue d'économie politique* 131, no. 3: 583–608.
- Evans, George W., and Seppo Honkapohja. 1993. "Adaptive Forecasts, Hysteresis, and Endogenous Fluctuations." *Economic Review of the Federal Bank of San Francisco*, 3–13. URL: <https://ideas.repec.org/a/fip/fedfer/y1993p3-13n1.html>.
- Evans, George W., and Seppo Honkapohja. 1994a. "Learning, Convergence, and Stability with Multiple Rational Expectations Equilibria." *European Economic Review* 38: 1071–1098.
- Evans, George W., and Seppo Honkapohja. 1994b. "On the Local Stability of Sunspot Equilibria under Adaptive Learning Rules." *Journal of Economic Theory* 64: 142–161.
- Evans, George W., and Seppo Honkapohja. 1995. "Local Convergence of Recursive Learning to Steady States and Cycles in Stochastic Nonlinear Models." *Econometrica* 63, no. 1: 195–206.
- Evans, George W., and Seppo Honkapohja. 2001. *Learning and Expectations in Economics*. Princeton, NJ: Princeton University Press.
- Evans, George W., and Seppo Honkapohja. 2009. "Learning and Macroeconomics." *Annual Review of Economics* 1, no. 1: 421–449.
- Evans, George W., Seppo Honkapohja, and Kaushik Mitra. 2012. "Does Ricardian Equivalence Hold When Expectations Are Not Rational?" *Journal of Money, Credit and Banking* 44, no. 7: 1259–1283.
- Evans, George W., Seppo Honkapohja, and Paul Romer. 1998. "Growth Cycles". *American Economic Review* 88, n. 3: 495–515.
- Evans, George W., Seppo Honkapohja, Thomas J. Sargent, and Noah Williams. 2013. "Bayesian Model Averaging, Learning, and Model Selection." In *Macroeconomics at the Service of Public Policy*, edited by Thomas J. Sargent, and Jouko Vilmunen, 99–119. Oxford: Oxford University Press.
- Evans, George W., and Bruce McGough. 2020. "Adaptive Learning in Macroeconomics." *Oxford Research Encyclopedia of Economics and Finance*. Published online November 13, 2020. DOI: 10.1093/acrefore/9780190625979.013.508.
- Farmer, Leland E., Emi Nakamura, and Jón Steinsson. 2021. "Learning About the Long Run." NBER Working Papers 29495, National Bureau of Economic Research, Inc. URL: <https://ideas.repec.org/p/nbr/nberwo/29495.html>.
- Fourgeaud, Claude, Christian Gourieroux, and Jacqueline Pradel. 1986. "Learning Procedures and Convergence to Rationality." *Econometrica* 54, no. 4: 845–868.
- Friedman, Benjamin M. 1979. "Optimal Expectations and the Extreme Information Assumptions of 'Rational Expectations' Macromodels." *Journal of Monetary Economics* 79: 23–41.
- Friedman, Benjamin M. 1980. "Survey Evidence on the 'Rationality' of Interest Rate Expectations." *Journal of Monetary Economics* 6: 453–465.
- Friedman, Milton. 1957. *A Theory of the Consumption Function*. Princeton, NJ: Princeton University Press.
- Friedman, Milton. 1968. "The Role of Monetary Policy." *The American Economic Review* 58, no. 1: 1–17.
- Frydman, Roman. 1982. "Towards an Understanding of Market Processes: Individual Expectations, Learning, and Convergence to Rational Expectations Equilibrium." *The American Economic Review* 72, no. 4: 652–668.
- Frydman, Roman, and Edmund S. Phelps. 2013. *Rethinking Expectations: The Way Forward for Macro Economics*. Princeton, NJ: Princeton University Press.
- Gali, Jordi. 2008. *Monetary Policy, Inflation, and the Business Cycle: An Introduction of the New Keynesian Framework*. Princeton, NJ: Princeton University Press.
- Hicks, John, Richard. 1939. *Value and Capital: An Inquiry into Some Fundamental Principles of Economic Theory*. Oxford: Clarendon Press.
- Gramlich, Edward M. 1983. "Models of Inflation Expectations Formation: A Comparison of Households and Economist Forecasts." *Journal of Money, Credit and Banking* 15, no. 2: 155–173.
- Hommes, Cars. 2013. *Behavioral Rationality and Heterogenous Expectations in Complex Economic Systems*. Cambridge: Cambridge University Press.
- Hommes, Cars. 2021. "Behavioral and Experimental Macroeconomics and Policy Analysis: A Complex Systems Approach." *Journal of Economic Literature* 59, no. 1: 149–219.
- Howitt, Peter. 1992. "Interest Rate Control and Nonconvergence to Rational Expectations." *Journal of Political Economy* 100, no. 4: 776–800.

- Kaldor, Nicholas. 1934. "A Classificatory Note on the Determinateness of Equilibrium." *The Review of Economic Studies* 1, no. 2: 122–136.
- Kreps, David M. 1998. "Anticipated Utility and Dynamic Choice." In *Frontiers of Research in Economic Theory*, edited by Donald P. Jacobs, Ehud Kalai, and Morton I. Kamien, 242–274. Cambridge: Cambridge University Press.
- Lansing, Kevin J. 2009. "Time Varying U.S. Inflation Dynamics and the New Keynesian Phillips Curve." *Review of Economic Dynamics* 12, no. 2: 304–326.
- Leeper, Eric M. 1991. "Equilibria under 'Active' and 'Passive' Monetary and Fiscal Policies." *Journal of Monetary Economics* 27: 129–147.
- Lewis Karen K. 1989. "Changing Beliefs and Systematic Rational Forecast Errors with Evidence from Foreign Exchange." *American Economic Review* 79 no. 4: 621–636.
- Ljung, Lennart. 1977. "Analysis of Recursive Stochastic Algorithms." *IEEE Transactions on Automatic Control* 22, no. 4: 551–557. DOI: 10.1109/TAC.1977.1101561.
- Lucas, Robert E. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 11, no. 1: 19–46.
- Lucas, Robert E. 1978. "Asset Prices in an Exchange Economy." *Econometrica* 46, no. 6: 1429–1445.
- Lucas, Robert E. 1986. "Adaptive Behavior and Economic Theory." *The Journal of Business* 59, no. 4: 401–426.
- Marcet, Albert, and Juan P. Nicolini. 2003. "Recurrent Hyperinflations and Learning." *American Economic Review* 93, no. 5: 1476–1498.
- Marcet, Albert, and Thomas J. Sargent. 1989a. "Convergence of Least-Squares Learning in Environments with Hidden State Variables and Private Information." *Journal of Political Economy* 97, no. 6: 1306–1322. URL: <https://econpapers.repec.org/RePEc:ucp:jpolec:v:97:y:1989:i:6:p:1306-22>.
- Marcet, Albert, and Thomas J. Sargent. 1989b. "Convergence of Least Squares Learning Mechanisms in Self-Referential Linear Stochastic Models." *Journal of Economic Theory* 48: 337–368.
- Marcet, Albert, and Thomas J. Sargent. 1995. *Speed of Convergence of Recursive Least Squares Learning with ARMA Perceptions*. Oxford: Basil Blackwell.
- McCallum, Bennett T. 1983. "On Non-Uniqueness in Rational Expectations Models: An Attempt at Perspective." *Journal of Monetary Economics* 11: 139–168.
- Milani, Fabio. 2007. "Expectations, Learning and Macroeconomic Persistence." *Journal of Monetary Economics* 54: 2065–2082.
- Milani, Fabio. 2023. "Expectational Data in DSGE Models." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 541–567. Amsterdam: Elsevier.
- Mullineaux, Donald J. 1980. "Inflation Expectations and Money Growth in the United States." *The American Economic Review* 80, no. 1: 149–161.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica* 29, no. 3: 315–335.
- Nerlove, Marc. 1958. "Adaptive Expectations and Cobweb Phenomena." *The Quarterly Journal of Economics* 72, no. 2: 227–240.
- Nordhaus, William D. 1987. "Forecast Efficiency: Concepts and Applications." *The Review of Economics and Statistics* 69, no. 4: 667–674.
- Orphanides, Athanasios, and John C. Williams. 2004. "Imperfect Knowledge, Inflation Expectations, and Monetary Policy." In *The Inflation Targeting Debate*, edited by Ben S. Bernanke, and Michael Woodford, 201–246. Chicago, IL: University of Chicago Press.
- Piazzesi, Monika, Juliana Salamao, and Martin Schneider. 2015. "Trend and Cycle in Bond Premia." Unpublished manuscript, Stanford University. URL: <https://web.stanford.edu/~piazzesi/trendcycle.pdf>.
- Preston, Bruce. 2005. "Learning about Monetary Policy Rules when Long-Horizon Expectations Matter." *International Journal of Central Banking* 1, no. 2: 81–126.
- Preston, Bruce. 2006. "Adaptive Learning, Forecast-Based Instrument Rules and Monetary Policy." *Journal of Monetary Economics* 53: 507–535.
- Roberts, John M. 1997. "Is Inflation Sticky?" *Journal of Monetary Economics* 39: 173–196.
- Sargent, Thomas J. 1993. *Bounded Rationality in Macroeconomics (Arne Ryde Memorial Lectures)*. Oxford: Clarendon Press.

- Sargent, Thomas J. 1999. *The Conquest of American Inflation*. Princeton, NJ: Princeton University Press.
- Sargent, Thomas J., and Neil Wallace. 1975. "Rational Expectations, the Optimal Monetary Instrument, and the Optimal Monetary Supply Rule." *Journal of Political Economy* 83: 241–254.
- Sargent, Thomas J., and Neil Williams. 2005. "Impacts of Priors on Convergence and Escape Dynamics." *Review of Economic Dynamics* 8, no. 2: 360–391.
- Slobodyan, Sergey, and Raf Wouters. 2012. "Learning in a Medium-Scale DSGE Model with Expectations Based on Small Forecasting Models." *American Economic Journal: Macroeconomics* 4, no. 2: 65–101.
- Taylor, John Brian. 1993. "Discretion versus Policy Rules in Practice." *Carnegie-Rochester Conference Series on Public Policy* 39: 195–214.
- Williams, Noah. 2019. "Escape Dynamics in Learning Models." *Review of Economic Studies* 86: 882–912.
- Winkler, Fabian. 2020. "The Role of Learning for Asset Prices and Business Cycles." *Journal of Monetary Economics* 114, (C): 42–58.
- Woodford, Michael. 1990. "Learning to Believe in Sunspots." *Econometrica* 58, no. 2: 277–307.
- Woodford, Michael. 2003. *Interest and Prices: Foundations of a Theory of Monetary Policy*. Princeton, NJ: Princeton University Press.

4

BOUNDED RATIONALITY, BELIEFS, AND BEHAVIOR

Sebastian Schweighofer-Kodritsch

Bounded rationality is a term proposed by Herbert Simon, who could be described as the first psychologist to be awarded the Nobel Memorial Prize in Economic Sciences (Camerer, Loewenstein, and Rabin 2004, xii). Simon refers to the discrepancies between human decision-making and that of “economic man” (*homo economicus*) as modeled in traditional economic theory (Simon 1955, 99). Since its inception, the term has received multiple interpretations, corresponding to different approaches to the implications of Simon’s proposition. Most prominently, bounded rationality is associated with the use of heuristics in judgment in the face of uncertainty, though there is disagreement on whether evidence of bias should be interpreted as irrationality (e.g., compare Gigerenzer and Selten (2002) with Kahneman (2003)).¹

The most important economic decisions we face (savings, education, fertility, etc.) are so because of their long-term and accordingly uncertain consequences. It seems obvious that our beliefs are a key component of our economic decision-making calculus. It is therefore rather surprising that research in economics, which seeks to understand observed outcomes as the result of optimal individual behavior, has until rather recently shunned the direct elicitation of individuals’ beliefs (see also Fritzsche and Döpke, Chapter 9 in this volume).²

Quite tellingly, research in behavioral economics—which seeks to better explain and predict individual behavior by incorporating more realistic psychological assumptions—initially focused on, and in the early 1990s gained momentum with firmly establishing and rigorously exploring deviations from standard assumptions on risk, social, and time preferences, as opposed to belief formation. Pioneers of this approach recount the hostility with which it was met. In view of this response to initial work on non-standard preferences, “a model of nonbelief in the law of large numbers” (Benjamin, Rabin, and Raymond 2016), for instance, would have seemed unpublishable, if not unthinkable, in those early days.

Incidentally, macroeconomic modeling for a long time assumed that (representative) agents’ consumption and saving behaviors follow adaptive expectations, a form of bounded rationality. The rational expectations revolution overturned this and instilled an insistence on microeconomic foundations in macroeconomic modeling (see Duarte, Chapter 2 in this volume). Against this backdrop, one can imagine that deviating from rational expectations in *micro*-economic modeling would have felt like a step backward. In any case, even

the psychology-oriented behavioral economics approach initially maintained not only that beliefs are probabilistic but also that they are unbiased relative to “a” rational benchmark. Depending on the type of analysis, this would correspond to probabilities that are either objectively given or theoretically determined by an equilibrium notion, or empirically estimated from actual data.

Over the past decade or so, however, this has changed drastically. Non-Bayesian decision models, as well as models of agents whose beliefs and tastes are non-separable, are increasingly developed, and belief elicitation techniques nowadays belong to the standard toolbox of experimental economists. Illustrating this change, the first economics experiment on belief updating (Grether 1980) had fewer citations during the whole of the first ten years after its publication than in the year 2022 alone (53 vs. 63).³ My own research has followed the same development, from studying non-standard preferences to studying non-standard belief formation, in “fast forward” so to speak.⁴

However, what “really” are beliefs, as a mental representation of uncertainty, and how do responses to probabilistic belief elicitation relate to them? In particular, how could one interpret elicited “belief bias” relative to some objective probability as a sign of irrationality? These questions should be fundamental for any researcher studying beliefs and anyone relying on such research. This chapter does not offer definitive answers, but instead some key insights as to how the answers depend on what one is willing to assume. Thus, it may also shed light on the above-documented historical development of “beliefs research,” in particular its otherwise surprisingly late adoption in behavioral economics.

The perspective presented in this chapter is a microeconomic, behavioral one, which is worthwhile clarifying. Economics generally, but especially *micro*-economics, is first and foremost concerned with explaining and predicting *behavior*, such as economic agents’ responses to different policies. Its approach of developing formal and broadly applicable models of decision-making for this purpose aspires to be fully transparent with regards to the assumptions underlying any welfare conclusions and policy recommendations. Strictly speaking, any psychological construct that is not directly observable, including an individual’s “beliefs,” therefore becomes meaningful to economics only insofar as it can be understood in terms of this individual’s observable behavior; indeed, a strict formulation of this methodological stance is the following:

Economic models connect to reality through economic variables, prices, quantities etc. and not through their modeling of the individual’s decision-making process. Evidence of the sort cited in neuroeconomics may inspire economists to write different models but it cannot reject economic models.

(Gul and Pesendorfer 2008, 22)

While one may simply ask people to state a probability that an event will occur, like “The Dow Jones will increase by more than 5 percent by next week,” the difference in economic meaning between responses of 43 percent and 29 percent depends on what that difference says about the behavior of interest, e.g., demand for various financial assets.

In this chapter, I first review the decision-theoretic foundations of expected utility and subjective probability (“Bayesianism”) in terms of observable behavior, including the debate among decision theorists about their normative status and related evidence from economics, both classic and recent. Then, I revisit the historical debate in psychology regarding Kahneman and Tversky’s “Heuristics and Biases” approach, specifically that between these

two researchers and their fierce critic Gerd Gigerenzer, where I add some recent, related evidence from experimental economics, including my own work. I conclude with what I consider the main lessons from this chapter.

Decision-Theoretic Foundations: Beliefs as Probabilities, and Rationality

In the modeling of agents making economic decisions under uncertainty, the standard assumption is that they maximize expected utility (EU). This means their subjective beliefs and tastes are well-defined separable objects, with beliefs being probability distributions. Indeed, in economics, there is never any need to explicitly mention, let alone defend, the assumption that beliefs are probabilistic.

There are good practical reasons for this assumption, of course. Being able to rely on probability theory, in particular Bayes' Theorem, is immensely powerful, similar to how modeling tastes via utility functions is useful in that it enables us to employ mathematical optimization techniques. In particular, using probabilities for beliefs provides a clean, mathematically well-understood structure for thinking about and illustrating agents' uncertainty, again similar to how utility functions are useful representations of tastes for this purpose. Economists therefore impose such basic assumptions, on which they then build equilibrium/solution concepts (e.g., some version of competitive equilibrium, or of Nash equilibrium) in order to derive implications for economic behavior and outcomes, which is their ultimate interest.

Decision theorists are specifically concerned with the foundations of such basic assumptions, both from a positive and from a normative point of view (Gilboa 2009). The dominant approach behaviorally characterizes models of decision-making in terms of preference axioms that directly correspond to choices, hence (at least in principle) observable behavior. On the one hand, these axioms therefore offer direct ways to test the descriptive validity of a given decision model and potentially refining or generalizing it. On the other hand, the axioms allow us to better assess the model's prescriptive appeal as a decision criterion directly on this behavioral level.

Students of economics encounter this approach early on. Indeed, I would expect the majority of undergraduate students to know of an alternative to utility functions in modeling consumer choice (under certainty), namely preference relations over consumption bundles. Some might even be familiar with the axiomatic foundation of EU by von Neumann and Morgenstern (1947) for choice among so-called lotteries, where uncertainty is given as probabilistic, as part of the data. By contrast, I would expect that even many actual economists would be puzzled if asked about an alternative to modeling a human decision-maker's beliefs as a probability distribution. (Preference relations, of course.) Yet, most economic applications involve *subjective* uncertainty, i.e., uncertainty that is not merely due to pure chance or the use of randomization devices. Modeling beliefs as probability distributions in this setting is an assumption indeed, and a—if not the—major achievement of decision theory has been to clarify what it means in terms of behavior. Moreover, it also allows us to clarify how given probabilistic beliefs should and do relate to behavior.

Expected Utility as Model

A classic distinction in decision theory is between types of uncertainty: objective uncertainty aka “risk” and subjective uncertainty aka “ambiguity” (Gilboa 2009). Work in the

former domain assumes probabilities are a given, as observable data. The seminal behavioral characterization result in decision theory with risk is von Neumann and Morgenstern's (1947) theorem. It offers the first axiomatic foundation of maximizing EU:

$$U(P) = \sum_{x \in X} p(x)u(x),$$

in choosing between lotteries P that assign probabilities $p(x)$ to various outcomes $x \in X$, which are usually taken to correspond to monetary amounts. Since probabilities are a given here, the behavioral characterization concerns how these probabilities enter the decision-making calculus.

In Leonard J. Savage's *tour de force* that revolutionized statistics (Giocoli 2013), he obtained a behavioral characterization of EU for uncertainty about which nothing is assumed or given (Savage 1954). Instead, the uncertainty and its probabilistic assessment are subjective and part of the behavioral characterization, considering choices between acts $f: S \rightarrow X$ whose outcomes depend on which state of the world $s \in S$ realizes. For his fully subjective setting, however, Savage requires an infinite state space. Anscombe and Aumann (1963) show how assuming that there also exist randomization devices—so that “acts,” in every state, may result in lotteries with given probabilities of various outcomes (Savage acts are then special cases of degenerate lotteries)—greatly simplifies the characterization of *subjective* EU (SEU) and allows to obtain it also for a finite state space. Denoting by $f(x|s)$ the objective probability of outcome x under act f if state s realizes, EU takes the form

$$U(f) = \sum_{s \in S} p(s) \sum_{x \in X} f(x|s)u(x).$$

This latter characterization result provides the foundation for the standard assumption of EU in economic modeling with uncertainty, and its generalizations in decision theory.

Objective Uncertainty and Rationality

What is meant by the *objective* probability of a particular outcome, and why even probability? The most common approach is to define the probability of an event in a frequentist manner, as the relative frequency with which it would occur in a large number of trials “under the same conditions,” thus by turning the law of large numbers that concerns convergence to a pre-supposed true probability on its head (Gilboa 2009, 21). As such, it is merely the definition of a precise quantitative measure of uncertainty, and what it results in is objective to the extent that we all agree on this number (Anscombe and Aumann 1963, 204).

This notion shifts the question to when we all shall definitely agree. For randomization devices like coins that are tossed, dice that are rolled, or roulette wheels that are spun—at least when this is done vigorously (Diaconis, Holmes, and Montgomery 2007)—but also for computer-generated (quasi-) random numbers, we could actually run very large numbers of such trials and, having agreed on doing so, will reach the same measurement. Put simply, for such uncertainty, one can turn probability into something that is commonly observable. These are the typical examples of objective probabilities.

The Independence Axiom as Rationality Given Probability

In von Neumann and Morgenstern's foundation of EU, probabilities are given as data, so why mention it here when this should be about beliefs? Most importantly with regards to rationality, EU with given probabilities allows us to ask, without any ambiguity, the normative question of how these *given* probabilities should enter one's decision calculus. That is, if I accept the given probabilities as measuring the uncertainty I am facing, how should I use this measure in my decision-making? The behavioral foundation of EU offers a basis for why we might want to use the probabilities to calculate the expectation of some cardinal utility function over outcomes and then maximize this criterion.

A priori, this must be a hugely challenging question. However, it is one that illustrates the value of decision theorists' foundational work, because the EU theorem simplifies the question enormously; it boils this normative question down to whether I want my choices to respect the independence axiom.

For any two lotteries P and Q , and any $\alpha \in [0, 1]$, let $\alpha P + (1 - \alpha)Q$ be the "mixed" lottery that assigns the probabilities $\alpha p(x) + (1 - \alpha)q(x)$ to various outcomes $x \in X$. The independence axiom says that if you prefer lottery P over lottery Q , then, for any third lottery R and any $\alpha \in (0, 1)$, you shall prefer lottery $\alpha P + (1 - \alpha)R$ over lottery $\alpha Q + (1 - \alpha)R$. This axiom did not appear as such in the work of von Neumann and Morgenstern (Fishburn and Wakker 1995), and while it was being distilled, even Paul Samuelson initially took the position that it was rather arbitrary—he could not see how rationality would imply cardinal utility, and specifically, more than respecting first-order stochastic dominance. No other than Savage then convinced him in a letter of correspondence, by stating it along the following lines (Moscatti 2016, 230): Given two mutually exclusive events E and F , and three outcomes $\{x, y, z\}$, suppose you prefer outcome x over outcome y and have to choose between the two contracts (i) " x if E occurs and z if F occurs" and (ii) " y if E occurs and z if F occurs." Then, your choice is irrelevant if F occurs, so you should condition on the event E where it matters. This should lead you to choose (i) because it delivers the preferred outcome in that event.

Note that Savage here makes no explicit reference to the nature of the uncertainty about events, nor to lotteries. Indeed, this is not really independence but actually the first statement of the sure-thing principle, the key axiom in Savage's derivation of SEU (Moscatti 2016, 230–231). However, upon replacing the three outcomes with lotteries $\{P, Q, R\}$ and the uncertainty about events with another lottery, yielding E with probability $\alpha \in (0, 1)$, (i) and (ii) correspond to lotteries over lotteries aka compound lotteries that reduce to $\alpha P + (1 - \alpha)R$ and $\alpha Q + (1 - \alpha)R$, respectively.

Using this dynamic compounding interpretation, a common related way of arguing for the normative appeal of independence is dynamic consistency (Karni and Schmeidler 1991). If you preferred P over Q , but also $\alpha Q + (1 - \alpha)R$ over $\alpha P + (1 - \alpha)R$, this means you would like to conditionally choose Q over P instead, a preference reversal. This argument for independence relies on a reduction (of compound lotteries) axiom, in the ex ante evaluation, as well as a consequentialism axiom, so that ex post the fact you did not end up with lottery R , whatever it might be, would not alter your preference regarding P and Q .

Bounded Rationality and Prospect Theory

Yet, independence is famously violated by most people, which is known as the Allais paradox (Allais 1953) and was key for Kahneman and Tversky's development of prospect theory,

which delivered the leading descriptive model of decision-making under risk (Kahneman and Tversky 1979). Consider their Problems 3 and 4, based on Allais, and then their Problem 10 (any residual chances in the lotteries below concern winning nothing, which I omit in the description):

- Problem 3 asks respondents to choose between (A) an 80% chance of winning 4,000 and (B) winning 3,000 for sure.
- Problem 4 asks respondents to choose between (C) a 20% chance of winning 4,000 and (D) a 25% chance of winning 3,000.
- Problem 10 has Problem 3 as a potential second stage preceded by a first stage, where there is a 75% chance that “the game” ends immediately without winning anything and a 25% chance of the second stage. It asks respondents for a conditional choice.

Note that Problem 4 is the reduced version of Problem 10, which features Problem 3 as a conditional choice. In particular, independence requires that in both Problems 3 and 4 the same “amount” is chosen (either both times the less likely 4,000 or both times the more likely 3,000), while reduction requires that this is true in both Problems 4 and 10. In their between-subjects study, while 80% chose the more likely 3,000 in Problem 3, only 35% did so in Problem 4, and again 78% did so in Problem 10. Notably, essentially the same fraction chose the more likely 3,000 in both Problems 3 and 10. This suggests that violations of independence are due to a cognitive difficulty with identifying common “sublotteries” in order to focus and condition on the “real” difference that matters. The dynamic compounding or description via events as in Problem 10 or Savage’s argument, respectively, make this transparent. Hence, while people rather clearly fail at reduction, they may well satisfy a weaker “compound independence” (Segal 1990), which experimental work has confirmed to a fair extent (Conlisk 1989).

Only very recently have researchers found a convincing way of directly eliciting how people would like to make choices for the (static) risk domain in an incentive-compatible manner (Nielsen and Rehbeck 2022). The authors operationalize the subjective notion of rationality suggested by Itzhak Gilboa:

(...) a mode of behavior is *irrational for a decision-maker*, if, when the latter is exposed to the analysis of her choices, she would have liked to change her decision, or to make different choices in similar future circumstance. Note that this definition is based on a sense of regret, or embarrassment about one’s decisions, and not only to observed behavior.

(Gilboa 2015, 316)

A vast majority of 83% of the study participants (Ohio State University undergraduate students) select the independence axiom for their choices, compared to 14% that select an “opposite” control axiom. A majority of 75% of them end up violating it when left to their own devices, however. Notably, almost half of the participants keep their choice inconsistent with the independence axiom when reminded of their prior selection of it and shown what the axiom would choose instead. For comparison, the transitivity axiom (and its opposite control axiom) was selected at very similar frequencies, but only 43% violated it, and of those only 17% left their choice and this axiom inconsistent when reminded. This further confirms that, while independence is generally normatively appealing, its application

is cognitively difficult, and the fact that many accept the inconsistency suggests that people even lose sight of its appeal in concrete examples.

Relative to EU, for static choice, the descriptive success of prospect theory stems from how given probabilities enter the decision calculus. The given probabilities are nonlinearly transformed via an inverse-S-shaped function into decision weights on outcome utility. Unlike probabilities, decision weights do not sum to the same constant/one. In particular, the utility of unlikely outcomes is therefore overweighted, while that of likely outcomes is underweighted, relative to EU. Very recent work interprets this as bounded rationality reflecting “cognitive uncertainty” (Enke and Graeber 2023). They elicit valuations for win-lose lotteries in a standard manner, varying the amount that may be won as well as the winning probability. However, they additionally elicit the participants’ confidence that their true valuation lies in a certain range around their earlier response. The valuations of those who report high confidence (low cognitive uncertainty) are closely in line with the risk-neutral EU prediction across the probability space, whereas those with low confidence (high cognitive uncertainty) show insensitivity in valuation to probability in line with the inverse-S-shape from prospect theory. Notably, the authors find that cognitive uncertainty is largely unrelated to response times or standard measures of cognitive ability. This opens an avenue for research to investigate the determinants of cognitive uncertainty, and their relevance for economic decisions in the field.

Most relevant to this chapter, however, it also raises the issue that the descriptive success of prospect theory might not be about preferences in the usual sense. It may be that people do not “accept” given and supposedly objective probabilities as the relevant measure of their uncertainty to begin with (Gollier and Muermann 2010); in particular, could we think of prospect theory’s decision weights as subjective non-probabilistic beliefs? Broadly speaking, even to this day, “the psychology of probability weighting is poorly understood” (O’Donoghue and Somerville 2018, 110).

Subjective Uncertainty and Bayesianism

In its extreme form, doing without any objectivity in assessing uncertainty, the subjectivist approach is most provocatively stated as “PROBABILITY DOES NOT EXIST” (de Finetti 1974, x). For most “naturally” occurring uncertainty (election outcomes, economic or financial conditions, health outcomes, relationship outcomes, etc.), the law of large numbers seems hopelessly inapplicable. How could one then give probability any meaning?

Savage’s *Foundations of Statistics* (1954) offers an answer, behaviorally founding Bayesianism as SEU, which is considered the “crowning achievement of single-person decision theory” (Kreps 1988, 127). Savage followed Abraham Wald’s approach to statistics, whereby every statistical problem is best viewed as a decision problem (Giocoli 2013). There is a set of unknown states of the world S , fully describing all uncertainty, and a set of relevant outcomes X . The decision problem is to choose among “acts” $f : S \rightarrow X$, whose consequences/outcomes depend on the uncertainty. Choices between acts satisfy a system of axioms (including the sure-thing principle, see above), if and only if there exist (i) a unique probability measure over states and (ii) a cardinal utility function over outcomes such that those choices maximize the expectation of (ii) using (i).

Savage thus shows how preferences over acts allow to pin down *both* subjective constructs “probabilistic belief” and “utility” (the former uniquely, the latter up to positive affine transformations). Taking this model literally appears descriptively ridiculous,

however—just think about making plans for retirement. Coming up with the state space, which here is assumed data, already seems daunting, and indeed, Savage requires an infinite state space. One is rather immediately led to accepting bounded rationality as the human condition (Simon 1955).

Bayesianism and the Ellsberg Paradox

Having already discussed the independence principle for choice given probability, including how humans violate it, I focus here on the Bayesian part of SEU—assigning precise subjective probabilities to various events (Savage speaks of “personal” probabilities)—regarding its descriptive validity and normative appeal, based on the “Ellsberg paradox,” a series of (thought) experiments that challenge it on both levels (Ellsberg 1961). As introduction to this discussion, it is worthwhile noting that Savage simply rejected the Allais paradox. He argued that any rational person, given probabilistic beliefs, when confronted with her violation of independence would revise her choice to be consistent with EU (Savage 1954, 102–103). Note that the aforementioned study of Nielsen and Rehbeck (2022) on undergraduate students directly relates to this argument, and Savage would have to declare a large fraction of those students “irrational.”

By contrast, Savage’s defense of the Bayesian approach’s assigning precise probabilities to various conceivable events, “before” evaluating different available acts conditionally on these events, appears more pragmatic:

Once a frequentist position is adopted, the most important uncertainties that affect science and other domains of application of statistics can no longer be measured by probabilities. A frequentist can admit that he does not know whether whisky does more harm than good in the treatment of snake bite, but he can never, no matter how much evidence accumulates, join me in saying that it *probably* does more harm than good. (...) he is cut off from most applications of Bayes’ theorem, the algorithm for calculating what the new probability of a proposition is on the basis of its original probability and new relevant evidence.

(Savage 1961, 576)

This pragmatism is confirmed also by Savage’s response to the Ellsberg paradox demonstrating the descriptive failure of SEU. Ellsberg himself subscribed to the subjective approach to uncertainty but criticized the reduction of all uncertainty to precise probabilities, as if it was risk. For instance, consider his single-urn experiment (Ellsberg 1961, 653ff.). An urn contains 90 balls, each of which is either red or black or yellow, and one ball will be drawn at random. You know that exactly 30 balls are red, but nothing about the color composition of the remaining 60 black and yellow balls. Consider bets that win you 100 if the underlying event concerning the color of the ball occurs, and nothing otherwise. Which bets will you choose in the following two problems?

- 1 Betting on “red” or betting on “black”?
- 2 Betting on “not red” or betting on “not black”?

Most people choose the “red” and “not red” bets, which entail only risk (where winning probabilities are given as $1/3$ and $2/3$, respectively). By contrast, the “black” and “not

black” bets entail ambiguity. Anyone assigning a probability to “black” does so to “not black,” however, as the probabilities of two complementary events add up to one. Betting on “red” reveals the probability assigned to “black” to be less than one third, whereas betting on “not red” reveals the probability assigned to “not black” to be less than two thirds, implying less than one third for “black,” an inconsistency. As it turns out, various famous economists not only exhibited this paradox but also questioned whether this was irrational.

This sparked an intense debate in economics. Savage, who allegedly exhibited the paradox himself, remained largely absent from this debate, focusing instead on his impact on the practice of statistics (Zappia 2021, 172). Correspondence between him and Ellsberg, as well as other researchers like William Fellner or Bruno de Finetti shows a rather nuanced viewpoint, however, that stands in contrast to his response to the Allais paradox and his published works in statistics (Zappia 2021). Not only did Savage himself admit to “vagueness” (e.g., regarding “the likelihood of total war in the near future” (Zappia 2021, 186)) but he also appeared open to considering it even from a normative viewpoint, should it be developed axiomatically for a behavioral characterization. Today, sixty years after these exchanges, there is still no broad consensus among decision theorists regarding whether rationality implies Bayesianism (Gilboa 2015).

Bayesianism as Rationality given Objective Probability

Unfortunately, I found no record of whether or how Savage’s views were affected by Anscombe and Aumann’s (1963) alternative characterization of SEU, which I find to contain the most compelling argument for Bayesianism. Technically, their mathematical approach leverages the existence of objective probability and EU on this part of the domain, for behaviorally defining—or, better, eliciting—various subjective probabilities. This immensely simplifies the characterization in terms of axioms and proof, and it obtains for a finite state space as well. Later work on generalizations of SEU have therefore relied on it, and so does incentivized belief elicitation in economics.

I interpret Anscombe and Aumann as follows: Upon accepting that rationality implies EU for objective probabilities, one cannot but accept that it implies Bayesianism. Indeed, the much more transparent set of axioms shows the key role of the independence principle. In this framework, it is applied to acts that assign to every state a lottery (objective probabilities over outcomes) and where “mixing” of any two such acts is done state by state. This may be cognitively hard to perform but is still harder to object.

Normative reservations with respect to Bayesianism arise from unease with assigning precise probabilities to the truth of any proposition, even “meaningless” ones employing words that may just as well be made up. Why should it be irrational to say “I don’t know” (Gilboa 2015, 329–330)? However, SEU takes as given what the decision-maker knows. With regards to the outcome, “I don’t know” is the defining feature of decision-making under any kind of uncertainty. The fact that SEU does not give us guidance as to how we might come up with precise probabilistic beliefs given what we know or do not know in relation to the uncertainty can therefore hardly be a criticism. Moreover, SEU is not about any kind of judgment but about decision-making when something is at stake. While I surely find it difficult to assign a precise probability to the event that Donald Trump will win the next US presidential election, if I had to choose between a bet on that event and a bet on a fair coin toss, this choice would reveal something about this probability anyways. Put simply, my acceptance of the existence of objective

probabilities and that my choices given such probabilities should satisfy independence implies that, in any situation of subjective uncertainty, I want to choose *as if* I were a Bayesian.

This difference between mere judgment and decision-making is reflected in the fact that experimental economics—in contrast to psychology—insists on incentivized elicitation, including belief elicitation (whenever possible). To caricature this methodological approach, it would hold that “actions speak louder than words” and therefore make sure you “put your money where your mouth is.” This seems to assume that, without incentives, people would lie to us researchers. More seriously, it derives from the understanding that incentives induce respondents to take the task seriously, as they supposedly do in naturally occurring decision problems. It is worth noting that this is reflected also in the behavioral characterization of SEU: If the decision-maker is indifferent over all acts from which to choose, subjective probability is not defined (Gilboa 2009, 91).

My sense is that the normative implication arising from Anscombe and Aumann’s result is underappreciated in the literature, because Savage came first, of course, and with such an impact that the result’s main contribution seemed to be one of mere technical simplification. It therefore seems somewhat ironic that the decision-theoretic development of non-Bayesian models relied on the Anscombe-Aumann setting, including objective probability and hence a rather compelling normative case for Bayesianism. The seminal two such models here are Choquet EU (Schmeidler 1989), generalizing subjective probabilities to subjective “capacities” that need not be additive, and maxmin EU (Gilboa and Schmeidler 1989), allowing decision-makers to simultaneously maintain multiple subjective beliefs from which they would compare various acts according to their minimal EU. These generalizations of SEU were not only intended by the authors to accommodate the Ellsberg paradox with a notion of ambiguity aversion but also as something of a critique of Bayesianism (Gilboa 2015). If one agrees that rationality implies SEU, however, these theoretical approaches constitute positive decision theory (Dekel and Lipman 2010), helping us to better understand the cognitive reasons why being a Bayesian is difficult, i.e., the nature of our bounded rationality. Indeed, they all rely on weakening the independence axiom (as extended by Anscombe and Aumann), and I am not aware of any normative argument with that (indeed, see the preface of Edwards (1992)).

There is one important limitation to SEU, however. The behavioral definition of subjective probability of an event cannot depend on the outcome that occurs in this event, so that probability and utility are separable (Gilboa 2009, 128). The definition of states and outcomes is a critical element in the applicability of SEU theory. In a letter to Aumann, who had posed problems with “state-dependent utility” (Drèze and Rustichini 2004), Savage would openly admit this general limitation, show how it may often be avoided by redefining outcomes, but then also that this could become ridiculous, by writing: “I should not mind being hung so long as it be done without damage to my health or reputation” (Gilboa et al. 2020, 382). Hence, from the behavioral viewpoint, subjective probabilities regarding adverse life events such as severe illness, divorce etc. are hardly defined, which is important to be aware of in the practice of belief elicitation (Schlag, Tremewan, and van der Weele 2015). Relatedly, even when subjective probabilistic beliefs about an event are well-defined, theoretically, no incentive scheme could truthfully elicit them if the respondent has a personal stake in the event—which may be hard to determine in practice (Kadane and Winkler 1988).

Bayesian Updating and Information

As Savage himself suggested, to motivate his Bayesian approach as a necessary replacement of frequentism, once the definition of probability is extended beyond the objective, frequentist domain, the logic of probability theory is broadly applicable to various problems. Scientific progress thus turns into Bayesian updating. Let $p(E)$ denote the prior probability of any event E (or a proposition's truth), so for its complement E^C (or the truth of the proposition's negation) we have that $p(E^C) = 1 - p(E)$. Bayes' Theorem says that upon learning event F that had positive prior probability $p(F) > 0$, the probability of any event E updates from prior $p(E)$ to posterior

$$p(E|F) = \frac{p(E \cap F)}{p(F)} = \frac{p(E \cap F)}{p(E \cap F) + p(E^C \cap F)} = \frac{p(F|E)p(E)}{p(F|E)p(E) + p(F|E^C)p(E^C)}.$$

Note that in order to apply it, the Bayesian decision-maker indeed has to have a prior probability for the event F and any joint event $E \cap F$ (or truth of both propositions). The prior thus defines the statistical meaning or information content of event F . This illustrates again the cognitive demands on beliefs as a subjective prior probability distribution.

In terms of behavior, given SEU, Bayesian updating is essentially equivalent to dynamic consistency of preferences, and some authors reverse-engineered updating under ambiguity from this property (Hanany and Klibanoff 2007). However, how people should and how they do update under ambiguity is still subject to much debate (Shishkin and Ortoleva 2023; see also Nützenadel and Streb, Chapter 8 in this volume).

It should be noted that Bayesianism in the sense of behaviorally revealing well-defined subjective probabilities does not imply SEU, just as knowledge of outcome probabilities does not imply EU. Someone's behavior may define her subjective probabilities—separable from tastes—despite being inconsistent with EU; e.g., a prospect-theory agent may have well-defined subjective probabilities implicit in their decision weights. Machina and Schmeidler (1992) characterize such “probabilistic sophistication” behaviorally (in the purely subjective Savage framework), thus obtaining “a more robust definition of subjective probability.” Of course, the Ellsberg paradox violates probabilistic sophistication, so it follows that there is indeed something to ambiguity beyond risk. Furthermore, probabilistic sophistication with Bayesian updating implies that dynamic consistency of preferences is essentially equivalent to independence (recall the earlier illustration). In this stronger sense, SEU is indeed the behavioral definition of Bayesianism.

Bounded Rationality and Ambiguity Theory

When it comes to theory testing, to ensure separability between probability and utility under SEU, the practice in experimental economics is to use money and abstract states (e.g., colors of balls drawn from urns), as in Ellsberg's experiment above. For an extensive survey of such experimental evidence on ambiguity attitudes, see Trautmann and van de Kuilen (2015). In contrast to prospect theory for risk, there is no leading descriptive model for ambiguity. One notable reason is that the axiomatic approach in decision theory has modeled decision-makers with ambiguity by generalizing SEU such that for risk they boil down to EU, at odds with evidence from risk.

At the same time, capturing the key cognitive challenges that occur under *any* uncertainty separately from those that arise especially under ambiguity remains an important challenge in this literature (Wakker 2010). Here I mention only two recent works that relate to bounded rationality in a way that is relevant to both risk and ambiguity.

First, a recent study suggests that a major cognitive difficulty in decision-making under any kind of uncertainty concerns contingent thinking (Esponda and Vespa 2023). The authors frame several well-known decision problems—both the Allais and (single-urn) Ellsberg paradox, as well as second-price auctions and majority voting—either in the traditional (non-contingent) way or an alternative (contingent) way that essentially guides respondents through the relevant contingencies so that they become obvious (Li 2017). For instance, the choice between the “not red” and “not black” bets on the Ellsberg urn is described such that one wins anyway with “yellow” and has to choose between winning with “black” but not “red” or winning with “red” but not “black.” They replicate earlier evidence in terms of mistakes and show that the contingent frame significantly helps decision makers to avoid them. For instance, violations of SEU on the Ellsberg urn halve from around 58% to around 28%. On the one hand, this idea is similar to and sits well with the aforementioned evidence that “compound independence” is more often satisfied than “mixture independence” under risk. On the other hand, it is more fundamental in that it extends to ambiguity and actually connects bounded rationality under risk and ambiguity. Moreover, the authors also cover strategic settings with a dominant strategy, which requires contingent thinking. (A dominant strategy dominates any alternative strategy in that it performs at least as well *in every possible contingency*.) Here, the contingent frame also reduces mistakes significantly, in line with another recent experiment’s finding that learning dominance in second-price auctions is greatly enhanced by dynamic framing (Breitmoser and Schweighofer-Kodritsch 2022).

In social behavior, recent co-authored work shows that the same person may reveal two contradictory beliefs, one held unconsciously and another formed consciously, depending on the complexity of the decision problem (Barron et al. 2024). We identify people betting on a female rather than a male candidate’s performance on a logic task whenever both candidates are equally qualified but reverse the “gender bet” whenever they are differently qualified. This is in line with an implicit/unconscious bias against women (stereotype) driving complex decisions where both qualification and gender differ, and which contradicts the same person’s explicit/conscious judgment about gender that is revealed when gender is the only difference between the candidates. “Belief” is thus not well-defined, which is relevant in settings when certain views are socially stigmatized, like “women are worse at logical reasoning than men,” but prevail (if only unconsciously). For a formal development of implicit preferences, co-existing with opposing explicit preferences, which explains also related evidence on social behavior under risk (Exley 2016); see Cunningham and de Quidt (2022).

Psychology and Economics: The “Heuristics and Biases” Debate, and Some Recent Evidence

Psychology has for a long time studied human judgment, resulting in a huge body of evidence, most famously from Kahneman and Tversky (KT)’s “Heuristics and Biases” research program. KT’s research is nowadays well-known and influential among behavioral

economists. It has been subject to intense debate within psychology, however, most notably in KT (1996) and Gigerenzer (1996), printed back-to-back in the *Psychological Review* in the very year of Tversky's premature death. Both in terms of normative and methodological questions, this debate complements the decision theoretical discussion.

Kahneman-Tversky vs. Gigerenzer

Research in cognitive psychology on deviations from Bayesian reasoning with given probabilities began with the work of Ward Edwards as early as the 1950s. In abstract settings, he established a deviation known as conservatism bias, which has been found surprisingly robust in a recent meta-analysis (Benjamin 2019, Section 4). It means that the updated posterior is too close to the prior. Tversky, influenced as a PhD student by Edwards, gave a talk on this bias on the invitation of Kahneman, who found it at odds with the observation that people would often jump to conclusions. Their ensuing exchange marks the start of their “Heuristics and Biases” research in the late 1960s, investigating errors in human judgment more comprehensively and fundamentally.

KT went on to establish a wide range of judgmental biases and fallacies, which they explained as the consequence of a few basic heuristics. Most prominently, they propose the so-called “Representativeness Heuristic,” whereby in judging how likely it is that B is true when A is observed, “probabilities are evaluated by the degree to which A is representative of B, that is, by the degree to which A resembles B” (Tversky and Kahneman 1974, 1124). They argued that, e.g., the apparent opposite of conservatism bias, base-rate neglect—ignoring prior probabilities, as “jumping to conclusions”—would be a consequence of representativeness because judgments of resemblance ignore prior information.

For instance, consider the following famous cab problem: 85% of cabs in a city are blue and the remaining 15% are green, one was involved in a hit-and-run accident at night, and a witness identified this cab as green. Given that the witness, under night conditions, correctly identifies the color correctly 80% of the time, what are the chances that the errant cab was indeed green? Using Bayes' Theorem, the correct answer is around 41%. (In the above, take E to be the event that it was green, so $p(E) = 0.15$, and F to be the event that the witness identified the car as green, so $p(F|E) = 0.8$.) The modal response, that given by most people, is 0.8, however, which completely neglects the “biased” prior, under which blue is much more likely ($p(E) < 0.5$).

Another equally famous example that KT also associate with representativeness is the so-called conjunction fallacy, demonstrated with the following problem: “Linda is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.” Respondents are asked to judge which of the following is more probable:

- Linda is a bank teller.
- Linda is a bank teller and is active in the feminist movement.

A basic property of any probability is that $p(E \cap F) \leq p(E)$ for any two events E and F , so unless one believes all female bank tellers are active in the feminist movement, the answer must be the first, of which the second is a special case. However, consistent with the idea

that the description is representative of a feminist, but not a bank teller, the vast majority of respondents in various studies indicated the opposite. This is taken to demonstrate that human intuitive (subjective) judgment need not obey even a basic law of probability.

Gigerenzer summarizes his critique of this finding as follows:

At issue is the imposition of unnecessarily narrow norms of sound reasoning that are used to diagnose so-called cognitive illusions and the continuing reliance on vague heuristics that explain everything and nothing. (...) The focus should be rather the construction of detailed models of cognitive processes that explain when and why they disappear.

(Gigerenzer 1996, 592)

By unnecessarily narrow norms, Gigerenzer essentially refers to Bayesianism. He criticizes KT's suggestion of human irrationality in judgment based on single-event problems like Linda, for which probability is not objectively defined. KT counter that the vast majority of biases in their 1974 *Science* article concern problems with objective probabilities, though there is apparent disagreement on this notion (Gigerenzer 1996, footnote 1). KT counter further that the "refusal to apply the concept of probability to unique events is a philosophical position that has some following among statisticians, but it is not generally shared by the public" (Kahneman and Tversky 1996, 585). Indeed, in everyday communication, we use the language of probability—or chances or odds—to express judgment/beliefs.

Here, Gigerenzer's second normative concern comes into play, namely that KT's Bayesian norms are "content-blind." Essentially, his argument concerns the role of framing and semantics in the presentation of a given abstract problem. One may read this also as KT's "tricking people" into mistakes. This is exemplified with the finding that frequency formats instead of probability formats (e.g., there are 200 cabs, 170 of which are blue and 30 of which are green, the witness would correctly identify 136 blue cars as blue and 24 green cars as green) strongly reduce biases in judgment.

This leads to Gigerenzer's third main criticism. He claims that KT's heuristics are so vague that they explain everything and hence nothing, and that progress will be achieved only with the development of models that are predictive of the extent of bias as a function of the problem's characteristics. KT countered that their proposed heuristics make predictions that can be experimentally studied, without any need to define them a priori.

I find this debate highly instructive, especially for behavioral economists. It highlights the difficulty of a normative debate regarding beliefs/judgment without connecting to observed behavior. In contrast, the celebration of Savage's result in decision theory stems from its *behavioral definition* of subjective probability. The normative disagreement between KT and Gigerenzer thus has to boil down to their respective judgments of the "ecological" relevance of the heuristics-induced biases that KT document (Gigerenzer and Todd 1999, 5). This should be familiar to experimental economists as concerns of external validity of laboratory experiments, which have been prominently raised against lab measures of social preferences and promoted the use of field experiments (Levitt and List 2007). Finally, and again related to this key point of disagreement, Gigerenzer's insistence on the development of precise models for explanation and prediction should resonate with any economist. It is the reason why economists seek decision models with broad applicability in various richer economic environments ("markets"). In the face of practical constraints on data availability and collection, such applied theoretical analysis provides another route to external validity.

Quite generally, this debate—including the fact that the models developed by Gigerenzer and his co-authors (Gigerenzer, Todd, and ABC Research Group 1999) are tailored toward judgment data and have not been useful for economists—serves as a useful reminder of the differences in methods and objectives between psychology and economics.

Selected Recent Evidence from Economics

The emphasis on behavior in economics has led to the methodological difference from psychology that experiments in economics generally employ monetary incentives. Sophisticated mechanisms have been developed to truthfully elicit a respondent's probabilistic belief (Schlag, Tremewan, and van der Weele 2015). The theoretical concern here has been with incentives to distort one's response away from the true belief due to non-EU risk preferences (e.g., prospect theory), and the leading incentive mechanism BSR (binarized scoring rule) achieves incentive compatibility also for these.

The use of incentives has resulted in qualifications regarding their incidence but by no means do the biases documented in psychology appear to be an artifact of a lack of incentives. This certainly includes all biases mentioned here (conservatism in updating, conjunction fallacy, base rate neglect). For a comprehensive survey I refer to Benjamin (2019).

This suggests that incentives appear to be unnecessary when noisiness is dealt with by a sufficiently large sample, which is good news for studies of beliefs that cannot be incentivized, such as macroeconomic expectations. In fact, recent evidence shows that complex incentives may even backfire by introducing (additional) centrality bias, meaning reported beliefs are distorted toward 0.5 (Danz, Vesterlund, and Wilson 2022). The authors find that transparent quantitative information on incentives under the leading elicitation mechanism—known as the binarized scoring rule, BSR (Hossain and Okui 2013)—actually exacerbates centrality bias in participants' responses, not only between but even within subjects (i.e., the same person responds “worse” under such transparency).

However, even when there is an objective probability like a Bayesian update, the psychology literature shows people typically do not know it, and recent evidence further suggests they know that they do not know, so from the respondent's perspective, there is subjective “cognitive uncertainty” (Enke and Graeber 2023). The Ellsberg paradox already tells us that, when it comes to behavior, beliefs regarding subjective uncertainty are not probabilistic. The interpretation of elicited probabilities against an objective benchmark as behaviorally relevant bias (or also non-bias) anyway rests on strong assumptions that are probably violated for at least a significant share of respondents.

This suggests a cautious approach in the use and interpretation of probabilistic belief elicitation, as followed by the state-of-the-art in information provision experiments (Haaland, Roth, and Wohlfart 2023). Elicited beliefs are compared between different (information) treatments, thus between random samples of subjects, and further augmented with behavioral measures. Though I am not aware of any rigorous theoretical analysis, the assumption that differences in probabilistic responses between subjects tell us something relevant about differences in beliefs seems highly plausible, even when the latter are not probabilistic.

Another conclusion from a large body of research in psychology is that anticipatory feelings matter (Sharot 2011), and, accounting for these in terms of utility, belief bias can be rational (Engelmann et al. 2024). The same is true in the presence of other non-standard preferences. Indeed, in recent work, we find evidence among students studying for an exam that they develop a belief bias to better achieve their study objectives, because it counteracts

another well-documented and behavioral bias called present bias (Bönisch et al. 2024). Study effort has immediate costs but delayed rewards, and present bias implies too little effort from the long-run perspective. Exploiting dynamic variation in the importance of study effort between two groups of students with exams at different dates, we find that students for whom self-control is more important due to the exam's imminence believe the returns to effort to be greater. Related work with field data also establishes that people deceive themselves in order to better deceive others (Schwardmann, Tripodi, and van der Weele 2022). In view of non-standard tastes or strategic interaction, belief bias can have behavioral/instrumental value, and human psychology appears able to deliver it.

Conclusion

Upon accepting the notion of probability from objective uncertainty, rationality implies Bayesian decision-making in the form of maximizing expected utility based on precise subjective probabilistic beliefs that are updated according to Bayes' Theorem. This standard model of decision-making is widely applicable and theoretically useful for economic analysis.

Evidence from psychology and experimental economics shows that this model is not an accurate description of how people think or act, however, due to their bounded rationality. In particular, subjective beliefs more often than not seem to differ from precise probabilities; even confronting objective uncertainty, many people act as if they did not accept the frequentist odds as measuring it. Moreover, elicited beliefs seem sensitive to framing effects, and researchers would be better off investing in larger sample sizes than monetary incentives.

Practically any uncertainty is subjective, and framing belief elicitation is unavoidable. Interpreting bias on probabilistic belief measures against some absolute objective benchmark as indicative of irrationality, hence relies on strong assumptions. In view of other deviations from the standard model, belief bias may even be rational—whether by enhancing emotional well-being or serving instrumental purposes.

These issues more or less disappear when comparing identically measured beliefs between “comparable” groups; e.g., as part of understanding potential treatment effects in experiments, or when repeatedly studying beliefs within the same population over time in surveys. However, as a call to the profession, framing effects should be actively dealt with as part of a common methodology, by systematically studying them and agreeing on a standard approach to framing tasks/questions.

Establishing the ecological economic relevance of any particular psychological bias established in experimental research ultimately requires field evidence. The most fruitful approach toward this goal is then to model such biases as portable extensions of standard models and derive their distinct implications for “market” settings (Rabin 2013). This is only beginning to happen and should become a priority.

Notes

- 1 An important omission from this chapter is the literature on limited/costly attention, which may well be closest in spirit to Simon's notion of bounded rationality, and also its interpretation by Gigerenzer and Selten (2002). For a recent survey of this literature see Gabaix (2019).
- 2 There are some exceptions, such as surveys of professional forecasters (Manski 2004).
- 3 I retrieved citations data via the “Publish or Perish” software from google scholar on March 23, 2023, so it includes also citations outside of economics; the software is available at <https://harzing.com/resources/publish-or-perish>.

- 4 My initial work on bargaining theory maintained very strong assumptions on players' beliefs, considering only non-standard time preferences (Schweighofer-Kodritsch (2018) or Schweighofer-Kodritsch (2022)), though I also experimentally tested some behavioral predictions in the laboratory under weaker such rationality assumptions (Kim, Lim, and Schweighofer-Kodritsch 2022).

References

- Allais, Maurice. 1953. "Le comportement de l'homme rationnel devant le risque: Critique des postulats et axiomes de l'Ecole Americaine." *Econometrica* 21, no. 4: 503–546. DOI: 10.2307/1907921.
- Anscombe, Francis J., and Robert J. Aumann. 1963. "A Definition of Subjective Probability." *The Annals of Mathematical Statistics* 34, no. 1: 199–205.
- Barron, Kai, Ruth Dittmann, Stefan Gehrig, and Sebastian Schweighofer-Kodritsch. 2024. "Explicit and Implicit Belief-Based Gender Discrimination: A Hiring Experiment." *Management Science*. DOI: 10.1287/mnsc.2022.01229
- Benjamin, Daniel J. 2019. "Errors in Probabilistic Reasoning and Judgment Biases." In *Handbook of Behavioral Economics—Foundations and Applications*, edited by B. Douglas Bernheim, Stefano DellaVigna, and David Laibson, 2: 69–186. Amsterdam: North-Holland. DOI: 10.1016/bs.hesbe.2018.11.002.
- Benjamin, Daniel J., Matthew Rabin, and Collin Raymond. 2016. "A Model of Nonbelief in the Law of Large Numbers." *Journal of the European Economic Association* 14, no. 2: 515–544. DOI: 10.1111/jeea.12139.
- Bönisch, Felix, Tobias König, Sebastian Schweighofer-Kodritsch, and Georg Weizsäcker. 2024. "Beliefs as a Means of Self-Control? Evidence from a Dynamic Student Survey." CESifo Working Paper No. 10984. SSRN: <https://ssrn.com/abstract=4756065>.
- Breitmoser, Yves, and Sebastian Schweighofer-Kodritsch. 2022. "Obviousness Around the Clock." *Experimental Economics* 25, no. 2: 483–513. DOI: 10.1007/s10683-021-09720-z.
- Camerer, Colin F., George Loewenstein, and Matthew Rabin, eds. 2004. *Advances in Behavioral Economics*. The Roundtable Series in Behavioral Economics. Princeton, NJ: Princeton University Press.
- Conlisk, John. 1989. "Three Variants on the Allais Example." *The American Economic Review* 79, no. 3: 392–407.
- Cunningham, Tom, and Jonathan de Quidt. 2022. "Implicit Preferences." CEPR Discussion Paper No. DP17343. SSRN: <https://ssrn.com/abstract=4144661>.
- Danz, David, Lise Vesterlund, and Alistair J. Wilson. 2022. "Belief Elicitation and Behavioral Incentive Compatibility." *The American Economic Review* 112, no. 9: 2851–2883. DOI: 10.1257/aer.20201248.
- de Finetti, Bruno. 1974. *Theory of Probability*, 2 vols. New York: John Wiley & Sons.
- Dekel, Eddie, and Barton L. Lipman. 2010. "How (Not) to Do Decision Theory." *Annual Review of Economics* 2: 257–282. DOI: 10.1146/annurev.economics.102308.124328.
- Diaconis, Persi, Susan Holmes, and Richard Montgomery. 2007. "Dynamical Bias in the Coin Toss." *SIAM Review* 49, no. 2: 211–235. DOI: 10.1137/S0036144504446436.
- Drèze, Jacques H., and Aldo Rustichini. 2004. "State-Dependent Utility and Decision Theory." In *Handbook of Utility Theory*, edited by Salvador Barberà, Peter J. Hammond, and Christian Seidl, 2: 839–892. New York: Springer Science+Business Media.
- Edwards, Ward. 1992. "Utility Theories: Measurements and Applications." *Studies in Risk and Uncertainty*. New York: Springer Science+Business Media.
- Ellsberg, Daniel. 1961. "Risk, Ambiguity, and the Savage Axioms." *The Quarterly Journal of Economics* 75, no. 4: 643–669. DOI: 10.2307/1884324.
- Engelmann, Jan B., Maël Lebreton, Nahuel A. Salem-Garcia, Peter Schwardmann, and Joël J. van der Weele. 2024. "Anticipatory Anxiety and Wishful Thinking." *American Economic Review* 114, no. 4: 926–960. DOI: 10.1257/aer.20191068.
- Enke, Benjamin, and Thomas Graeber. 2023. "Cognitive Uncertainty." *The Quarterly Journal of Economics* 138, no. 4: 2021–2067. DOI: 10.1093/qje/qjad025.
- Esponda, Ignacio, and Emanuel Vespa. 2023. "Contingent Thinking and the Sure-Thing Principle: Revisiting Classic Anomalies in the Laboratory." *The Review of Economic Studies*. DOI: 10.1093/restud/rdad102.

- Exley, Christine L. 2016. "Excusing Selfishness in Charitable Giving: The Role of Risk." *The Review of Economic Studies* 83, no. 2: 587–628. DOI: 10.1093/restud/rdv051.
- Fishburn, Peter, and Peter Wakker. 1995. "The Invention of the Independence Condition." *Management Science* 41, no. 7: 1130–1144. DOI: 10.1287/mnsc.41.7.1130.
- Gabaix, Xavier. 2019. "Behavioral Inattention." In *Handbook of Behavioral Economics: Applications and Foundations*, edited by B. Douglas Bernheim, Stefano DellaVigna, and David Laibson, 1: 261–343. Amsterdam: North-Holland. DOI: 10.1016/bs.hesbe.2018.11.001.
- Gigerenzer, Gerd. 1996. "On Narrow Norms and Vague Heuristics: A Reply to Kahneman and Tversky (1996)." *Psychological Review* 103, no. 3: 592–596. DOI: 10.1037/0033-295X.103.3.592.
- Gigerenzer, Gerd, and Peter M. Todd. 1999. "Fast and Frugal Heuristics: The Adaptive Toolbox." In *Simple Heuristics That Make Us Smarter*, edited by Gerd Gigerenzer, Peter M. Todd, and The ABC Research Group, 3–34. New York: Oxford University Press.
- Gigerenzer, Gerd, and Reinhard Selten. 2002. *Bounded Rationality: The Adaptive Toolbox*. Cambridge: The MIT Press.
- Gigerenzer, Gerd, Peter M. Todd, and the ABC Research Group, eds. 1999. *Simple Heuristics That Make Us Smarter*. New York: Oxford University Press.
- Gilboa, Itzhak. 2015. "Rationality and the Bayesian Paradigm." *Journal of Economic Methodology* 22, no. 3: 312–334. DOI: 10.1080/1350178X.2015.1071505.
- Gilboa, Itzhak. 2009. *Theory of Decision under Uncertainty*. New York: Cambridge University Press.
- Gilboa, Itzhak, and David Schmeidler. 1989. "Maxmin Expected Utility with Non-unique Prior." *Journal of Mathematical Economics* 18, no. 2: 141–153. DOI: 10.1016/0304-4068(89)90018-9.
- Gilboa, Itzhak, Stefania Minardi, Larry Samuelson, and David Schmeidler. 2020. "States and Contingencies: How to Understand Savage without Anyone Being Hanged." *Revue économique* 71, no.2: 365–385.
- Giocoli, Nicola. 2013. "From Wald to Savage: Homo Economicus Becomes a Bayesian Statistician." *Journal of the History of Behavioral Sciences* 49, no. 1: 63–95. DOI: 10.1002/jhbs.21579.
- Gollier, Christian, and Alexander Muermann. 2010. "Optimal Choice and Beliefs with Ex Ante Savoring and Ex Post Disappointment." *Management Science* 56, no. 8: 1272–1284. DOI: 10.1287/mnsc.1100.1185.
- Grether, David M. 1980. "Bayes Rule as a Descriptive Model: The Representativeness Heuristic." *The Quarterly Journal of Economics* 95, no. 3: 537–557. DOI: 10.2307/1885092.
- Gul, Faruk, and Wolfgang Pesendorfer. 2008. "The Case for Mindless Economics." In *The Foundations of Positive and Normative Economics—A Handbook*, edited by Andrew Caplin, and Andrew Schotter, 3–39. New York: Oxford University Press.
- Haaland, Ingar, Christopher Roth, and Johannes Wohlfart. 2023. "Designing Information Provision Experiments." *Journal of Economic Literature* 61, no. 1: 3–40. DOI: 10.1257/jel.20211658.
- Hanany, Eran, and Peter Klibanoff. 2007. "Updating Preferences with Multiple Priors." *Theoretical Economics* 2, no. 3: 261–298.
- Hossain, Tanjim, and Ryo Okui. 2013. "The Binarized Scoring Rule." *The Review of Economic Studies* 80, no. 3: 984–1001. DOI: 10.1093/restud/rdt006.
- Kadane, Joseph B., and Robert L. Winkler. 1988. "Separating Probability Elicitation from Utilities." *Journal of the American Statistical Association* 83, no. 402: 357–363.
- Kahneman, Daniel. 2003. "Maps of Bounded Rationality: Psychology for Behavioral Economics." *American Economic Review* 93, no. 5: 1449–1475. DOI: 10.1257/00028280332265392.
- Kahneman, Daniel, and Amos Tversky. 1996. "On the Reality of Cognitive Illusions." *Psychological Review* 103, no. 3: 582–591. DOI: 10.1037/0033-295X.103.3.582.
- Kahneman, Daniel, and Amos Tversky. 1979. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica* 47, no. 2: 263–292. DOI: 10.2307/1914185.
- Karni, Edi, and David Schmeidler. 1991. "Atemporal Dynamic Consistency and Expected Utility Theory." *Journal of Economic Theory* 54, no. 2: 401–408. DOI: 10.1016/0022-0531(91)90130-V.
- Kim, Jeongbin, Wooyoung Lim, and Sebastian Schweighofer-Kodritsch. 2022. "Patience Is Power: Bargaining and Payoff Delay." Berlin School of Economics Discussion Papers 0015. DOI: 10.48462/opus4-4946.
- Kreps, David M. 1988. *Notes on the Theory of Choice*. Boulder, CO: Westview Press.

- Levitt, Steven D., and John A. List. 2007. "What Do Laboratory Experiments Measuring Social Preferences Reveal About the Real World?" *Journal of Economic Perspectives* 21, no. 2: 153–174. DOI: 10.1257/jep.21.2.153.
- Li, Shengwu. 2017. "Obviously Strategy-Proof Mechanisms." *The American Economic Review* 107, no. 11: 3257–3287. DOI: 10.1257/aer.20160425.
- Machina, Mark J., and David Schmeidler. 1992. "A More Robust Definition of Subjective Probability." *Econometrica* 60, no. 4: 745–780. DOI: 10.2307/2951565.
- Manski, Charles F. 2004. "Measuring Expectations." *Econometrica* 72, no. 5: 1329–1376. DOI: 10.1111/j.1468-0262.2004.00537.x.
- Moscatti, Ivan. 2016. "How Economists Came to Accept Expected Utility Theory: The Case of Samuelson and Savage." *Journal of Economic Perspectives* 30, no. 2: 219–236. DOI: 10.1257/jep.30.2.219.
- Nielsen, Kirby, and John Rehbeck. 2022. "When Choices Are Mistakes." *The American Review* 112, no. 7: 2237–2268. DOI: 10.1257/aer.20201550.
- O'Donoghue, Ted, and Jason Somerville. 2018. "Modeling Risk Aversion in Economics." *Journal of Economic Perspectives* 32, no. 2: 91–114. DOI: 10.1257/jep.32.2.91.
- Rabin, Matthew. 2013. "An Approach to Incorporating Psychology into Economics." *The American Economic Review* 103, no. 3: 617–22. DOI: 10.1257/aer.103.3.617.
- Savage, Leonard J. 1954. *The Foundations of Statistics*. New York: John Wiley & Sons.
- Savage, Leonard J. 1961. "The Foundations of Statistics Reconsidered." In *Contributions to the Theory of Statistics*, edited by Jerzy Neyman, 575–586. Vol. 1 of *Proceedings of the Fourth Berkeley Symposium on Mathematical Statistics and Probability*. Berkeley: University of California Press.
- Schlag, Karl H., James Tremewan, and Joël J. van der Weele. 2015. "A Penny for Your Thoughts: A Survey of Methods for Eliciting Beliefs." *Experimental Economics* 18, no. 3: 457–490.
- Schmeidler, David. 1989. "Subjective Probability and Expected Utility without Additivity." *Econometrica* 57, no. 3: 571–587. DOI: 10.2307/1911053.
- Schwardmann, Peter, Egon Tripodi, and Joël van der Weele. 2022. "Self-persuasion: Evidence from International Debating Competitions." *The American Economic Review* 112, no. 4: 1118–1146. DOI: 10.1257/aer.20200372.
- Schweighofer-Kodritsch, Sebastian. 2018. "Time Preferences and Bargaining." *Econometrica* 86, no. 1: 173–217. DOI: 10.3982/ECTA14396.
- Schweighofer-Kodritsch, Sebastian. 2022. "The Bargaining Trap." *Games and Economic Behavior* 136: 249–254. DOI: 10.1016/j.geb.2022.09.006.
- Segal, Uzi. 1990. "Two-Stage Lotteries without the Reduction Axiom." *Econometrica* 58, no. 2: 349–377. DOI: 10.2307/2938207.
- Sharot, Tali. 2011. "The Optimism Bias." *Current Biology* 21, no. 23: R941–R945. DOI: 10.1016/j.cub.2011.10.030.
- Shishkin, Denis, and Pietro Ortoleva. 2023. "Ambiguous Information and Dilation: An Experiment." *Journal of Economic Theory* 208: 105610. DOI: 10.1016/j.jet.2023.105610.
- Simon, Herbert A. 1955. "A Behavioral Model of Rational Choice." *The Quarterly Journal of Economics* 69, no. 1: 99–118. DOI: 10.2307/1884852.
- Trautmann, Stefan, and Gijs van de Kuilen. 2015. "Ambiguity Attitudes." In *The Wiley Blackwell Handbook of Judgment and Decision Making*, edited by Gideon Keren, and George Wu, 89–116. New York: John Wiley & Sons.
- Tversky, Amos, and Daniel Kahneman. 1974. "Judgment under Uncertainty: Heuristics and Biases." *Science* 185, no. 4157: 1124–1131. DOI: 10.1126/science.185.4157.1124.
- von Neumann, John, and Oskar Morgenstern. 1947. *Theory of Games and Economic Behavior*. 2nd ed. Princeton, NJ: Princeton University Press.
- Wakker, Peter P. 2010. *Prospect Theory: For Risk and Ambiguity*. Cambridge: Cambridge University Press.
- Zappia, Carlo. 2021. "Leonard Savage, the Ellsberg Paradox and the Debate on Subjective Probabilities: Evidence from the Archives." *Journal of the History of Economic Thought* 43, no. 2: 169–192. DOI: 10.1017/S1053837220000152.

5

NARRATIVES, REPRESENTATIONS, AND EXPECTATIONS

David Tuckett

The term “narrative” as a means of denoting and discussing processes of representation and communication in the social and some psychological sciences has a long history in a wide range of disciplines. It has played a major role, to a greater or lesser extent explicitly, in core foundational works of philosophy and social and psychological theory such as those by Dilthey, Gadamer, Heidegger, Benjamin, Weber, Freud, Ricoeur, Derrida, Lacan, Levi-Strauss, Jameson, Luhmann, Bruner, and Habermas.¹

To date, however, standard economics has omitted the role of narratives (the stories that people tell themselves and others) when they make all kinds of decisions (Akerlof and Snower 2016). Yet narratives throughout the social and some biological sciences are widely held to play a role in understanding and responding to the environment; focusing attention; predicting events; motivating action; assigning social roles and identities; defining power relations; and establishing and conveying social norms. They are also the dominant form of scientific communication, including in economics, for example in the form of scientific articles that tell a story about research findings (McCloskey 1985, 1990a, 1990b, 1994).

Recently, however, to judge by both title and abstract searches in economics journals (as well as its choice as a topic for two American Economic Association (AEA) presidential addresses) (Shiller 2019; Romer and Romer 2023), narratives and the role they might play in economic analysis have been receiving increasing attention; although, as Roos and Reccius ([2023] 2024) note, not all authors employ the term in the same way or for the same purpose as that Akerlof and Snower, above, advocate. Some, effectively, borrow it for their own idiosyncratic uses. For example, a widely cited paper in political economy (that of Eliaz and Spiegler 2020) “models” what the authors designate as different “narratives.” The authors ask how “the public” (not publics) might respond to competing narratives and what might be the long-run outcome. Specifying that as one or other “narrative” ceases to fit, i.e., to be “correct,” it will no longer deliver utility and so cease to be adopted, they argue that there will be a long-run tendency to narrative equilibrium dominated by narratives that are more rather than less correct. This model overlooks numerous factors that might influence narrative adoption or disposal, such as identity; it seems, for instance, at variance with narratives about the 2020 US Presidential election claiming the latter to have been rigged or “stolen.”

More importantly, the approach of Eliaz and Spiegler (2020) described above is an example of idiosyncratic use. As Roos and Reccius ([2023] 2024) point out, an approach in which the conflict between observers' different interpretations of political events is modelled to make predictions of possible outcomes, is very different to one that makes narratives of real-world phenomena themselves the object of attention, as has been common in social science disciplines and indeed in economic history for many years. This latter approach, whether explicitly or otherwise, introduces subjective human understanding and sense-making, as well as social discourse, into economic understanding, and specifically opens ways to explore how narratives, understood as ways agents represent the world to themselves and each other, may exert strong influences on expectations and so be potent drivers of the economy.

The events of 2007–2008, the subsequent slow recovery, the subsequent Euro currency crisis, and the doubts about central bank monetary and forecasting that became evident as policymakers struggled with the inflation surge of 2022–2023, have also motivated some economists to innovate. They all appeared to pose decisive challenges to the usefulness of rational expectations theory, to the extent that some authors suggested the field had been suffering from “omitted variables bias” (Romer and Romer 2023), and argued for new approaches. A striking example of an omission at the heart of many macroeconomic models is, for instance, that although expectations theoretically play the core role, what they really are, where they come from, and how they are modified, are “the big unexplained issue” and “a complete black box” (Rajan 2023).

This chapter reviews ideas about how narrative theories of economics, by offering a way to introduce subjectively formed knowledge into the study of economic action, may provide a candidate set of ideas to fill some current lacunae and may add explanatory power. Focusing particularly on the potential for the study of narrative representation to solve the problem of expectations, the remainder of the chapter will be structured as follows. We begin by introducing efforts to use historical texts—that is, what people have written about the economy—to explore economic drivers. Next, we discuss the different attitudes to the role of subjectively formed knowledge that are found in the social sciences and most modern economic analyses, showing how these attitudes are rooted in different assumptions about knowledge uncertainty and how it is managed in everyday life. Third, we discuss what narratives appear to be and do from a perspective outside economics, specifically how they appear to manage subjectively formed cognition as a driver of expectations and action under uncertainty. This leads us, fourth, to discuss Conviction Narrative Theory (CNT), a theory of choice under knowledge uncertainty. CNT provides us with one framework for understanding and investigating how changes in the shared narratives economic agents use to make their decisions are likely to drive economic events. Fifth, we discuss some empirical data and the research methodologies developed so far, before some concluding remarks.

Historical Narratives

There is a long tradition of studying what people have written about past and more recently present economic events in order to understand how the economy works. Charles Kindleberger (2000), for instance, draws on Charles Mackay's (1932) accounts of “popular delusions” dating back to the South Sea Bubble and the Dutch Tulip crisis, to explain the origin of financial crises as the outcome of investor beliefs and stories. Authors such as Galbraith (1993) also conduct similar historical approaches and Shiller (2000, 2019), Tuckett and

Taffler (2003, 2008), and Reinhart and Rogoff (2009), look at past and more recent history to find evidence that shifts in various shared economic narratives explain the unprecedented valuations that precede financial crashes.

Romer and Romer's (2023) AEA address is the outcome of decades of work, using an analysis of written documents depicting what was being discussed and done ("narrative analysis") alongside with an analysis of statistical data. In one example, Romer and Romer (1989), suggested they could resolve the question of whether (as originally argued by Friedman and Schwartz (1963)) monetary disturbances have real effects on an economy or not. Since then, Romer and Romer's argument for a narrative analysis approach (also made by Akerlof and Shiller 2010; Shiller 2017)—as one potentially providing economists with a new set of empirical techniques to gather systematic evidence from contemporaneous qualitative sources such as newspapers, government reports, and policy meeting transcripts and incorporate it into statistical analysis—has been supported and strengthened (e.g., Hamilton 1985; Romer and Romer 1989; Ramey 2011; Jalil 2015; Hansen, McMahon, and Prat 2018).

Romer and Romer (1989) described the challenge of how to go beyond statistics to discern the intentions of the Federal Reserve Bank. For this they relied entirely on contemporary Federal Reserve records—the "Record of Policy Actions" of the Board of Governors and the Federal Open Market Committee (FOMC) and, until their discontinuance in 1976,² the minutes of FOMC meetings. Methodologically, the question was whether they could reliably identify a shock from these sources. To do this, they looked in the texts both for a clear statement of a belief that the current level of inflation needed to be lowered and some indication that output consequences would be sought, or at least tolerated, to bring the reduction about. The use of the narrative approach, they argued in 1989 and elaborated in 2023, is that it "allows a vast body of information *that cannot be employed in conventional statistical tests* to be brought to bear on this question" (this author's emphasis). They suggest that it is this additional information "that can solve the problem of identifying the direction of causation between monetary factors and real economic developments" (1989, 167–168).

Using narratives found in texts to argue causally, as such work has encouraged, can lead to bias, either in the interpretation of the historical record (influenced first, by what is available and then, what is selected for study) or in the inference that one draws about real effects, such as monetary shocks. Questions surround how the narratives found in texts can be reliably selected and used, and how to argue for causality. These will be discussed later in this chapter. But by now there seems little doubt, confirmed by the fact that two AEA presidential addresses have been devoted to this topic in the last five years, that the analysis of narratives that began with trying to understand historical events is likely to become a powerful tool for understanding the present as well.

Narratives as Mental Representations

Although the concept of "mental representation" has received negligible attention in economics, it is vital to the fields of psychological and social science, and many other disciplines, for example philosophy, have also made important contributions to the field.

Mental representations are objects and structures in the mind with semantic properties. More precisely, they are information-containing, physically-realized structures through which we perceive, make sense of, process, understand, and recall all stimuli. In simple

terms, the world, the information in it, and our expectations of it must be represented, if we are to think or act via any form of consideration.

Numbers, mathematical symbols, frequency charts, tables, texts, etc., are all ways of representing information. In this chapter, *narratives* will be defined as by Johnson, Bilovich, and Tuckett (2023), as structured, higher-order mental representations incorporating causal, temporal, analogical, and valence information about agents and events, which function to explain data, imagine and evaluate possible futures, and motivate and support action over time.

In a structured mental representation, relations are set out between the objects it represents. For example, a feature list is an unstructured representation of a category, whereas a propositional sentence (assigning attributes to specific elements and specifying relations among elements) is highly structured. Similarly, causal models are highly structured, as are representations of categories whose features are related to one another through analogy (Gentner 1983). The point is that narratives, too, are structured—similarly to causal models (event causation and agent-causation), but containing richer information that is not typically represented in the latter, because they add temporal, analogical, and valence structure. This definition distinguishes narratives from several other kinds of representations, including probabilities, spatial maps, associative networks, images, categories, and logical relations (see Johnson, Bilovich, and Tuckett 2023 for further explanation).

The notion of *representation* is crucial for what follows because the relative importance given to the potential role of narratives in economics, compared to its potential role in the social and psychological sciences, depends on the scope given by theorists in the different disciplines to the importance of agents' mental representations and how they are formed. Economic models use probabilities but are usually silent on how these are chosen by the modeler. Expectations of future interest rates, inflation, output etc., can be represented by an abstract symbol. But once the model is to be applied to real world contexts, these symbols must be given values. At this point the world must be represented more precisely.

In this author's view, economics, by focusing on logical relationships in abstract models, has hitherto been handicapped first, by ignoring the problematics of representation and, second—insofar as it is influenced by the behavioral trend in economics—by supposing that only two types of expectation can matter empirically: rational and irrational, where rationality has the very specific “economic” meaning of being optimal and agents are constrained by competitive markets which institutionalize and enforce “rational” action in the economics sense.

The distinction rational/irrational must break down in the world we live in, because for most significant decisions, the decision context is “radically uncertain” (Kay and King 2020). This means that consensus probabilities as to the outcomes of action are often not available and therefore that there is no guarantee, even if actors are fully rational, that they can collectively create the conditions to enforce optimal choices. Although some actions can look decidedly foolish *ex ante* as well as *ex post*, what it is rational to choose under radical uncertainty is far from clear. In this situation, everything depends on how agents “represent” the world, in other words on the narratives they tell themselves about it.

Sociology and social anthropology, because these disciplines devote much effort to how people construct representations of the world and how this varies in different social networks, adopt a different rationality standard, more suited to reality. Action is still means-end rational, but expectations are informed by whatever subjectively formed knowledge available to an actor makes sense. Whereas social order (i.e., macro equilibrium states)

occurs in economic theory because agents are constrained to be economically rational, social scientists suppose order occurs because the knowledge held by individuals is structured by the prevailing network-specific roles, norms, values, beliefs, and narratives, and applied when they develop expectations and act performatively (i.e., choose to put them into action) in their context. Because norms, values, beliefs, and other cultural artefacts (such as narratives) are network-specific and performed, they vary to produce diverse outcomes across space and time. Multiple outcomes (equilibria) influenced broadly by the forces of local culture, power, and circumstance, are possible.

Interestingly, from a social science viewpoint dominant beliefs and narratives in any network are only partially fully accepted. Contrarian beliefs are always bubbling away under the surface, sometimes emerging as more dominant when local conditions shift. An important consequence is that because social order is the outcome of culture, performed interpretively by subjectively capable actors, it is always conceptually provisional. It follows that when circumstances or power structures are interpreted in new ways, innovative approaches to means-end rationality can take over.

Behavioral economics, like neuroeconomics as presently constituted (Tuckett 2017b), with its origin in a more empirically-based approach to human decision-making than traditional economics, could have shifted economic analysis in the direction of the wider definition of rationality just mentioned and so signposted a way to arrive at multiple equilibria accounts of economic outcomes. But, so far, this has not been the case.

Rather than focus on the study of actual economic behavior, the main lines of behavioral research have aimed at explaining macroeconomic outcomes in terms of error. Agents are depicted as sometimes overcome with “irrationality,” conceived as a by-product of (hypothesized) human fallibility. Hence, behavioral economists explain the 2008 crisis as the outcome of “biased” beliefs (Thaler and Sunstein 2008) or “inaccurate” beliefs about risk (Gennaioli and Shleifer 2018) taking over. Shiller’s work on narratives has been highly innovative, although remaining within the “behavioral” perspective. He defines narratives as “stories that offer interpretations of economic events” (Shiller 2000, 792) and in his 2019 book studies them empirically by using a word frequency measure (Google N-grams) which indicates historical shifts in word use. The data shows that some word clusters are perennial narratives (such as about “fabulously successful investors,” dotcoms, and other “popular” ideas) that sometimes go viral and then produce widespread “contagion.” His idea is that they then influence market behavior in irrational directions much as a virus disrupts our bodies. Shiller’s work is innovative because he provides “a fundamentally different paradigm for the power of narratives than any previous approach in economics” (Roos and Reccius [2023] 2024, 7). Yet, by retaining the idea that narrative-based behavior is irrational, rather than recognizing that some narrative-based representation is necessary to act, he loses the opportunity to develop a new paradigm focused on the everyday role of representation in evolving economic events.

To dig a little deeper into the differences in how economists (including behavioral economists) and social scientists think about the potential role of narratives as representations of subjective knowledge, we first need to discuss what importance to attach to subjectively formed knowledge in all economic situations, not just those that arise when markets are disrupted. Stripping away the normative rhetoric, the issue at stake is not the assumptions to be made about rationality and irrationality, but whether these highly normative utilitarian terms are enlightening and useful ways to conceive of the role of knowledge formation and representation in economic life. Put another way, is a normative approach useful to

consider what economic actors can know about the world, how they are conceived to develop expectations to act within it, and the implications?

The potential benefit to economists of using a concept of narrative representation to focus directly on the problematics of what economic actors can know, is that it opens research questions about how knowledge representations are constructed. Crucial here is the role of the imagination. Jens Beckert (2016) makes this point, starting from the assumption that many key decision situations in economic contexts are characterized by fundamental uncertainty. Consequently, the decision-making of means-end rational actors must be anchored in “fictions”—Beckert’s word for imaginative narratives. For Beckert, “fictionality” in economic action is the creation inside the mind of an imagined future representation of the state of the world and of the causal mechanisms leading to this future state. Actors are motivated in their actions by these imagined futures and organize their activities based on these mental representations. Crucially, and fundamental to Beckert’s explanation of capitalism, since these representations are not confined to empirical reality, Beckert argues that fictionality is a necessary source of creativity and innovation. Beckert’s theory of fictionality—narrative—provides insight into the microfoundations of the dynamics of a capitalist economy and can be applied to understanding its components—investments, consumption, and money. Beckert elaborates that to understand economic action in capitalism, actors’ perceptions of the future must take center stage. Not only “history” (i.e., statistically analyzed data) “matters” but also the “future matters.”

Beckert’s theory of expectation formation contrasts vividly with the “black hole” at the heart of macro-models. His use of narratives, as representations of subjective knowledge, contrasts with the restricted use of narrative to denote error in behavioral economics. As Roos and Reccius ([2023] 2024) warn, if the term narrative is misappropriated by removing it from its consensus intellectual context and constraining it within standard economics, much will be lost.

In this author’s view, an additional and significant reason for the inattention to representation in economics is a consequence of the decision made by some economists, particularly by Friedman (1953), to discount the importance of uncertain knowledge in expectation formation. In a sense, Friedman misappropriated expected utility theory (von Neumann and Morgenstern 1944) to treat it as a psychological explanation of behavior, although it was never intended to be (Ford and Kay 2023; Johnson, Tuckett, and Bilovich 2023; Newell and Szollosi 2023). In doing so, he then limited the world of economic analysis to Savage’s “small world” or “model-land” (Thompson and Smith 2019) and rejected the tentative steps taken by significant predecessors such as Pareto, Durkheim, Weber, Marshall, Knight, and Keynes. In different ways, these authors had each realized that to understand how economic order was attained meant asking what we would now see as psychological and sociological questions, starting with how economic actors gain knowledge to guide their actions (Knight 1921; Keynes 1936; Parsons 1937).

Because sociologists, social anthropologists, and some psychologists, have treated knowledge representation as a problematic, they have explored social (and, therefore, economic) order as the outcome of socially shared beliefs, practices, and institutions that function to contain knowledge uncertainty (e.g., Berger and Luckman 1966). An important corollary is that whatever order is attained is necessarily impermanent, inherently fragile, and subject to change. Compared with standard economics, such theories make it much easier to understand social and economic systems as endogenous producers of instability and change.

An obvious starting point for a view beyond standard macroeconomics that is able to explain both the stability and instability of economies is to suppose that the interpretation of data necessarily plays a key role in any knowledge claim. And this is where narratives come in, as higher order mental representations that summarize relevant causal, temporal, analogical, and valence information about the world and where it is going. Narratives summarize actionable knowledge about options. The hypothesis is that by studying narrative shifts, that is, shifts in how agents are developing interpretations of the economy, we should be able to examine and determine how particular interpretations become dominant and influence outcomes in both good times and bad. As an example, Collier and Tuckett (2021) use the concept of narrative as a coordinator of collective action in achieving local economic equilibria, such as in an economic region or developing country where market forces fail. They argue that what they call hardened (pessimistic) narratives about a place influence both local and global investors and place obstacles in the way of turning their economies round. For them, changing “the” local narrative and using it to initiate coordinated action to launch an investment re-set would be a precondition for place-based economic policy.

What Are Narratives and What Do They Do?

We will now take a closer look at narratives and what we know about what they do. Analytically, decisions to act require a solution to a mediation and combination challenge respectively. The mediation challenge is that of turning the information available to a decision-maker in the external world into an actionable representation that allows the likely outcomes of action to be decided internally (in the mind). The combination challenge is to combine beliefs about potential actions and their outcomes with goals to yield action.

Probabilities and utilities are forms of mental representation chosen in economics. The beauty of probability is that it appears to solve both challenges—turning available information into an actionable summary and providing an easy way to value whether the cost of the action is worth the expected outcome.

The problem with probabilities for developing forward-looking expectations is how to decide what they are. Other than models and the small world of well-constrained situations (for example, gambling choices in a laboratory), it is rarely the case that the major drivers of an economy (i.e., those that matter to us in terms of understanding its evolution) can be reliably or demonstrably calculated. Moreover, as noted above, calculating the probability of imagined futures not yet encountered is impossible. Who knows whether an invention or business model will work? What is the probability of the next European war or the next pandemic? What are the exact consequences of different climate change mitigation measures, or what new plans for generating electricity will be a success? Artificial intelligence (AI) and statistical methodologies can only be backward-looking. Realistically, in terms of the future only guesses are possible.

Narratives, on the other hand, if embedded within calculative devices (Beckert and Bronk 2018) such as spreadsheets and cost benefit analyses, provide an alternative human solution. They are used to support statistical inferences in everyday life, academic journals, and central bank meetings. They neatly solve both the mediation and combination challenges. First, their function is to make sense of the world and indicate what is going on and why. Second, they provide an easy way to represent alternative action scenarios and outcomes. Third, they provide a coherent framework to choose between alternatives. Moreover, fourth, they can be used to communicate to others to help them to collaborate with

decision-makers and to influence them to do or to believe in what they (the decision-makers) consider the best approach. This is why they are used in such things as company mission statements, advertising, central bank communications, company business plans, and scientific papers. Indeed, often the communicability of a decision narrative influences whether or not a decision is adopted. Investors, for example, use narratives to tell stories to themselves about what a particular investment promises, why it is better than an alternative, and what the risks are. In doing so they evaluate elements of the narrative they are developing, its assumptions and weak points, etc., both cognitively and affectively. They can also tell a story around their imagination of how their clients will respond.

As we will see, because narratives are both embodied (that is, they engage affective and cognitive systems in the human brain) as well as socially embedded, they are particularly strong theoretical candidates to be key drivers of economic activity.

Conviction Narrative Theory (CNT)

Most non-routine economic decisions, including virtually all policy, investment, and regulatory decisions, are made in contexts in which there is only very partial scope to imagine all possibly successful actions, let alone the probabilities of success. Moreover, as just noted, knowledge about what is only imagined must elude quantification. Evaluating future outcomes to learn from actions is also often fuzzy. Furthermore, in many cases decisions and their outcomes are separated in time, creating waiting periods and commitment difficulties. Doubt is endemic. Additionally, decisions about the future depend on data to grasp the present accurately. This has proved a major obstacle for central banks, which usually make decisions with old data. They are not alone. Pandemic policy must be made with many features of the pathogen or public responses to policy unknown. And finally, anticipating the desirability of different imagined outcomes requires both our beliefs about and our valuations of each action, both of which are inherently embedded in the culture and practices around us.

Conviction Narrative Theory (CNT) (Chong and Tuckett 2015; Tuckett and Nikolic 2017; Johnson, Bilovich, and Tuckett 2023)³ draws on evolved human capacities beyond simple utility calculation, to provide an account of choice under radical uncertainty—trying to answer the question posed by Simon (1989) as to “how human beings reason when the conditions for rationality postulated by the model of neoclassical economics are not met” (Simon 1989, 377). It sets out how, although it is impossible to make an (ex post) optimal decision in an uncertain context and the likelihood of either success or failure must be retained long after the decision is committed, human agents successfully use narratives to make decisions (not necessarily successful ones of course) rather than being impaled by doubt. They do this by adopting and/or perhaps modifying preferred action narratives that support their intended actions, therefore convincing themselves they have a successful way forward.

According to CNT, narratives—mental representations that summarize relevant causal, temporal, analogical, and valence information—are the psychological substrate underlying decisions to act. They support and link four processes: explanation (structuring evidence to understand the past and present, yielding emotional satisfaction), simulation (generating imagined futures by running the narrative forward), affective evaluation (appraising the desirability of imagined futures and managing commitment toward a course of action over time), and communication (transmitting decision relevant knowledge across

social networks to justify, persuade, and coordinate action). In contexts marked by radical uncertainty and fuzzy evaluation, we use narratives to make sense of the past, imagine the future, commit to action, and share these judgments and choices with others.

In this way action is supported by a preferred action narrative that makes sense of the situation actors suppose they are in, offers an underlying causal model explaining how action leads to the desired outcome, and allows the conviction that one or other of the alternate actions considered (including inaction) is likely to produce the desired outcome. Preferred narratives tend to be selected with amendments “on the fly” from among alternatives circulating in the decision-makers’ relevant social networks. They are selected via cognitive and affective processes that generate approach rather than avoidance feelings that the action will be successful.

The role given to narratives and simulation via “mental time travel” (Suddendorf and Corballis 2007) in CNT is consistent with past use in the social and psychological sciences and the previous discussion. The innovation is to join these aspects with emotion, drawing on evidence that modifies prior views of emotion in relation to complex, future-oriented decision-making.⁴ Generating emotions of excitement at anticipated success (approach emotions) and overcoming doubt and paralysis at the possibility of failure (avoidance emotions) are central to decision-making under uncertainty. Hamlet was uncertain for three acts of Shakespeare’s play before discovering in the fifth act that it was too late. The proverbial Buridan’s ass could not choose between two equidistant haystacks and starved to death (Sen 2003). Hodgkinson and Wright (2002) document how a senior corporate management team they supported through a scenario planning process failed to engage with the uncertainties they faced, deploying a range of individual and organizational defenses to avoid decisive action, with almost fatal consequences. Investing in the stock market after a crash could be hugely profitable (if the market recovers) or hugely costly (if it continues to crash). Compounding this, high-stakes decisions often unfold over long periods, requiring lengthy commitments. Likewise, preparing for a pandemic requires sustained investment for years, with no sense of when (if ever) it will pay off. Altogether, there is overwhelming evidence that conflicting arguments about which course to take produce ambivalence and that this can then stop action in its tracks (Festinger 1962; Smelser 1998; Rucker et al. 2014; Armitage and Conner 2000; Rosner et al. 2022).

In the face of ambivalence, the point is that conviction bears dividends. It is not “irrational.” But conviction is also dangerous: decision-makers who stick to their guns regardless of the evidence fare no better than those who vacillate at every turn. Thus, an important function of emotions is to manage conviction—gaining conviction to act even when every option has strong arguments for and against, maintaining conviction to commit to a sustained decision over time in the face of unfolding information, and moderating conviction when the evidence reaches a sufficient threshold to reverse course. We become emotionally attached to a particular future scenario, investment, or romantic partner, to gain and maintain confidence in strategic, financial, or romantic decisions in the face of conflicting reasons and short-term variability. Yet excessive or unreflective conviction yields disaster.

In CNT, conviction is built through narratives that integrate evidence and expectations with emotional support for a preferred choice. For example, the narratives uncovered in Tuckett’s (2011) interview studies of money managers revealed two key conviction-generating strategies (Chong and Tuckett 2015). First, 90 percent of respondents cited at least one narrative containing attractors—belief that an entity was attractive because it provided an exceptional opportunity for gain, either because the respondent felt they had

special insight or because the entity itself was special (e.g., due to exceptional products). Second, 88 percent of respondents cited at least one narrative classified as a doubt-repeller that served to reduce anxiety, either because it capped uncertainty (e.g., due to competent management) or because of downside surprise.

Decision-making in the face of recognized uncertainty generates anxiety and excitement. On the one hand, excitement, the reward system deep within brain structures, is triggered by opportunity. If it is not, then nothing happens. On the other hand, anxiety is triggered by potential threat in the face of a perceived reward that we desire to approach. Both approach and avoidance emotions are necessarily aroused by the thought of action, insofar as the limited information about potential rewards and harms is recognized.

This “felt” ambivalence triggers the behavioral inhibition system and the anxiety associated with significant potential goal conflicts (Gray and McNaughton 2003). In the short term, anxiety is functional, activating search and vigilance. However, it is an aversive state; there is a strong motivation to quickly resolve the goal conflict that is generating anxiety. This may be through emotion-focused defense and coping mechanisms which downplay the conflict or, alternatively, through problem-focused approaches which seek to resolve it (Ashforth et al. 2014).

From an economics viewpoint, when considering how to explain financial crises and major economic fluctuations, CNT makes clear that in the face of the radical uncertainty that is an inevitable feature of a dynamic economy, the way in which ambivalence is managed will be a key driver of its evolution. Any plan or consequential narrative about the future should evoke ambivalence: the presence of conflicting cognitions and conflicting emotions which respond to both the attractive possibilities and the potential aversive outcomes (Fenton-O’Creedy and Tuckett 2021). It is how this dilemma is dealt with that matters, which raises research issues not hitherto investigated. CNT contains the proposition that one way forward may be to examine whether the dominant narratives in economies at particular moments coalesce around more or less of what is termed a *Divided State* (Tuckett 2011).

When emotions are well-regulated (Gross 1998), conviction buffers against the vicissitudes of the unfolding situation, but can be moderated. In such an *integrated state* (Tuckett and Taffler 2008; Tuckett 2011; Fenton-O’Creedy and Tuckett 2022), individuals and institutions can be sensitive to new information and adjust decisions in an orderly way; a particular narrative is adopted but with acknowledgement of the possibility of error and a commitment to staying attuned to evidence that rejected, competing narratives may be unfolding. In contrast, in a *divided state*, ambivalence is hidden by attentional neglect of information that is (felt to be) inconsistent with the preferred narrative. Whereas new information in integrated states can trigger curiosity and evidence integration, in a divided state incongruent information is felt as a threat and rejected (Tuckett and Taffler 2008; Tuckett 2011). This is why ambivalence has been linked both to maladaptive responses, such as confirmation bias and behavioral paralysis, and adaptive responses, such as broader attention and willingness to consider multiple perspectives (Rothman et al. 2017; Fenton-O’Creedy and Tuckett 2022).

Shared Narratives as Economic Drivers

CNT posits that actors select preferred conviction narratives from among other possibilities to enable action under uncertainty. Because narratives enable cognition and emotion

to combine, this “solves” both the mediation and combination challenges that mental representations must master. But conviction narratives are selected in a social environment and are socially embedded.

Because decision-makers live and work in groups and social networks in times and places in which future-oriented action narratives are always swirling around, they only partially, if at all, create their narratives “on the fly.” What they find makes felt sense of their situation. The alternate actions they consider, and the actions they envisage and feel attracted to or repulsed by, are all represented through locally social embedded narratives that feel right now. Hence in the same way as Durkheim ([1912] 1995) classically argued that collective representations underpinned social order, so in CNT shared narratives that are felt to be appropriate for guiding action, underpin the collective decision-making that produces equilibrium in an economy. When narratives shift, they alter the risk/reward calculus for investors or other decision-makers. Think of the different narratives about debt before and after the financial crisis, or about which firms to invest in before and during the energy price inflation provoked by the Ukraine war.

CNT provides an underlying theoretical framework as to why “collective economic narratives” (Reccius and Roos [2023] 2024) may drive an economy, and so provides a new analytic framework for a policy-relevant understanding of two of the currently most difficult to explain outcomes of a modern dynamic economy: when and how economies remain in, or move to new, macro equilibria, and when and why financial instability is an ongoing feature. At a general level it also seems likely narratives (conviction narratives) will be a useful theoretical tool if and when economists move from the current position of treating preferences as “immaculately conceived” (Boulding 1956, 1–2) to become interested in the sources of their instability (Bronk and Beckert 2022).

Second, because narratives that fit and support decisions both depend on, and are spread via, contexts and social networks, they are subject to social influence—they become shared narratives. Uncertain agents, such as the fund managers interviewed in the context of this chapter, watch price screens and monitor news. In other words, they keep looking around and potentially copying, or otherwise drawing on, the actions and narratives of others. In doing so, they may be particularly attracted to such things as the reputed success or failure of other agents in their salient networks. Certainly, these processes can be seen in the financial pages of any newspaper or in the avalanche of news on Bloomberg and other services, as well as in the reports of financial analysts.

But the future present can be made and re-made. Because the world is complicated and places are different, not all narratives of what is happening are given the same weight across either space or time. Sometimes, particularly with modern communications, some narrative topics can be shared widely. They can then rapidly become quite homogenous narratives, although this is not always the case. Past examples would be stories about the opportunities to be gained or not from tulips, dotcoms, sovereign debt, buying a house, new financial instruments, trade policies, or whether inflation will be higher or lower than previously supposed. The crucial point is that the circulating stories about the future seem to make sense of whatever data is treated as fact by different groups or networks of actors at moments in time. Some read the *Quarterly Journal of Economics*, for instance, others watch Fox News. In this way, stories influence what is perceived as opportunity or threat and are selected, dropped, or modified as useful explanations of experience as events unfold.

If economic decisions rest on selection from conflicting or competing narrative sense-making, then change can come about through change in narratives whether or not there is

change in the world. And since new narratives can be adopted and shared rather quickly, whereas changes in the world are often slower and harder to anticipate, a narrative approach to understanding the economy is more likely to be capable of exploring change.

Although uncertainty means that future asset prices or the future success of business plans are inherently unpredictable, agents have little option but to select forward-looking narratives, form expectations based on them, make decisions, and adapt them as the stories change. Note, stories in this account are not arbitrary—they are best efforts to make sense of information and interpret it. This is why there is a solid body of accumulating evidence, from discussions with economic agents, to suggest that this is exactly what they rely on when they make sense of the world (e.g. Bewley 1999; Knorr Cetina 1999; Smith 1999; Abolafia 2005; Berezin 2005; Stark 2009; Tuckett 2011; Collier and Tuckett 2021). It is also why increasing attention is likely to be given to the precise construction of the narratives used by central banks to influence forward-looking expectations (Holmes 2014; Tuckett et al. 2020; see also Dräger, Chapter 12 in this volume).

Empirical Data and Research Methodologies

Various data sources, research logics, and methodologies have so far been used to try to ascertain empirically whether it is possible to infer reliably to what extent narratives drive the economy. Some data sources have already been mentioned—qualitative historical research, interviews, observation, Google N-grams, and news and other texts. In this section, we look further at the issues of narrative selection and causal inference introduced in discussing Romer and Romer (2023) above.

Two main methodological issues must be faced. First, how to identify and track narrative content? In other words, how to capture which narratives are circulating in an economy and the moment at which new shared narratives seem to emerge and become dominant—a task that requires significant amounts of theoretical definition. Second, how to attribute causality? In other words, supposing shifts in shared narratives are identified, are they driving shifts in the economy or vice versa?

To date, most research in this area has the characteristic of data mining (seeing what correlations turn up in the data) rather than the specific investigation of hypotheses suggested by theory. What constitutes a new narrative, what effect it might have on which aspect of an economy, and how that effect is to be measured, all need to be theorized—something that has perhaps been held back by lack of interdisciplinary cooperation and the implicit mainstream view in economics, discussed earlier, that narrative effects on the economy are the outcome of error. Roos and Reccius ([2023] 2024, 8) also suggest that the structure of the information that is extracted from text sources and then used to explain variations in economic variables has not been informed by “economic theory (or theory of any other kind)” but is largely a result of the available tools. The benchmark method, Latent Dirichlet Allocation (LDA), is a topic model that identifies term clusters resembling topics from large corpora of documents based exclusively on their co-occurrence in these documents. Impressive looking word clouds can be derived so that the relative frequency of different topics at different periods can be envisaged by looking at the font size in which they appear. Such analyses may be suggestive but do not lend themselves either to the study of causal inference or to any reliable interpretation.

“Bag of words” approaches to measuring shift in narrative content perhaps offer a more directly interpretable approach. Researchers look for the changing frequency of

selected words. For instance, economically or financially orientated sentiment word lists have been applied to content analysis of different text databases to try to predict various aspects of asset prices (Tetlock 2007, 2011; Tetlock, Saar-Tsechansky, and Macskassy 2008; Loughran and McDonald 2011; Soo 2015). Other word lists have been used to indicate “Economic Policy Uncertainty” (Baker, Bloom, and Davis 2016) or other components of uncertainty (Larsen 2021) and still others to try to forecast macroeconomic variables (Ardia, Bluteau, and Boudt 2019; Larsen and Thorsrud 2019; Kalamara et al. 2020; Rambaccussing and Kwiatkowski 2020). And regularly reported induces, such as the MCCI (Michigan Consumer Confidence Index) and its components, the VIX measure of financial strain or various financial spreads, have also been used, for example to capture shifts in animal spirits.

To establish causality, research has relied on Granger’s (1969) method for trying to determine causality between time series, VAR (Vector Auto Regression) techniques (Toda and Yamamoto 1995), and structural break analysis (Bai and Perron 2002), with varying results.

CNT, introduced above, permits a more theoretically-derived hypothesis than much other research. If shared narratives facilitate coordination and learning, then as they shift over time and propagate through social networks, they are likely to be tied to large-scale outcomes. Then, if economic actors’ decisions are driven by narratives (changes in the emotional content of socially available narratives may shift attitudes toward risk) then measures of approach and avoidance emotions in economic narratives should indicate a narrative shift and predict the direction of economic aggregates—output, employment, GDP growth—that depend on investment. Nyman, Kapadia, and Tuckett (2021) studied this claim using specially developed text-analytic techniques on internal Bank of England commentary (2000–2010), broker research reports (2010–2013), and Reuters news articles (1996–2014). There were several findings.

First, *relative sentiment* was found to be a leading indicator of economic volatility and consumer sentiment. This reflects the idea that a preponderance of approach over avoidance emotions is needed to produce conviction to invest (Keynes 1936). For each document, the proportion of words signaling approach (e.g., “excited,” “ideal”) and avoidance words (“threatening,” “eroding”) was calculated, with the difference between these indices constituting relative sentiment. Shocks to relative sentiment in the period 1996–2015 in the UK had negative effects on industrial production, employment, and the stock market, with each impact lasting for nearly 20 months (Nyman, Kapadia, and Tuckett 2021). Tuckett and Nyman (2017) also found that relative sentiment also predicted changes in investment and employment in the UK, US, and Canada more than 12 months in advance (Tuckett 2017). For example, a plot of relative sentiment against major events in the lead-up to the global financial crisis shows a precipitous decline in relative sentiment in the year leading up to the failure of Bear Sterns in March 2008. A similar analysis using 1920s data from the *Wall Street Journal* found that sentiment shocks, beyond economic fundamentals, impacted production and stock values leading up to the Great Depression (Kabiri et al. 2023); sentiment, in this case a divided state around lack of approach emotions, has likewise been argued theoretically perhaps to account for the slow recovery from the 2008 recession (Carlin and Soskice 2018).

Second, excessive homogeneity around narratives portends trouble. Nyman, Kapadia, and Tuckett (2021) used topic modelling theoretically to investigate if they could detect

when some narratives grow to become dominant, effectively establishing a potential “divided state,” arguably to the detriment of the smooth functioning of the financial system and potentially hinting at impending distress, if also associated with strongly positive aggregate sentiment. Here a narrative was defined as a collection of articles and consensus was defined as a “lack of a natural division” of articles into clearly defined separate groups. They were not, therefore, referring to consensus in terms of “views” or “opinions,” but rather as “concentration of articles.” They relied on a straightforward approach, clustering the articles in word-frequency space (after removal of commonplace words) to form topic groups, whereby each article belongs to a single distinct topic. They then measured the uncertainty (entropy) in the distribution of the articles across the topic groups, considering an increase in the uncertainty (entropy) of the topic distribution as a decrease in consensus and vice versa.

Prior to the 2008 crisis, homogeneity increased around narratives high in approach emotions (excitement) and lacking avoidance emotions (anxiety), which could have been a potential warning sign of a divided state potentially requiring correction, indicating impending financial system distress (Nyman, Kapadia, and Tuckett 2021). This supports the idea of groupfeel or emotional conformity as a driver of booms and busts and the notion that integrated emotional states that manage ambivalence are better suited to stable decision-making, compared to divided states that ignore discordant information (Tuckett and Taffler 2008).

Conclusion

The development of a narrative economics is in its infancy. In this chapter some of the main theoretical issues and the current state of empirical methodologies and findings have been reviewed. Overall, there are both theoretical and research-backed reasons for supposing that economic narratives—that is, structured higher-ordered mental representations of economically relevant variables that summarize relevant causal, temporal, analogical, and valence information—play a driving role in an economy. Theoretically, it is through the forward-looking narratives that they tell themselves (responding to the shared narratives circulating in their social networks) that economic agents develop expectations and act: they use them to make sense of their world, imagine actions to undertake, evaluate which actions they think and feel will fulfil their goals, and to communicate and collaborate with others. Evidence for this proposition is accumulating, but for narrative economics to fill the current gap in economic understanding of how real-world economies evolve requires a far greater commitment to interdisciplinary empirical investigation. It needs to focus on measurement and causal inference in ways that hitherto have received little investment in the discipline. Particularly important, there needs to be a determined effort to use the term *narrative* as a structured higher-order representation consistent with its use in psychological and social science, and to avoid any further misappropriation of the concept.

Notes

- 1 The author wishes to acknowledge support from the Institute of New Economic Thinking (grants no. IN0110 0 025 and IN130 0 051), the Eric Simenhauer Foundation of the Institute of Psychoanalysis (London), and to the UK Research Councils (EPSRC grant reference EP/P016847/1 and the ESRC-NIESR Rebuilding Macroeconomics network (grant RM02)).

- 2 In fact various minutes were then opened up again in later times. See Abolafia 2020; Hansen et al. 2018.
- 3 This reference includes 27 evaluative commentaries on CNT provided by 27 scientists from cognitive psychology, neuroscience, philosophy, psychiatry, management studies, kinesiology, social psychology, affective science, earth science, experimental humanities, semiotics, literature, organizational behaviour, religious studies, and economics.
- 4 The standard case for the role of approach and avoidance emotion is discussed in Johnson, Bilovich, and Tuckett 2023.

References

- Abolafia, Mitchel Y. 2005. "Interpretive Politics at the Federal Reserve." In *The Sociology of Financial Markets*, edited by Karin Knorr Cetina, and Alex Preda, 207–228. Oxford: Oxford University Press.
- Abolafia, Mitchel Y. 2020. *Stewards of the Market: How the Federal Reserve Made Sense of the Financial Crisis*. Cambridge, MA: Harvard University Press.
- Akerlof, George A., and Robert J. Shiller. 2010. *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton, NJ: Princeton University Press.
- Akerlof, George A., and Dennis J. Snower. 2016. "Bread and Bullets." *Journal of Economic Behavior and Organization* 126 (Part B): 58–71. DOI: 10.1016/j.jebo.2015.10.021.
- Ardia, David, Keven Bluteau, and Kris Boudt. 2019. "Questioning the News about Economic Growth: Sparse Forecasting Using Thousands of News-Based Sentiment Values." *International Journal of Forecasting* 35, no. 4: 1370–1386. DOI: 10.1016/j.ijforecast.2018.10.010.
- Armitage, Christopher J., and Mark Conner. 2016. "Attitudinal Ambivalence: A Test of Three Key Hypotheses." *Personality and Social Psychology Bulletin* 26, no. 11: 1421–1432. DOI: 10.1177/0146167200263009.
- Ashforth, Blake. E., Kristie M. Rogers, Michael G. Pratt, and Camille Pradies. 2014. "Ambivalence in Organizations: A Multilevel Approach." *Organization Science* 25, no. 5: 1453–1478. DOI: 10.1287/orsc.2014.0909.
- Bai, Jushan, and Pierre Perron. 2002. "Computation and Analysis of Multiple Structural Change Models." *Journal of Applied Econometrics* 18, no. 1: 1–22. DOI: 10.1002/jae.659.
- Baker, Scott R., Nicholas Bloom, and Steven J. Davis. 2016. "Measuring Economic Policy Uncertainty." *The Quarterly Journal of Economics* 131, no. 4: 1593–1636. DOI: 10.1093/qje/qjw024.
- Beckert, Jens. 2016. *Imagined Futures: Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Beckert, Jens, and Richard Bronk, eds. 2018. *Uncertain Futures. Imaginaries, Narratives, and Calculation in the Economy*. Oxford: Oxford University Press.
- Berezin, Mabel. 2005. "Emotions and the Economy." In *Handbook of Economic Sociology*, edited by Neil J. Smelser, and Richard Swedberg, 109–127. Princeton, NJ: Princeton University Press.
- Berger, Peter L., and Thomas Luckmann. 1966. *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. London: Penguin Books.
- Bewley, Truman. 1999. *Why Wages Don't Fall During a Recession*. Cambridge, MA: Harvard University Press.
- Boulding, Kenneth. 1956. *The Image: Knowledge in Life and Society*. Ann Arbor: University of Michigan Press.
- Bronk, Richard, and Jens Beckert. 2022. "The Instability of Preferences: Uncertain Futures and the Incommensurable and Intersubjective Nature of Value(s)." MPIfG Discussion Papers (22/01). Cologne: Max Planck Institute for the Study of Societies. https://pure.mpg.de/rest/items/item_3373427/component/file_3373490/content.
- Carlin, Wendy, and David Soskice. 2018. "Stagnant Productivity and Low Unemployment: Stuck in a Keynesian Equilibrium." *Oxford Review of Economic Policy* 34, no. 1–2: 169–194. DOI: 10.1093/oxrep/grx060.
- Chong, Kimberly, and David Tuckett. 2015. "Constructing Conviction through Action and Narrative: How Money Managers Manage Uncertainty and the Consequence for Financial Market Functioning." *Socio-Economic Review* 13, no. 2: 309–330. DOI: 10.1093/ser/mwu020.

- Collier, Paul, and David Tuckett. 2021. "Narratives as a Coordinating Device for Reversing Regional Disequilibrium." *Oxford Review of Economic Policy* 37, no. 1: 97–112. DOI: 10.1093/oxrep/gra060.
- Durkheim, Emile. (1912) 1995. *The Elementary Forms of Religious Life*. Translated by Karen E. Fields. New York: The Free Press. (Original publication: *Formes élémentaire de la vie religieuse*. Paris: F. Alcan, 1912).
- Eliaz, Kfir, and Ran Spiegler. 2020. "A Model of Competing Narratives." *American Economic Review* 110, no. 12: 3786–3816. DOI: 10.1257/aer.20191099.
- Fenton-O'Creevy, Mark, and David Tuckett. 2022. "Selecting Futures: The Role of Conviction, Narratives, Ambivalence, and Constructive Doubt." *Futures and Foresight Science* 4: e111. DOI: 10.1002/ffo2.111.
- Festinger, Leon. 1962. "Cognitive Dissonance." *Scientific American* 207, no. 4: 93–106. DOI: 10.1038/scientificamerican1062-93.
- Ford, Matthew Charles, and John Anderson Kay. 2023. "Psychological Frameworks Augment Even Classical Decision Theories." *Behavioral and Brain Sciences* 46: e92. DOI: 10.1017/S0140525X22002709.
- Friedman, Milton. 1953. *Essays in Positive Economics*. Chicago, IL: University of Chicago Press.
- Friedman, Milton, and Anna Jacobson Schwartz. 1963. *A Monetary History of the United States: 1863–1960*. Princeton, NJ: Princeton University Press.
- Galbraith, John Kenneth. 1993. *A Short History of Financial Euphoria*. New York: Penguin Books.
- Gennaioli, Nicola, and Andrei Shleifer. 2018. *A Crisis of Beliefs: Investor Psychology and Financial Fragility*. Princeton, NJ: Princeton University Press.
- Gentner, Dedre. 1983. "Structure-Mapping: A Theoretical Framework for Analogy." *Cognitive Science* 7, no. 2: 155–170. DOI: 10.1016/s0364-0213(83)80009-3.
- Granger, Clive W. J. 1969. "Investigating Causal Relations by Econometric Models and Cross-Spectral Methods." *Econometrica* 37, no. 3: 424–438. DOI: 10.2307/1912791.
- Gray, Jeffrey A., and Neil McNaughton. 2003). *The Neuropsychology of Anxiety: An Enquiry into the Function of the Septo-Hippocampal System*. Oxford Psychology Series No. 33. Oxford: Oxford University Press.
- Gross, James J. 1998. "The Emerging Field of Emotion Regulation: An Integrative Review." *Review of General Psychology* 2, no. 3: 271–299. DOI: 10.1037/1089-2680.2.3.271.
- Hamilton, James D. 1985. "Historical Causes of Postwar Oil Shocks and Recessions." *The Energy Journal* 6, no. 1: 97–116. DOI: 10.5547/ISSN0195-6574-EJ-Vol6-No1-9.
- Hansen, Stephen, Michael McMahon, and Andrea Prat. 2018. "Transparency and Deliberation Within the FOMC: A Computational Linguistics Approach." *The Quarterly Journal of Economics* 133, no. 2: 801–870. DOI: 10.1093/qje/qjx045.
- Hodgkinson, Gerard P., and George Wright. 2002. "Confronting Strategic Inertia in a Top Management Team: Learning from Failure." *Organization Studies* 23, no. 6: 949–977. DOI: 10.1177/0170840602236014.
- Holmes, Douglas R. 2014. *Economy of Words: Communication Imperatives in Central Banks*. Chicago, IL: Chicago University Press.
- Jalil, Andrew J. 2015. "A New History of Banking Panics in the United States, 1825–1929: Construction and Implications." *American Economic Journal: Macroeconomics* 7, no. 3: 295–330. DOI: 10.1257/mac.20130265.
- Johnson, Samuel G. B., Avri Bilovich, and David Tuckett. 2023. "Conviction Narrative Theory: A Theory of Choice Under Radical Uncertainty." *Behavioral and Brain Sciences* 46: e82. DOI: 10.1017/S0140525X22001157.
- Kabiri, Ali, Harold James, John Landon-Lane, David Tuckett, and Rickard Nyman. 2023. "The Role of Sentiment in the US Economy: 1920 to 1934." *The Economic History Review* 76, no. 1: 3–30. DOI: 10.1111/ehr.13160.
- Kalamara, Eleni, Arthur Turrell, Chris Redl, George Kapetanios, and Sujut Kapadia. 2020. "Making Text Count: Economic Forecasting Using Newspaper Text." Bank of England Staff Working Paper, Number 865. London: Bank of England. URL: <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2020/making-text-count-economic-forecasting-using-newspaper-text>.
- Kay, John, and Mervyn King. 2020. *Radical Uncertainty*. London: The Bridge Street Press.

- Keynes, John Maynard. 1936. *The General Theory of Employment, Interest and Money*. London: Palgrave Macmillan.
- Kindleberger, Charles P. 2000. *Manias, Panics, and Crashes: A History of Financial Crises*. 4th ed. New York: Wiley.
- Knight, Frank H. 1921. *Risk, Uncertainty and Profit*. Boston, MA: Houghton Mifflin Company.
- Knorr-Cetina, Karin. 1999. *Epistemic Cultures: How the Sciences Make Knowledge*. Cambridge, MA: Harvard University Press.
- Larsen, Vegard H. 2021. "Components of Uncertainty." *International Economic Review* 62, no. 2: 769–788. DOI: 10.1111/iere.12499.
- Larsen, Vegard H., and Leif A. Thorsrud. 2019. "The Value of News for Economic Developments." *Journal of Econometrics* 210, no. 1: 203–218. DOI: 10.1016/j.jeconom.2018.11.013.
- Loughran, Tim, and Bill McDonald. 2011. "When Is a Liability Not a Liability? Textual Analysis, Dictionaries, and 10-Ks." *The Journal of Finance* 66, no. 1: 35–65. DOI: 10.1111/j.1540-6261.2010.01625.x.
- Mackay, Charles. 1932. *Memoirs of Extraordinary Popular Delusions and the Madness of Crowds*. London: Wordsworth.
- McCloskey, Deirdre N. 1985. *The Rhetoric of Economics*. Madison, WI: University of Wisconsin Press.
- McCloskey, Deirdre N. 1990a. *If You're So Smart: The Narrative of Economic Expertise*. Chicago, IL: University of Chicago Press.
- McCloskey, Deirdre N. 1990b. "Story-Telling in Economics." In *Narrative in Culture. The Uses of Storytelling in the Sciences, Philosophy, and Literature*, edited by Cristopher Nash, 5–22. London: Routledge.
- McCloskey, Deirdre N. 1994. *Knowledge and Persuasion in Economics*. Cambridge: Cambridge University Press.
- Newell, Ben R., and Aba Szollosi. 2023. "Is Conviction Narrative Theory a Theory of Everything or Nothing?" *Behavioral and Brain Sciences* 46: e103. DOI: 10.1017/S0140525X22002679.
- Nyman, Rickard, Sujit Kapadia, and David Tuckett. 2021. "News and Narratives in Financial Systems: Exploiting Big Data for Systemic Risk Assessment." *Journal of Economic Dynamics and Control* 127: 104119. DOI: 10.1016/j.jedc.2021.104119.
- Parsons, Talcott. 1937. *The Structure of Social Action*. Glencoe, IL: The Free Press.
- Rajan, Raghuram. 2023. "Bank of England Operational Independence: Has Separating the Responsibilities of Fiscal and Monetary Policy Worked?" Oral Evidence to the UK House of Lords Economic Affairs Committee, June 6, 2023. URL: <https://committees.parliament.uk/event/18508/formal-meeting-oral-evidence-session/>.
- Rambaccussing, Dooruj, and Andrzej Kwiatkowski. 2020. "Forecasting with News Sentiment: Evidence with UK Newspapers." *International Journal of Forecasting* 36, no. 4: 1501–1516. DOI: 10.1016/j.ijforecast.2020.04.002.
- Ramey, Valerie A. 2011. "Identifying Government Spending Shocks: It's All in the Timing." *The Quarterly Journal of Economics* 126, no. 1: 1–50. DOI: 10.1093/qje/qjq008.
- Reinhart, Carmen M., and Kenneth S. Rogoff. 2009. *This Time is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.
- Roos, Michael, and Matthias Reccius. (2023) 2024. "Narratives in Economics." *Journal of Economic Surveys* 38, no. 2: 303–341. DOI: 10.1111/joes.12576.
- Romer, Christina D., and David H. Romer. 1989. "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz." *NBER Macroeconomics Annual* 4: 121–170. DOI: 10.1086/654103.
- Romer, Christina D., and David H. Romer. 2023. "Presidential Address: Does Monetary Policy Matter? The Narrative Approach after 35 Years." *American Economic Review* 113, no. 6: 1395–1423. DOI: 10.1257/aer.113.6.1395.
- Rosner, Agnes, Irina Basieva, Albert Barque-Duran, Andreas Glöckner, Bettina von Helversen, Andrei Khrennikov, and Emmanuel M. Pothos. 2022. "Ambivalence in Decision Making: An Eye Tracking Study." *Cognitive Psychology* 134: 101464. DOI: 10.1016/j.cogpsych.2022.101464.
- Rothman, Naomi B., Michael G. Pratt, Laura Rees, and Timothy J. Vogus. 2017. "Understanding the Dual Nature of Ambivalence: Why and When Ambivalence Leads to Good and Bad Outcomes." *Academy of Management Annals* 11, no. 1: 33–72. DOI: 10.5465/annals.2014.0066.

- Rucker, Derek D., Zakary L. Tormala, Richard E. Petty, and Pablo Briñol. 2013. "Consumer Conviction and Commitment: An Appraisal-Based Framework for Attitude Certainty." *Journal of Consumer Psychology* 24, no. 1: 119–136. DOI: 10.1016/j.jcps.2013.07.001.
- Sen, Amartya. 2003. *Rationality and Freedom*. Cambridge, MA: Harvard University Press.
- Shiller, Robert J. 2000. *Irrational Exuberance*. Princeton, NJ: Princeton University Press.
- Shiller, Robert J. 2017. "Narrative Economics." *American Economic Review* 107, no. 4: 967–1004. DOI: 10.1257/aer.107.4.967.
- Shiller, Robert J. 2019. *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*. Princeton, NJ: Princeton University Press.
- Simon, Herbert A. 1989. "The Scientist as Problem Solver." In *Complex Information Processing: The Impact of Herbert A. Simon*, edited by David Klahr, and Kenneth Kotovsky, 373–398. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Smelser, Neil J. 1998. "The Rational and the Ambivalent in the Social Sciences: 1997 Presidential Address." *American Sociological Review* 63, no. 1: 1–15. DOI: 10.2307/2657473.
- Smith, Charles W. 1999. *Success and Survival on Wall Street: Understanding the Mind of the Market*. 2nd ed. Lanham, MD: Rowman and Littlefield.
- Soo, Cindy K. 2015. "Quantifying Animal Spirits: News Media and Sentiment in the Housing Market." Ross School of Business Working Paper No. 1200. Ann Arbor: University of Michigan. Handle: <https://hdl.handle.net/2027.42/99759>.
- Stark, David. 2009. *The Sense of Dissonance*. Princeton, NJ: Princeton University Press.
- Suddendorf, Thomas, and Michael C. Corballis. 2007. "The Evolution of Foresight: What Is Mental Time Travel, and Is It Unique to Humans?" *Behavioral and Brain Sciences* 30, no. 3: 299–313. DOI: 10.1017/S0140525X07001975.
- Tetlock, Paul C. 2007. "Giving Content to Investor Sentiment: The Role of Media in the Stock Market." *The Journal of Finance* 62, no. 3: 1139–1168. DOI: 10.1111/j.1540-6261.2007.01232.x.
- Tetlock, Paul C. 2011. "All the News That's Fit to Reprint: Do Investors React to Stale Information?" *Review of Financial Studies* 24, no. 5: 1481–1512. DOI: 10.1093/rfs/hhq141.
- Tetlock, Paul C., Maytal Saar-Tsechansky, and Sofus Macskassy. 2008. "More Than Words: Quantifying Language to Measure Firms' Fundamentals." *The Journal of Finance* 63, no. 3: 1437–1467. DOI: 10.1111/j.1540-6261.2008.01362.x.
- Thaler, Richard H., and Cass R. Sunstein. 2008. *Nudge: Improving Decisions about Health, Wealth and Happiness*. New Haven, CT: Yale University Press.
- Thompson, Erica L., and Leonard A. Smith. 2019. "Escape from Model-Land." *Economics: The Open-Access, Open-Assessment E-Journal* 13 (2019–40): 1–15. DOI: 10.5018/economics-ejournal.ja.2019-40.
- Toda, Hiro Y., and Taku Yamamoto. 1995. "Statistical Inference in Vector Autoregressions with Possibly Integrated Processes." *Journal of Econometrics* 66, nos. 1–2: 225–250. DOI: 10.1016/0304-4076(94)01616-8.
- Tuckett, David. 2011. *Minding the Markets: An Emotional Finance View of Financial Instability*. Basingstoke: Palgrave Macmillan.
- Tuckett, David. 2017b. "Narrative, Emotion and Mental States: Bringing Uncertainty into Neuroeconomics." Paper presented at *OECD Conference on The State of Mind in Economics*, Paris, France, October 30–31, 2017. URL: https://www.oecd.org/naec/D_Tuckett_Neuroeconomics_October%2030%20.pdf. (Also forthcoming in *The State of Mind in Economics*, edited by A. Kirman and M. Teschi, Cambridge University Press.)
- Tuckett, David, Douglas Holmes, Alice Pearson, and Graeme Chaplin. 2020. "Monetary Policy and the Management of Uncertainty: A Narrative Approach." Bank of England Staff Working Paper, Number 870. URL: <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2020/monetary-policy-and-the-management-of-uncertainty-a-narrative-approach.pdf>
- Tuckett, David, and Milena Nikolic. 2017. "The Role of Conviction and Narrative in Decision-Making Under Radical Uncertainty." *Theory and Psychology* 27, no. 4: 501–523. DOI: 10.1177/0959354317713158.
- Tuckett, David, and Rickard Nyman. 2017. "The Relative Sentiment Shift Series for Tracking the Economy." UCL Working Paper. London: University College London. URL: https://www.researchgate.net/publication/316923347_THE_RELATIVE_SENTIMENT_SHIFT_SERIES_FOR_TRACKING_THE_ECONOMY.

- Tuckett, David, and Richard Taffler. 2003. "The Role of the Unconscious in the Dot.Com Bubble: A Psychoanalytic Perspective." In *Boom and Bust: The Equity Market Crisis—Lessons for Asset Managers and their Clients*, edited by the European Equity Management Association, 150–162. London: European Equity Management Association.
- Tuckett, David, and Richard Taffler. 2008. "Phantastic Objects and the Financial Market's Sense of Reality: A Psychoanalytic Contribution to the Understanding of Stock Market Instability." *International Journal of Psychoanalysis* 89, no. 2: 389–412. DOI: 10.1111/j.1745–8315.2008.00040.x.
- von Neumann, John, and Oskar Morgenstern. 1944. *Theory of Games and Economic Behavior*. Princeton, NJ: Princeton University Press.

6

HETEROGENEOUS EXPECTATIONS AMONG PROFESSIONAL FORECASTERS

Christian Conrad and Kajal Lahiri

Forecasts or expectations of economic variables inform the decision-making of policymakers, firms, and households.¹ For example, central banks base their policies on inflation projections, fiscal planning depends on predictions of future revenues, and financial decision-making requires forming expectations about risks and returns of alternative assets (see also Dräger, Chapter 12, Müller, Chapter 13, and Lenel and Reichmann, Chapter 16 in this volume).

In this survey, we focus on the expectations of professional forecasters for macroeconomic variables and the empirical evidence on their properties based on survey data.² Despite substantial efforts to improve prediction accuracy for better-informed decision-making, empirical evidence shows persistent cross-sectional heterogeneity in the expectations of professional forecasters (for early evidence, see Zarnowitz and Lambros 1987; Mankiw et al. 2003). We address the question: Why do professional forecasters disagree?

The literature on econometric forecasting has introduced the concept of *forecast optimality* or *rationality* (e.g., Theil 1966; Granger 1969; Diebold and Lopez 1996; Elliott et al. 2005; Patton and Timmermann 2007). Based on the properties of optimal or rational forecasts, methods for testing forecast rationality have been developed and applied to the forecasts of professional forecasters (see, for example, Mincer and Zarnowitz 1969; Zarnowitz 1985; Nordhaus 1987).

Forecast biases or inefficient usage of available information can lead to a rejection of forecast rationality and, hence, explain why forecasters disagree. However, the optimal prediction depends on the forecaster's loss function, i.e., on how a forecaster assesses forecast errors. As emphasized by Elliott et al. (2005, 2008), tests of forecast rationality are conditional on the assumed loss function, and forecasts that might appear to violate rationality when assuming a symmetric loss function can be consistent with rationality when assuming an asymmetric loss function. When forecasters are heterogeneous regarding loss functions, disagreement among forecasters can arise even if all forecasters are rational. Alternative explanations for forecast heterogeneity are differences in prior beliefs about the data-generating process (e.g., about long-run output growth), different interpretations of the same publicly available information (see, for example, Lahiri and Sheng 2008), or different information sets (Patton and Timmermann 2010). Again, heterogeneity in expectations may arise even if all forecasters rationally update their expectations.

In general, rational forecasters have homogeneous expectations if they (i) are homogenous regarding loss functions, (ii) know the data-generating process, i.e., the structure of the economy, and (iii) have access to the same information.

For a long time, the prevalence in macroeconomic modeling has been to assume that economic agents, particularly professional forecasters, have *rational expectations* in the sense of Muth (1961). Under rational expectations, in knowing the economy's structure, agents form *forward-looking* expectations, making efficient use of available information. Rational expectations can be seen as a response to the critique of the shortcomings of earlier, backward-looking models of expectation formation. It paved the way for the so-called *rational expectations revolution* (see Lucas 1972, 1976, and Garcia Duarte, Chapter 2 in this volume).

Despite the importance of rational expectations in economic modeling, macroeconomists have often been skeptical concerning the credibility of survey-based expectations data (Manski 2017). This has changed in recent years, and evidence from survey data for deviations from rational expectations and for heterogeneity in expectations, which may have important implications for the transmission of monetary and fiscal shocks, has spurred interest in theoretical models that can generate such heterogeneity. Empirical approaches for testing deviations from rational expectations often rely on econometric tests of forecast optimality.

In the macroeconomic literature, heterogeneity in expectations has been mainly explained by focusing on deviations from the *full information rational expectations* (FIRE) framework (see Coibion and Gorodnichenko 2012 and Born, Enders, and Müller, Chapter 10 in this volume). First, heterogeneous expectations can be due to differences in information sets (Lucas 1973). Models with sticky (Mankiw and Reis 2002) or noisy (Sims 2003) information can generate forecast heterogeneity while preserving the rational expectations assumption. The empirical observation that individual forecasters tend to overreact to new information is inconsistent with such models and has led to models that allow for deviations from rationality. For example, in the diagnostic beliefs model of Bordalo et al. (2020), forecasters place too much weight on the most recent information. In other models, heterogeneity is driven by differences in subjective historical experiences (Malmendier and Nagel 2011, 2016) or by agents' subjective models of the economy (Andre et al. 2022).

As our summary of the empirical evidence shows, one of the primary sources of disagreement among professional forecasters is heterogeneity in prior beliefs, particularly concerning long-run outcomes. Disagreement in prior beliefs about long-run outcomes has been documented for various sample periods and can be attributed, at least partially, to forecasters' diverse historical and anthropological backgrounds.

This chapter is organized as follows. In an initial section, we present stylized facts documented in the literature concerning the expectations of professional forecasters. Subsequently, we discuss econometric and macroeconomic models that can generate and explain heterogeneous expectations, before presenting and relating the empirical evidence regarding the different models. Finally, we summarize the main findings and point to directions for future research.

Heterogeneity: Stylized Facts

Empirical evidence in the previous literature has been based on surveys such as the US Survey of Professional Forecasters (SPF), the Blue Chip survey, or Consensus Economics.

These surveys ask professional forecasters about their expectations about various economic variables such as output growth and inflation. The SPF has been conducted quarterly since 1968, and the Blue Chip survey and Consensus Economics monthly since 1976 and 1989 respectively. While the SPF asks for predictions of US macroeconomic variables only, the Blue Chip survey and Consensus Economics ask for predictions of variables in various countries. Predictions are elicited as point forecasts and/or probabilistic forecasts. Participants are asked for either fixed-horizon (e.g., inflation two-quarters-ahead) or fixed-event (e.g., inflation in the current year) forecasts in each survey round. Fixed-event forecasts are particularly useful for the analysis of interpersonal forecast heterogeneity. For encompassing surveys on survey expectations and their econometric analysis, see Pesaran and Weale (2006) and Clements (2019).

We complement the literature review with empirical evidence from the ZEW Financial Market Survey (henceforth ZEW survey), which is conducted by the ZEW in Mannheim, Germany. Since November 2014, this survey has asked professional forecasters from banks and insurance companies for their expectations of Harmonised Index of Consumer Prices (HICP) inflation in the Eurozone. In each quarter (specifically, in February, May, August, and November), participants are asked about their predictions of this year's inflation, next year's inflation, and inflation in two years' time. Thus, predictions of Eurozone inflation in a specific year are collected for each forecaster in the survey for forecast horizons from twelve-quarters-ahead to one-quarter-ahead. For details on the ZEW survey, see Brückbauer and Schröder (2022).

The left panel in Figure 6.1 shows the *consensus forecasts* of the ZEW survey's participants for the years 2016 to 2020. Consensus forecasts are defined as the cross-sectional average of the individual point predictions concerning a specific forecast horizon when the survey is conducted (Zarnowitz and Lambros 1987). Each line shows how the consensus forecast of Eurozone inflation in a specific target year changed with the forecast horizon (e.g., the gray line illustrates how the consensus forecast of inflation in 2020 varied over time). The most extended forecast horizon is twelve quarters, and the shortest is one quarter. The figure shows that, independently of the target year, the consensus forecasts are close to the ECB's inflation target of (close to but below) two percent when the forecast horizon is long. When the forecast horizon decreases and forecasters update their predictions, the consensus forecasts become more dispersed. This is illustrated by the gray bars, which show the standard deviation of the consensus forecasts at each forecast horizon. Intuitively, this is the behavior that we would expect from the forecasts when inflation follows a stationary process with an unconditional mean that equals the inflation target of the ECB.

Disagreement

While the left panel of Figure 6.1 illustrates how the consensus forecasts vary over time, it is not informative about forecast heterogeneity across survey participants. At a specific point in time, the heterogeneity or disagreement among forecasters concerning the h -step-ahead (e.g., two-quarters-ahead) forecast is commonly measured by the cross-sectional variance of the individual point predictions (see, e.g., Zarnowitz and Lambros 1987; Lahiri and Sheng 2008). The h -step-ahead disagreement is obtained by averaging the corresponding disagreements over time. In the following, we illustrate how disagreement varies with the forecast horizon and over the business cycle.

Forecast Horizon

Strong empirical evidence exists that disagreement among forecasters varies with the forecast horizon (Lahiri and Sheng 2008; Patton and Timmermann 2010). For fixed-event forecasts, disagreement is typically highest at the most extended forecast horizons and tends to decrease when the forecast horizon gets shorter. Nevertheless, even at short forecast horizons, considerable disagreement remains. The solid line in the right panel of Figure 6.1 illustrates this stylized fact for the inflation forecasts from the ZEW survey (again based on data for the target years 2016 to 2020).

An alternative perspective on the behavior of the individual forecasts can be gained by decomposing the total sum of squares of forecasts at each forecast horizon into the within-forecaster variation and the between-forecaster variation. The former is measured by first computing the time-variation of each forecaster's h -step-ahead forecasts and then averaging over forecasters. The latter is calculated as the cross-sectional variance of the forecaster-specific time-averaged h -step-ahead forecasts. The dashed line in the right panel of Figure 6.1 shows that within-forecaster variation is usually the lowest at the most extended forecast horizons and increases with decreasing forecast horizons. Interestingly, within-forecaster variation increases at forecast horizons of eight and four quarters respectively. This is when information about inflation two years and one year ahead of the target year becomes available.

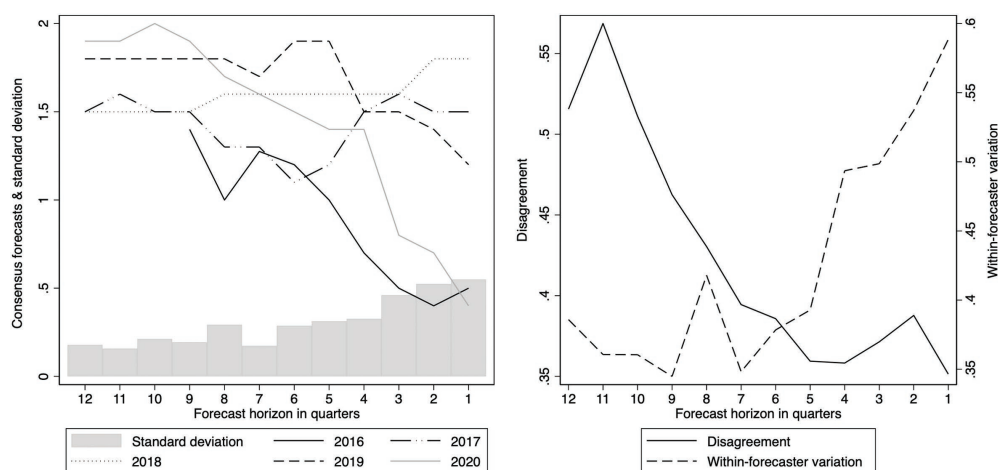


Figure 6.1 Left panel: Consensus forecasts of HICP inflation in the Eurozone from the ZEW Financial Market Survey. The lines show the fixed-event inflation forecasts for the target years 2016 to 2020. The black solid line begins for $h=9$ because the ZEW survey asked for a forecast of inflation in target year 2016 for the first time in November 2014. Gray bars indicate the standard deviation of the consensus forecasts at each forecast horizon. Right panel: Disagreement and within-forecaster variation of individual forecasts of HICP inflation in the Eurozone. The figure shows (the square root of) disagreement (left axis) and (the square root of) within-forecaster variation (right axis) at each forecast horizon. On average, the consensus forecast, disagreement, and within-forecaster variation are computed based on individual predictions of 146 survey participants.

Source: Author creation

As we will discuss below, strong disagreement in combination with low within-forecaster variation in long-term predictions can be explained by persistent differences in subjective beliefs about how the economy works. Disagreement in short-term predictions is likely due to different interpretations of the same information.

Persistence

Evidence shows forecasters persistently deviate from the consensus forecast on the upper or lower side (Batchelor 2007; Patton and Timmermann 2010; Boero et al. 2015). That is, some forecasters are persistently optimistic, while others are pessimistic. For each forecast horizon, the left panel of Figure 6.2 shows the time-averaged position of four selected participants of the ZEW survey in the cross-sectional forecast distribution. All four participants are characterized by persistent optimism or pessimism. As we discuss in “Importance of Prior Beliefs” below, expectation persistence may be due to the “anchoring effect” of prior beliefs (Zellner 2002; Lahiri and Sheng 2010a).

Time-Variation

There is also considerable variation in disagreement over time. For example, Mankiw et al. (2003) show that disagreement about inflation increases with the level of inflation and, in particular, when inflation changes substantially. Patton and Timmermann (2010) confirm the positive correlation between the level of inflation and disagreement. In addition, they provide evidence for a negative correlation between output growth and disagreement about

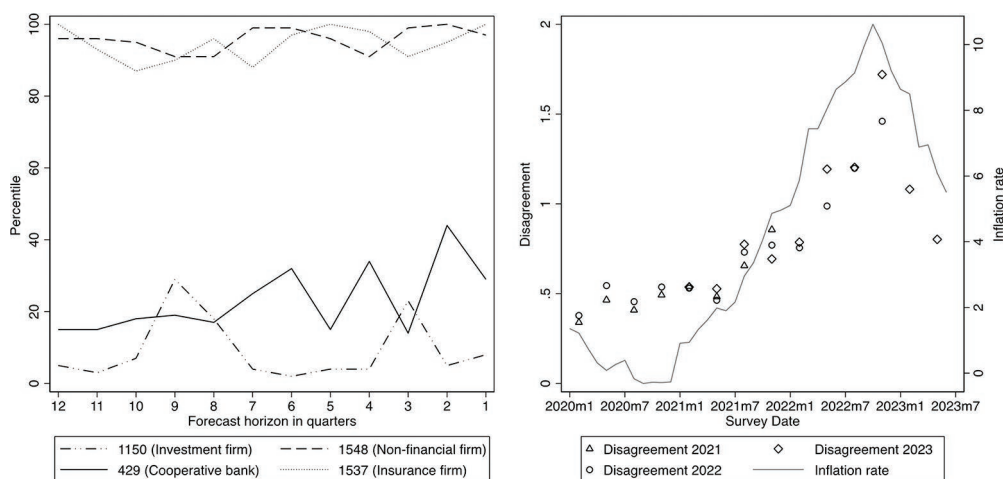


Figure 6.2 Left panel: For each forecast horizon, the figure shows the relative position (time average) of four selected forecasters in the cross-sectional forecast distribution. Right panel: Evolution of disagreement during the inflation surge in 2021 and 2022. The triangles, circles, and diamonds show (the square root of) disagreement among forecasters concerning inflation in 2021, 2022, and 2023. The solid line depicts actual HICP inflation in the Eurozone.

Source: Author creation

future output growth, i.e., disagreement about output growth behaves counter-cyclically. Both findings are confirmed by Dovern et al. (2012). The right panel of Figure 6.2 shows how disagreement among the participants of the ZEW survey about inflation in 2021 (triangles), 2022 (circles), and 2023 (diamonds) evolved over time. Forecasts for those years were not included in Figure 6.1 because of the extreme surge in actual inflation. The right panel of Figure 6.2 illustrates that disagreement about inflation in 2021 and 2022 increased almost parallel with the level of the actual inflation rate. In particular, disagreement jumped to higher levels than usually observed for even the most extended forecast horizons. During the 2021–2022 period, characterized by high uncertainty about future inflation, disagreement about inflation in 2021 and 2022 increased with decreasing forecast horizons and peaked in November 2021 and November 2022 respectively. Disagreement about inflation in 2023 started to fall with declining inflation rates in 2023.

Uncertainty vs. Disagreement

As many surveys (e.g., the SPF) do not only ask for point predictions but also probabilistic predictions, i.e., histogram forecasts, ex ante forecast uncertainty can be estimated at an individual level. This is typically done by assuming a parametric distribution and fitting this distribution to the respondent's histogram forecast (Giordani and Söderlind 2003; Engelberg et al. 2009). The fitted distribution's estimated standard deviation is then used to measure individual ex ante uncertainty. Similar to the findings reported in the previous section, there is strong evidence for heterogeneity in individual uncertainty and evidence for persistence in the relative level of individual uncertainties, i.e., some forecasters are persistently more/less uncertain than others (Boero et al. 2015; Rich and Tracy 2021). Thus, there is not only disagreement in point predictions but also in individual forecast uncertainties.

Similar to the construction of the consensus forecast, the “typical” uncertainty can be measured by the average individual uncertainty (Lahiri and Sheng 2010b). Because not all surveys elicit probabilistic predictions, it has been common to use disagreement among forecasters as a proxy for the average individual uncertainty. However, as pointed out by Zarnowitz and Lambros (1987), disagreement might be low or even zero, i.e., all forecasters make the same point prediction, while average individual uncertainty can be high. Conversely, each forecaster might be very confident about their prediction, i.e., average individual uncertainty is low, but disagreement can be high. Lahiri and Sheng (2010b) provide a framework for linking disagreement to average individual uncertainty. In their model, forecasters receive and optimally combine a private and a public signal. Individual uncertainty can be decomposed into the perceived uncertainty of aggregate shocks and the variance of idiosyncratic shocks. In this setting, average individual uncertainty can be written as disagreement plus the perceived uncertainty of aggregate shocks. Thus, disagreement is likely to be a good proxy for uncertainty only during periods in which the perceived uncertainty of aggregate shocks is low. Indeed, the empirical evidence suggests that the link between disagreement and uncertainty is relatively weak and depends on the sample period used (Glas 2020).

Two Perspectives on Forecast Heterogeneity

This section presents theoretical explanations for forecast heterogeneity. The first perspective is motivated by the econometric literature on forecast evaluation and tests for forecast

rationality. The second perspective comes from macroeconomic modeling. Research on forecast heterogeneity is currently striving, and the econometric tests and macroeconomic approaches we present are only a selection of available models motivated by our perception of the literature.

Forecast Rationality—The Econometric Perspective

The econometric literature on forecast rationality typically takes the loss function of a forecaster as a starting point. Based on the loss function, the data-generating process, and available information, the optimal forecast can be determined, and properties of the optimal forecast and the corresponding forecast errors and revisions can be derived. In the following, we will assume that the process to be forecasted is covariance-stationary. In particular, this implies that the process has a time-invariant mean and variance. First, “Squared Error Loss” will focus on the situation where a forecaster has a squared error (SE) loss function. In this case, a rational forecast is unbiased; hence, forecast errors have zero mean. However, this does not need to be the case under more general loss functions. The optimal forecast will typically be biased if forecasters have an asymmetric loss function, as discussed subsequently (“Asymmetric Loss Functions”). The role of prior beliefs in forming expectations is then highlighted in “Importance of Prior Beliefs.”

Squared Error Loss

It is common to assume that forecasters minimize the SE loss conditional on a specific information set. The information set contains past observations of the process to be forecasted and, potentially, other variables that are observed when the forecast is made. In this setting, the optimal forecast is given by the conditional mean (see, e.g., Diebold and Lopez 1996; Patton and Timmermann 2007). Tests of forecast rationality are based on or derived from the properties of the forecast errors.

First, the optimal forecast is unbiased, i.e., the forecast errors have a mean of zero. A simple test of forecast rationality can be conducted by running a regression of the forecast error on a constant and testing whether the constant is significantly different from zero. Because the process to be forecasted is covariance-stationary, the h -step-ahead forecast should converge to the unconditional mean of the process. Thus, disagreement among forecasters about long-run predictions suggests differences in subjective opinions about the unconditional mean of the process.

Second, the forecast error should be uncorrelated with all variables in the information set. Hence, tests for forecast rationality check whether a forecaster efficiently uses all available information. Since it is often unclear which variables were included in an information set that a forecaster was conditioning on, obvious choices for those variables are forecasts or lagged forecast errors. For example, testing whether the forecast has explanatory power for the future forecast error is common. A version of this test suggested by Mincer and Zarnowitz (1969) is a regression of the outcome on a constant and the forecast. This test of forecast rationality has the joint null hypothesis that the constant and the slope are equal to zero and one, respectively. An alternative test of forecast rationality was suggested by Nordhaus (1987). His test is designed for settings where fixed-event forecasts are available. It is based on a regression of the *current* h -step-ahead forecast error on *past* forecast revisions for the same target variable. If forecasters use available information efficiently,

past forecast revisions should not predict the current forecast error. We will refer to this approach as the “Nordhaus test” in the following.

Third, the variance of the forecast error or, alternatively, the forecast’s mean squared error (MSE) should be a non-decreasing function of the forecast horizon (e.g., Patton and Timmermann 2007). Again, because of covariance-stationarity, the variance of the forecast error will converge to the unconditional variance of the process as the forecast horizon increases. Isiklar and Lahiri (2007) focus on the difference of the MSE at forecast horizons $h+1$ and h . This difference should be non-negative for the optimal forecast and can be considered a measure of the new information content that becomes available at forecast horizon h . If forecasters deviate from the optimal forecast, i.e., do not efficiently use available information, the change in the MSE is the sum of two components. The first component corresponds to the MSE change observed when information is efficiently used. The second term reflects the price the forecaster has to pay for deviating from efficiency. Isiklar and Lahiri (2007) suggest comparing the change in the MSE to the expectation of the squared forecast revision from $h+1$ to h . For the optimal forecast, the expected squared revision equals the change in the MSE. If the expected squared revision is *smaller/larger* than the change in the MSE, the forecaster tends to *underreact/overreact* to new information.

Asymmetric Loss Functions

Forecasters do not necessarily have a SE loss function. Instead, it is often reasonable to assume that forecasters have an asymmetric loss function, e.g., due to the underlying decision problem and strategic or psychological causes (Capistrán and Timmermann 2009). For example, it might be costlier for a central bank to underestimate inflation than to overestimate it. If the costs of under- and overpredicting are no longer symmetrical, the optimal prediction typically deviates from the conditional mean (e.g., Granger 1969; Patton and Timmermann 2007). For example, under a Linex loss function, the optimal forecast is the conditional mean plus a term that depends on an asymmetry parameter and the conditional variance of the target variable (Zellner 1986). This implies that the optimal forecast is no longer unbiased and that even the long-run forecast deviates from the unconditional mean. In addition, even one-step-ahead forecast errors can be serially correlated if the conditional variance is persistent. Thus, a rejection of forecast rationality based on the tests described in “Squared Error Loss” above may be spurious due to an asymmetric loss function (Elliott et al. 2005, 2008). However, standard tests may be adjusted, for example, by regressing the forecast error on the conditional variance and other variables that are observable when the forecast is made. Controlling for the conditional variance, those other variables should still have no predictive power for the forecast errors (Pesaran and Weale 2006). Asymmetric loss functions can explain disagreement in point predictions; even if all forecasters base their predictions on the same information set, there will be heterogeneity in predictions due to different asymmetry parameters. Under a Linex loss function, disagreement among forecasters will vary with the level of uncertainty concerning the target variable (Capistrán and Timmermann 2009). This loss function can also explain the persistence in the relative ranking of the individual forecasts described earlier. If all forecasters use the same conditional mean and conditional variance forecasts, the relative ranking of the forecasts is determined by the individual asymmetry parameters.

Importance of Prior Beliefs

At the beginning of this chapter, we documented that forecast disagreement varies with the forecast horizon. Lahiri and Sheng (2008, 2010a) use a Bayesian learning model to explain this behavior. In their model, forecasters have prior beliefs about the outcome variable, and, in addition, can interpret public signals differently; in each period, beliefs are updated according to Bayes' rule. In this model, disagreement among forecasters is generated by three components: prior beliefs, the weight attached to prior beliefs (depending on the precision of both the initial belief and the public signal), and the interpretation of public signals. Specifically, the Bayesian learning model provides a means of studying the relative importance of prior beliefs and heterogeneity in incorporating new, publicly available information for explaining heterogeneity in forecasters' predictions at different forecast horizons. Notably, prior beliefs induce stickiness in expectations so that stickiness is consistent with rational updating of forecasts. Lahiri and Sheng (2008) propose a forecast horizon-specific regression of the *current* forecast error on the *current* forecast revision to test the rationality of forecasters at an individual level. It is important to note that the Lahiri and Sheng (2008) regression differs from the "Nordhaus test" because the regressor is the *current* and not the *past* forecast revision. Thus, the Lahiri and Sheng (2008) regression tests how *new* information is incorporated. Similar to Isiklar and Lahiri (2007), a *positive/negative* slope coefficient implies *under-/overreaction* to public news.

Patton and Timmermann (2010) also distinguish between information signals and prior beliefs or subjective models. They assume that the variable to be forecasted is the sum of a persistent and a transitory component. The forecasters' observation is contaminated with common and idiosyncratic shocks. First, assuming a SE loss function, forecasters compute the optimal prediction, conditional on available information. Although all forecasters use the same model, there is forecast heterogeneity due to differences in information sets. Second, Patton and Timmermann (2010) introduce an additional layer of heterogeneity: forecasters have subjective beliefs about the unconditional mean of the variable to be forecasted and shrink the optimal forecast toward the subjective belief. Thus, similarly to Lahiri and Sheng (2008), disagreement is strongly driven by heterogeneity in prior/subjective beliefs. Giacomini et al. (2020) combine heterogeneous priors and differences in how new public information is interpreted (due to heterogeneous statistical models) with inattentiveness, i.e., infrequent updating, to explain why forecasters "agree to disagree."

Expectation Formation in Macroeconomic Models

The macroeconomic literature has recently collected ample empirical evidence against the FIRE paradigm. In this section, we first discuss models that deviate from the assumption of full information and explain how those deviations generate disagreement. We then turn to models that allow for non-rational expectations and introduce complementary approaches that focus on experiences and subjective models of the economy.

Sticky and Noisy Information Models

Sticky information models (see Mankiw and Reis 2002) and noisy information models (see Sims 2003) have been suggested to introduce information rigidities. In both models,

forecasters are rational (given available information) and minimize the SE loss. In sticky information models, updating information sets is costly, and disagreement is generated because, in each period, only a fraction of the forecasters updates information. In the noisy information model, forecasters observe noisy public and private information, and the amount of disagreement depends on the variance of the innovation to the private signal. Coibion and Gorodnichenko (2012) show that noisy and sticky information models can be distinguished by the predicted effects of economic shocks on disagreement. While economic shocks should not affect disagreement in the noisy information model, disagreement responds to shocks in the sticky information model. While agents act rationally at the individual level, both models imply that the consensus forecast underreacts to new information. Coibion and Gorodnichenko (2015) suggest regressing *current* forecast errors on *current* forecast revisions to test this property. Under the null hypothesis of FIRE, the forecast errors of the consensus forecast are unpredictable. Under the alternative, both sticky and noisy information models imply that the coefficient on the forecast revision is *positive*. However, it is essential to note that under both models (sticky and noisy), individual forecast errors should not be predictable based on individual forecast revisions. The regression proposed by Coibion and Gorodnichenko (2015) is the same as the Lahiri and Sheng (2008) regression but uses the consensus forecast instead of the individual forecasts. Their important contribution is the insight that this regression can be used to test sticky and noisy information models against the FIRE paradigm.³

Deviations from Rationality

Recently, several models of expectation formation that allow for deviations from rational expectations have been introduced. A prominent example is the diagnostic expectations model proposed by Bordalo et al. (2020). In this model, agents make a forecast that consists of the rational forecast plus a component that overweighs the most recent information. Forecast updates in response to good/bad news are too optimistic/pessimistic. A testable prediction of this model is that individual forecasters tend to overreact to new information. Interestingly, this overreaction at the individual level is consistent with the underreaction of the consensus forecast. This prediction distinguishes the model from noisy and sticky information models, which, as discussed before, imply forecast rationality at the individual level.

Subsequently, several approaches for more granular modeling of under-/overreaction have been proposed. For example, Angeletos et al. (2021) suggest a model that combines noisy information and overextrapolation. Their model can explain why forecasters initially underreact to news but overreact subsequently. Based on evidence from a randomized lab experiment, Afrouzi et al. (2023) develop a model where overreaction to news depends on the forecasted process properties and the forecast horizon. Overreaction is more pronounced for more transitory processes and at longer forecast horizons. In their model, recent observations affect the forecasters' beliefs about the long-run mean of the process to be forecasted.

Experiences, Subjective Models, and Narratives

Malmendier and Nagel (2011, 2016) show that individual lifetime experiences strongly affect how agents form expectations. For example, if agents have experienced bad stock

market performance, this has a long-lasting negative effect on their expectations of future returns. Agents with different experiences have different expectations. This is true even for professional forecasters. For example, Malmendier et al. (2021) use a model of experience-based learning to explain heterogeneity in the inflation projections of the members of the Federal Open Market Committee by their individual inflation experiences. Similarly, Benchimol et al. (2022) show that experiences such as having worked at a central bank affect expectations. Conrad et al. (2022) find that experiences also interact with how agents process new information. For example, households that have experienced higher inflation rates are less responsive to news about inflation in the media. This has important policy implications. For example, as Conrad et al. (2022) discussed, the expectations of households with higher inflation experience might be harder to “manage” by central banks (see also Chapter 12 in this volume).

Another source of disagreement are subjective models of the economy. If forecasters believe in different models of the economy, there will be heterogeneity in how they update their forecasts in response to the same new information. For example, Conrad et al. (2022) find that households that experienced high inflation in the past are more likely to update their inflation expectations upward in response to a contractionary monetary policy shock. They argue that inflation experiences shape the economic models that households rely on when processing new information. Andre et al. (2022) show that even among professional forecasters, there is heterogeneity, for example, in how they update their unemployment forecast in response to a monetary policy shock. Their findings highlight the role of “associative memory” in explaining heterogeneity; forecasters might entertain several subjective models, and the context or individual experiences can determine which model the forecaster is using.

Empirical Evidence

This section summarizes empirical evidence for and against the explanations for heterogeneity discussed in the previous section. We mainly focus on tests of forecast rationality.

Result 1: Biases at the Individual Level

The simplest explanation for disagreement is heterogeneity in individual biases. Because there is ample evidence for biases at the level of individual forecasters, we only refer to a few selected studies. Using data from the SPF for the 1968 to 1979 period, Zarnowitz (1985, 299) shows that “almost all forecasters underestimated inflation and did so increasingly for the more distant future.” About half the participants have significant biases. Similarly, Davies and Lahiri (1995) provide evidence for biases in the Blue Chip survey’s inflation and output growth expectations of individual forecasters. Using data from Consensus Economics, Batchelor (2007) finds evidence for systematic biases in individual expectations, particularly in output growth forecasts. Capistrán and Timmermann (2009) analyze the inflation predictions of the individual forecasters from the SPF. They provide evidence that at least half of the forecasters have a significant bias, whereby most forecasters tend to under-predict inflation. For further evidence of biases at the individual level, see, for example, Dovern and Weisser (2011) and Sheng (2015). Overall, the evidence suggests that biases depend on the forecast horizon. While individual forecasts are most biased at the longest

forecast horizons (Zarnowitz 1985; Juodis and Kučinskas 2023), forecasts are essentially unbiased at very short horizons, i.e., shortly before a data release (e.g., Conrad et al. 2023).

Finally, it is essential to note that the evidence for biases is much stronger at the individual level than when using the consensus forecast, where individual biases tend to cancel out (Zarnowitz and Lambros 1987).

Result 2: Asymmetric Loss Function

As discussed earlier in this chapter, forecast biases may arise due to asymmetric loss functions. Elliott et al. (2008) find that the evidence against forecast rationality in SPF data based on the Mincer and Zarnowitz (1969) regression is driven by the joint hypothesis of rationality and a symmetric loss function. Instead, when allowing for asymmetric loss, the inflation and output growth forecasts are consistent with rationality. Using the latest weighting matrices for generalized method of moments estimation, Krüger and LaCrone (2019) show that the Elliott et al. (2008) approach leads to precise estimates of the degree of asymmetry of the loss function. Capistrán and Timmermann (2009) report that roughly half of the SPF survey respondents are characterized by a Linex loss function. Even when allowing for asymmetric loss, they find evidence for a time-invariant bias for more than thirty percent of the forecasters. This time-invariant bias, in combination with the asymmetric loss, helps to explain why forecasters tended to underestimate inflation before the Great Moderation and to overestimate inflation during that period. Before the Great Moderation, inflation volatility was high and, in combination with a negative asymmetry parameter, forecasts underestimated inflation despite a positive time-invariant bias. During the Great Moderation, inflation volatility was low, and the positive time-invariant bias dominated. Capistrán and Timmermann (2009) also find that the ranking of the forecasters' predictions is persistent over time, as predicted by the model, and that disagreement is positively related to the conditional variance of inflation. If the volatility of inflation is positively related to the level of inflation, as empirical evidence suggests (Conrad and Hartmann 2019), there is also a positive relation between disagreement and the level of inflation (as observed in "Heterogeneity: Stylized Facts" above). Further evidence for asymmetric loss functions is provided in, for example, Capistrán (2008) and Patton and Timmermann (2007). As shown in Conrad and Hartmann (2023), disagreement or, if available, the average individual variance can be used to de-bias the consensus forecast when individual forecasters entertain asymmetric loss functions.

Result 3: Prior Beliefs Induce Persistence

As discussed in "Importance of Prior Beliefs" above, Lahiri and Sheng (2008, 2010a) investigate the determinates of heterogeneity in expectations at different forecast horizons. Using data from Census Economics, they show that prior beliefs and heterogeneity in interpreting public signals are the most critical drivers of heterogeneity in expectations. While prior beliefs dominate at long-forecast horizons, public signals are more important at shorter horizons. Patton and Timmermann (2010) obtained similar results but argued that prior beliefs are generally more important for explaining expectation heterogeneity than information signals. Their empirical results also suggest that the weight attached to prior beliefs increases in crisis periods, which explains heightened disagreement during those periods. Finally, differences in prior beliefs help to explain why differences in forecasts (optimism/pessimism) persist over time.

*Result 4: Underreaction of the Consensus Forecast
and Overreaction of Individual Forecasts*

Empirical evidence suggests that forecasters do not efficiently use all available information. We first discuss evidence at the level of the consensus forecast and then for the individual forecasters.

The approach suggested by Isiklar and Lahiri (2007) and Lahiri (2012) can be used to check for forecast horizon-specific inefficiencies. Based on the Blue Chip consensus forecasts for output growth for 1986–2009, Lahiri (2012) shows that the change in the MSE is bigger than the average squared forecast revision, i.e., the consensus forecast underreacts to new information. The underreaction is most pronounced at the middle forecast horizons of 11 to 15 months. Typically, at these horizons, forecasters revise their predictions most strongly (see Lahiri and Sheng 2010a). Similar evidence is provided by Isiklar and Lahiri (2007).

Using SPF data, Coibion and Gorodnichenko (2015) provide further evidence for the underreaction of the consensus forecast by regressing the forecast error on the current forecast revision. They interpret this as evidence against the FIRE hypothesis and as evidence in favor of models that drop the *full information* assumption. Combined with earlier empirical evidence in Coibion and Gorodnichenko (2012) that disagreement does not appear to respond to economic shocks, the data aligns with the noisy but not the sticky information model. In contrast, using forecast revisions of fixed target forecasts as a measure of shocks, Hur and Kim (2016) find that the dynamics of dispersion in survey forecasts are consistent with sticky information models as opposed to conventional noisy information models.

In Figure 6.3, we reproduce Lahiri's (2012) analysis for the consensus inflation forecasts from the ZEW survey. First, the figure shows how forecast accuracy (as measured by the mean squared error, MSE) increases with decreasing forecast horizons. For example, substantial gains in forecast accuracy materialize at forecast horizons of eight and four quarters respectively, i.e., when realized inflation two and one years before the forecast target year becomes available. By comparing the change in the MSE (i.e., the MSE difference) and the mean squared forecast revision (MSR), it becomes evident that the consensus forecast underreacts to new information at most forecast horizons. The underreaction is most pronounced at forecast horizons of three, four, and eight quarters.

More recently, Bordalo et al. (2020), Kohlhas and Walther (2021), and Angeletos et al. (2021), among others, have provided further evidence for the underreaction of the consensus forecast.

Several studies have found that at the individual level, forecasters tend to overreact to new information. Using data from several countries, Lahiri and Sheng (2008) test for forecaster rationality at the individual level. For each forecast horizon, they consider a regression of individual forecast errors on the current individual forecast revision, whereby the coefficient in front of the revision is the same for all forecasters. For output growth, they find that individual forecasters *overreact* to new information at long forecast horizons but *underreact* at middle-forecast horizons. This result is confirmed in Lahiri and Sheng (2010a) for output growth, while there is only evidence for overreaction at short forecast horizons for inflation.

Bordalo et al. (2020) use SPF and Blue Chip data for several macroeconomic variables and apply the same regression as in Lahiri and Sheng (2008). They also provide evidence for overreaction to news but mainly focus on a forecast horizon of three-quarters-ahead. Importantly, Bordalo et al. (2020) also run regressions with a forecaster-specific slope

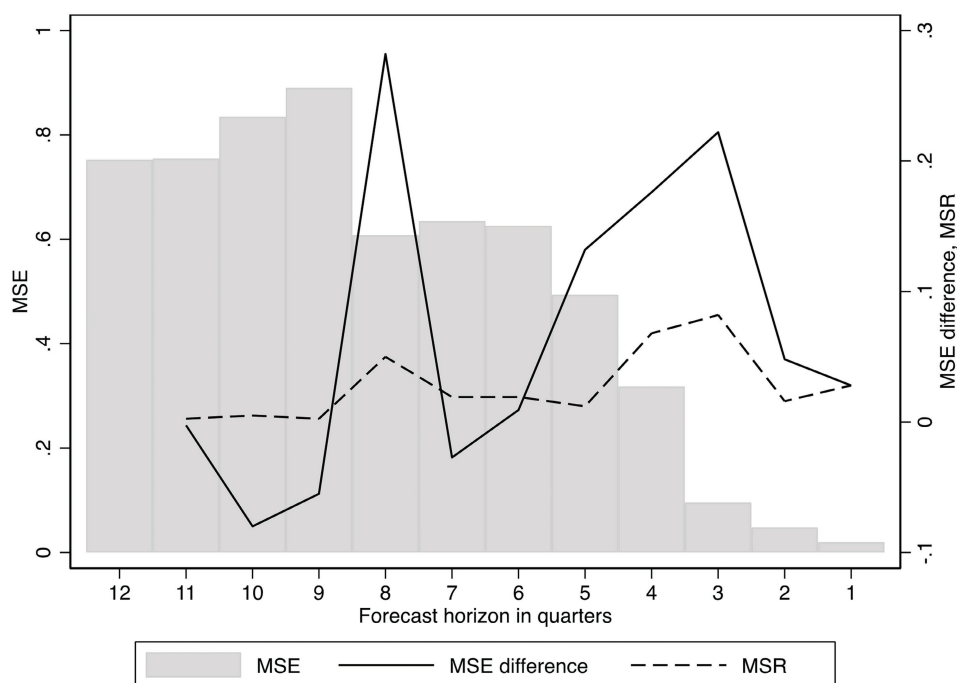


Figure 6.3 The gray bars show the consensus forecast's horizon-specific mean squared error (MSE). At each forecast horizon h , the solid line shows the difference between the $(h+1)$ -step MSE and the h -step MSE (denoted by MSE difference). The dashed line shows the mean squared revision (MSR), i.e., the average of the squared forecast revision when the forecast horizon decreases from $h+1$ to h . Forecast errors and forecast revisions are based on consensus forecasts for the years 2016 to 2020.

Source: Author creation

parameter. Again, the evidence (as measured by the median parameter estimate across all forecasters) is in line with overreaction at the individual level, which is inconsistent with sticky and noisy information models. However, it is consistent with their model of diagnostic expectations, which can generate underreaction at the consensus level simultaneously with overreaction at the individual level. If individual forecasters have different degrees of overreaction, this is another source of disagreement.

We re-estimated those regressions (with a common slope coefficient for all forecasters) using data from the ZEW survey. In line with Lahiri and Sheng (2008), we find evidence for significant overreaction at most forecast horizons.⁴ The evidence provided by Lahiri and Zhao (2020, 3) is more mixed: “Even though overreaction to news at each horizon is more common, the overreaction to individual news is not as ubiquitous as suggested in Bordalo et al. (2020).”

The literature on over-/underreaction in the predictions of professional forecasters is rapidly evolving. For example, Kohlhas and Walther (2021) argue that forecasters simultaneously extrapolate (i.e., overreact to recent realizations of the forecasted variable) and underreact in the sense of a positive correlation between forecast errors and average revisions, which is inconsistent with the diagnostic expectations model of Bordalo et al. (2020). For further evidence, see Kučinskias and Peters (2022) and Juodis and Kučinskias (2023).

Discussion and Conclusion

Various mechanisms can generate heterogeneity in macroeconomic expectations. Some mechanisms can generate disagreement while preserving rational expectations and full information, others preserve rational expectations and deviate from full information, while some deviate from both. Empirical evidence from survey data is crucial because it helps to decide which mechanisms are most credible. As Manski (2017, 413) put it:

I favorably observe the increasing willingness of macroeconomic theorists to pose and study alternatives to the RE [rational expectations] assumption, but I worry that models of expectations formation will proliferate endlessly in the absence of empirical research to discipline thinking.

Our survey highlights the essential features that drive expectations heterogeneity in observational data, such as prior beliefs or subjective views of the economy. This suggests that more research is needed on the determinants of those beliefs. One aspect that has received less attention but may be essential is the demand side. As Nordhaus (1987) and Lahiri (2012) emphasized, considering the demands of clients or institutional requirements is important for understanding the forecaster's incentives and learning about their true loss functions. Following this line of argument, Valchev and Gemmi (2023) suggest that survey forecasts may not reflect the true expectations of forecasters but might be driven by strategic incentives. Concerning survey design, Patton (2020) argues to communicate explicitly to the forecasters according to which loss function their forecasts will be evaluated. While the literature almost exclusively focuses on disagreement in point predictions, disagreement on forecast uncertainty is an interesting area for future research (see Glas and Hartmann 2022).

The macroeconomic literature has recently focused on regressions that relate forecast errors to forecast revisions. However, as Nordhaus (1987) emphasized, the uncorrelatedness of forecast errors and revisions is only one aspect of a rational forecast. Even if forecasts satisfy this condition, it does not mean that forecasts are of good quality. Conversely, forecasts which fail the rationality test can be highly accurate. For example, we present evidence for underreaction of the consensus forecast. Nevertheless, empirically, the SPF consensus forecasts for many variables tend to outperform predictions from state-of-the-art econometric models (see, for example, Ang et al. 2007; Faust and Wright 2013). Again, it would be worth putting more effort into understanding what steps in the actual process of forecasting lead to the observed deviations from rationality. For example, parameter estimation uncertainty is typically neglected. In the real world, forecasters must estimate model parameters. In small samples, it can be beneficial in terms of out-of-sample forecast performance to deliberately use a small, misspecified model instead of the true but more complex model. Alternatively, in the presence of non-stationarities and uncertainty about the true model, forecasters will ensure against misspecification by relying on a combined forecast that integrates various models (Bates and Granger 1969; Timmermann 2006). The benefits of forecast combination are illustrated by the fact that the consensus forecast typically outperforms individual forecasts. On top of that, forecasters regularly adjust model-based predictions based on subjective judgment (Brenna and Budrys 2024). Finally, as noted, for example, in Davies and Lahiri (1995), forecasts are contaminated with measurement error. An interesting paper that explores the importance of measurement error and consequences

for tests of forecast rationality is Juodis and Kučinskas (2023). All these factors also contribute to explaining disagreement in survey expectations.

Notes

- 1 We are grateful to Julius T. Schoelkopf and Anna-Lena Herforth for their helpful comments, suggestions, and excellent research assistance.
- 2 For a recent survey on the expectations of households and firms, see Weber et al. (2022) and Chapter 7 of this handbook.
- 3 For other approaches that confront sticky and noisy information models with survey data and link them to disagreement, see, for example, Andrade and Le Bihan (2013), Dovern (2015), Andrade et al. (2016), and Dovern and Hartmann (2017).
- 4 Detailed estimation results are omitted for brevity but available upon request.

References

- Afrouzi, Hassan, Spencer Y. Kwon, Augustin Landier, Yueran Ma, and David Thesmar. 2023. "Overreaction in Expectations: Evidence and Theory." *The Quarterly Journal of Economics* 138, no. 3: 1713–1764.
- Andrade, Philippe, and Hervé Le Bihan. 2013. "Inattentive Professional Forecasters." *Journal of Monetary Economics* 60, no. 8: 967–982.
- Andrade, Philippe, Richard K. Crump, Stefano Eusepi, and Emanuel Moench. 2016. "Fundamental Disagreement." *Journal of Monetary Economics* 83: 106–128.
- Andre, Peter, Carlo Pizzinelli, Christopher Roth, and Johannes Wohlfart. 2022. "Subjective Models of the Macroeconomy: Evidence from Experts and Representative Samples." *The Review of Economic Studies* 89, no. 6: 2958–2991.
- Ang, Andrew, Geert Bekaert, and Min Wie. 2007. "Do Macro Variables, Asset Markets, or Surveys Forecast Inflation Better?" *Journal of Monetary Economics* 54, no. 4: 1163–1212.
- Angeletos, George-Marios, Zhen Huo, and Karthik A. Sastry. 2021. "Imperfect Macroeconomic Expectations: Evidence and Theory." *NBER Macroeconomics Annual* 35, no. 1: 1–86.
- Batchelor, Roy. 2007. "Bias in Macroeconomic Forecasts." *International Journal of Forecasting* 23, no. 2: 189–203.
- Bates, John M., and Clive W. J. Granger. 1969. "The Combination of Forecasts." *Operational Research* 20, no. 4: 451–468.
- Benchimol, Jonathan, Makram El-Shagi, and Yossi Saadon. 2022. "Do Expert Experience and Characteristics Affect Inflation Forecasts?" *Journal of Economic Behavior & Organization* 201: 205–226.
- Boero, Gianna, Jeremy Smith, and Kenneth F. Wallis. 2015. "The Measurement and Characteristics of Professional Forecasters' Uncertainty." *Journal of Applied Econometrics* 30, no. 7: 1029–1046.
- Bordalo, Pedro, Nicola Gennaioli, Yueran Ma, and Andrei Shleifer. 2020. "Overreaction in Macroeconomic Expectations." *American Economic Review* 110, no. 9: 2748–2782.
- Brenna, Federica, and Zymantas Budrys. 2024. "The Term Structure of Judgement: Interpreting Survey Disagreement." Bank of Lithuania Working Paper Series 123, Bank of Lithuania. URL: <https://ideas.repec.org/p/lie/wpaper/123.html>.
- Brückbauer, Frank, and Michael Schröder. 2022. "The ZEW Financial Market Survey Panel." *Jahrbücher für Nationalökonomie und Statistik* 243, no. 3–4: 451–469.
- Capistrán, Carlos. 2008. "Bias in Federal Reserve Inflation Forecasts: Is the Federal Reserve Irrational or Just Cautious?" *Journal of Monetary Economics* 55, no. 8: 1415–1427.
- Capistrán, Carlos, and Allan Timmermann. 2009. "Disagreement and Biases in Inflation Expectations." *Journal of Money, Credit and Banking* 41, no. 2–3: 365–396.
- Carroll, Christopher D. 2003. "Macroeconomic Expectations of Households and Professional Forecasters." *Quarterly Journal of Economics* 118, no. 1: 269–298.
- Clements, Michael P. 2019. *Macroeconomic Survey Expectations*. Cham: Palgrave Macmillan.

- Coibion, Olivier, and Yuriy Gorodnichenko. 2012. "What Can Survey Forecasts Tell Us about Information Rigidities?" *Journal of Political Economy* 120, no. 1: 116–159.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2015. "Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts." *American Economic Review* 105, no. 8: 2644–2678.
- Conrad, Christian, Zeno Enders, and Alexander Glas. 2022. "The Role of Information and Experience for Households' Inflation Expectations." *European Economic Review* 143: 104015.
- Conrad, Christian, and Matthias Hartmann. 2019. "On the Determinants of Long-Run Inflation Uncertainty: Evidence from a Panel of 17 Developed Economies." *European Journal of Political Economy* 56: 233–250.
- Conrad, Christian, and Matthias Hartmann. 2023. "When Does Information on Forecast Variance Improve the Performance of a Combined Forecast?" Working Paper, Heidelberg University. URL: <https://hdl.handle.net/10419/168200>.
- Conrad, Christian, Julius T. Schoelkopf, and Nikoleta Tushteva. 2023. "Long-Term Volatility Shapes the Stock Market's Sensitivity to Macroeconomic News." DOI: 10.2139/ssrn.4632733.
- Davies, Anthony, and Kajal Lahiri. 1995. "A New Framework for Analyzing Survey Forecasts using Three-Dimensional Panel Data." *Journal of Econometrics* 68, no. 1: 205–227.
- Diebold, Francis X., and Jose A. Lopez. 1996. "Forecast Evaluation and Combination." In *Handbook of Statistics*. Vol. 14, *Statistical Methods in Finance*, edited by Gangadharrao Soundalyarao Maddala, and Calyampudi Radhakrishna Rao, 241–268. Amsterdam: Elsevier.
- Dovern, Jonas. 2015. "A Multivariate Analysis of Forecast Disagreement: Confronting Models of Disagreement with Survey Data." *European Economic Review* 80: 16–35.
- Dovern, Jonas, and Matthias Hartmann. 2017. "Forecast Performance, Disagreement, and Heterogeneous Signal-to-Noise Ratios." *Empirical Economics* 53, no. 1: 63–77.
- Dovern, Jonas, Ulrich Fritzsche, and Jiri Slacalek. 2012. "Disagreement among Forecasters in G7 Countries." *Review of Economics and Statistics* 94, no. 4: 1081–1096.
- Dovern, Jonas, and Johannes Weisser. 2011. "Accuracy, Unbiasedness and Efficiency of Professional Macroeconomic Forecasts: An Empirical Comparison for the G7." *International Journal of Forecasting* 27, no. 2: 452–465.
- Elliott, Graham, Ivana Komunjer, and Allan Timmermann. 2008. "Biases in Macroeconomic Forecasts: Irrationality or Asymmetric Loss?" *Journal of the European Economic Association* 6, no. 1: 122–157.
- Elliott, Graham, Allan Timmermann, and Ivana Komunjer. 2005. "Estimation and Testing of Forecast Rationality under Flexible Loss." *Review of Economic Studies* 72, no. 4: 1107–1125.
- Engelberg, Joseph, Charles F. Manski, and Jared Williams. 2009. "Comparing the Point Predictions and Subjective Probability Distributions of Professional Forecasters." *Journal of Business & Economic Statistics* 27, no. 1: 30–41.
- Faust, Jon, and Jonathan H. Wright. 2013. "Forecasting Inflation." In *Handbook of Economic Forecasting*, edited by Graham Elliott, and Allan Timmermann, 2: 2–56. Amsterdam: Elsevier.
- Gemmi, Luca, and Rosen Valchey. 2023. "Biased Surveys." NBER Working Paper Series no. w31607. SSRN: <https://ssrn.com/abstract=4553611>.
- Giacomini, Raffaella, Vasiliki Skreta, and Javier Turen. 2020. "Heterogeneity, Inattention, and Bayesian Updates." *American Economic Journal: Macroeconomics* 12, no. 1: 282–309.
- Giordani, Paolo, and Paul Söderlind. 2003. "Inflation Forecast Uncertainty." *European Economic Review* 47, no. 6: 1037–1059.
- Glas, Alexander. 2020. "Five Dimensions of the Uncertainty-Disagreement Linkage." *International Journal of Forecasting* 36, no. 2: 607–627.
- Glas, Alexander, and Matthias Hartmann. 2022. "Uncertainty Measures from Partially Rounded Probabilistic Forecast Surveys." *Quantitative Economics* 13, no. 3: 979–1022.
- Granger, Clive W. J. 1969. "Prediction with a Generalized Cost of Error Function." *Operational Research* 20: 199–207.
- Hur, Joonyoung, and Insu Kim. 2016. "Information Rigidity in Survey Data: Evidence from Dispersion in Forecasts and Forecast Revisions." *Economic Letters* 142: 1–14.
- Isiklar, Gultekin, and Kajal Lahiri. 2007. "How Far Ahead Can We Forecast? Evidence from Cross-Country Surveys." *International Journal of Forecasting* 23, no. 2: 167–187.

- Juodis, Artūras, and Simas Kučinskas. 2023. "Quantifying Noise in Survey Expectations." *Quantitative Economics* 14, no. 2: 609–650.
- Kohlhas, Alexandre N., and Ansgar Walther. 2021. "Asymmetric Attention." *American Economic Review* 111, no. 9: 2879–2925.
- Krüger, Jens J., and Julian LeCrone. 2019. "Forecast Evaluation under Asymmetric Loss: A Monte Carlo Analysis of the EKT Method." *Oxford Bulletin of Economics and Statistics* 81, no. 2: 437–455.
- Kučinskas, Simas, and Florian S. Peters. 2022. "Measuring Under- and Overreaction in Expectation Formation." *The Review of Economics and Statistics*, forthcoming. SSRN: <https://ssrn.com/abstract=3188065>.
- Lahiri, Kajal. 2012. "Comment on 'Rationality Tests Based on Multi-Horizon Bounds'." *Journal of Business & Economic Statistics* 30, no. 1: 20–25.
- Lahiri, Kajal, and Xuguang Sheng. 2008. "Evolution of Forecast Disagreement in a Bayesian Learning Model." *Journal of Econometrics* 144, no. 2: 325–340.
- Lahiri, Kajal, and Xuguang Sheng. 2010a. "Learning and Heterogeneity in GDP and Inflation Forecasts." *International Journal of Forecasting* 26, no. 2: 265–292.
- Lahiri, Kajal, and Xuguang Sheng. 2010b. "Measuring Forecast Uncertainty by Disagreement: The Missing Link." *Journal of Applied Econometrics* 25, no. 4: 514–538.
- Lahiri, Kajal, and Yongchen Zhao. 2020. "The Nordhaus Test with Many Zeros." *Economic Letters* 193: 109308.
- Lucas, Robert E. Jr. 1972. "Expectations and the Neutrality of Money." *Journal of Economic Theory* 4, no. 2: 103–124.
- Lucas, Robert E. Jr. 1973. "Some International Evidence on Inflation-Output Tradeoffs." *American Economic Review* 63, no. 3: 326–334.
- Lucas, Robert E. Jr. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 1: 19–46. ISSN 0167-2231, [https://doi.org/10.1016/S0167-2231\(76\)80003-6](https://doi.org/10.1016/S0167-2231(76)80003-6)
- Malmendier, Ulrike, and Stefan Nagel. 2011. "Depression Babies: Do Macroeconomic Experiences Affect Risk Taking?" *Quarterly Journal of Economics* 126, no. 1: 373–416.
- Malmendier, Ulrike, and Stefan Nagel. 2016. "Learning from Inflation Experiences." *Quarterly Journal of Economics* 131, no. 1: 53–87.
- Malmendier, Ulrike, Stefan Nagel, and Zhen Yan. 2021. "The Making of Hawks and Doves." *Journal of Monetary Economics* 117: 19–42.
- Mankiw, N. Gregory, and Ricardo Reis. 2002. "Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve." *Quarterly Journal of Economics* 117, no. 4: 1295–1328.
- Mankiw, N. Gregory, Ricardo Reis, and Justin Wolfers. 2003. "Disagreement about Inflation Expectations." *NBER Macroeconomics Annual* 18: 209–248.
- Manski, Charles F. 2017. "Survey Measurement of Probabilistic Macroeconomic Expectations: Progress and Promise." *NBER Macroeconomics Annual* 32: 411–471.
- Mincer, Jacob A., and Victor Zarnowitz. 1969. "The Evaluation of Economic Forecasts." In Jacob A. Mincer (ed.) *Economic Forecasts and Expectations*, 3–46. New York, NY: National Bureau of Economic Research.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica* 29, no. 3: 315–335.
- Nordhaus, William D. 1987. "Forecasting Efficiency: Concepts and Applications." *Review of Economics and Statistics* 69, no. 4: 667–674.
- Patton, Andrew J. 2020. "Comparing Possibly Misspecified Forecasts." *Journal of Business & Economic Statistics* 38, no. 4: 796–809.
- Patton, Andrew J., and Allan Timmermann. 2007. "Properties of Optimal Forecasts under Asymmetric Loss and Nonlinearity." *Journal of Econometrics* 140, no. 2: 884–918.
- Patton, Andrew J., and Allan Timmermann. 2010. "Why Do Forecasters Disagree? Lessons from the Term Structure of Cross-Sectional Dispersion." *Journal of Monetary Economics* 57, no. 7: 803–820.
- Pesaran, M. Hashem, and Martin Weale. 2006. "Survey Expectations." In *Handbook of Economic Forecasting*, edited by Graham Elliott, Clive Wilfred James Granger, and Allen Timmermann, 1: 715–776. Amsterdam: Elsevier.

- Rich, Robert, and Joseph Tracy. 2021. "A Closer Look at the Behavior of Uncertainty and Disagreement: Micro Evidence from the Euro Area." *Journal of Money, Credit and Banking* 53, no. 1: 233–253.
- Sheng, Xuguang Simon. 2015. "Evaluating the Economic Forecasts of FOMC Members." *International Journal of Forecasting* 31, no. 1: 165–175.
- Sims, Christopher A. 2003. "Implications of Rational Inattention." *Journal of Monetary Economics* 50, no. 3: 665–690.
- Theil, Henri. 1966. *Applied Economic Forecasting*. Amsterdam: North-Holland.
- Timmermann, Allan. 2006. "Chapter 4: Forecast Combinations." In *Handbook of Economic Forecasting*, edited by Graham Elliott, Clive Wilfred James Granger, and Allen Timmermann, 1: 135–196. Amsterdam: Elsevier.
- Weber, Michael, Francesco D'Acunto, Yuriy Gorodnichenko, and Olivier Coibion. 2022. "The Subjective Inflation Expectations of Households and Firms: Measurement, Determinants, and Implications." *Journal of Economic Perspectives* 36, no. 3: 157–184.
- Zarnowitz, Victor. 1985. "Rational Expectations and Macroeconomic Forecasts." *Journal of Business & Economic Statistics* 3, no. 4: 293–311.
- Zarnowitz, Victor, and Louis A. Lambros. 1987. "Consensus and Uncertainty in Economic Predictions." *Journal of Political Economy* 95, no. 3: 591–621.
- Zellner, Arnold. 1986. "Biased Predictors, Rationality and the Evaluation of Forecasts." *Economics Letters* 21, no. 1: 45–48.
- Zellner, Arnold. 2002. "Information Processing and Bayesian Analysis." *Journal of Econometrics* 107, no. 1–2: 41–50.

SUBJECTIVE INFLATION EXPECTATIONS OF HOUSEHOLDS

How They Are Formed and their Role in Economic Choices

Francesco D'Acunto and Michael Weber

Theoretically, expectations are central to most economic choices made by households. Such choices are based on intertemporal consumption optimization. Inflation expectations play a special role in most models because they determine consumers' consumption and saving decisions via the consumption Euler equation, and hence also households' investment, debt, and labor-supply decisions, including wage bargaining. Above and beyond defining individual choices, because aggregate consumption represents the largest component of gross domestic product in market-based economies, individuals' inflation expectations are also central in assessing the effectiveness of monetary and fiscal policy measures that aim to modulate aggregate demand by changing consumers' incentives to shift consumption intertemporally (Bernanke 2007). The centrality of subjective expectations to such important economic decisions would suggest that understanding how subjective expectations are formed and updated and whether they differ across consumers should be a central research program within economics. And yet, after the rational expectations revolution, academic economists lost interest in studying how subjective expectations are formed and updated, because under the theoretical assumption of full-information rational expectations (FIRE), individuals' subjective expectations play no independent role and only one set of expectations is consistent with the specific economic model. The FIRE hypothesis was so ingrained in economics during this period that the idea of using real-world data on elicited individual subjective expectations to assess the validity of this assumption has been dismissed for decades. For instance, Prescott (1977) asserted that "Like utility, expectations are not observed [i.e., they are not observable], and surveys cannot be used to test the rational expectations hypothesis."

Contrary to this statement, however, the growing availability of high-quality data on expectations at the individual level—elicited through carefully designed surveys over the course of the last two decades—and the coherent facts about subjective expectations that have emerged—which have revealed substantial deviations from the FIRE hypothesis—have largely changed academic economists' and policymakers' perspective on the relevance

and importance of understanding subjective inflation expectations and their consequences. For instance, recently the chairman of the Federal Reserve, Jerome Powell (2021) stated: “Inflation expectations are terribly important. We spend a lot of time watching them.”

Instead, for decades central banks around the world have focused on the elicitation and management of the inflation expectations of professional forecasters and financial market participants, in order to use them to forecast future realized inflation and to assess the potential effectiveness of the banks’ policy actions and communication. The fact that financial markets tend to react within seconds to any relevant policy announcement by central banks is a testament to the effectiveness of this approach in managing the expectations of experts (Bernanke and Kuttner 2005). And yet, in the quote reported above Chair Powell referred to households’ subjective expectations rather than those of experts. But why would central banks care about the expectations of specific consumers? Wouldn’t managing the expectations of financial market participants successfully be enough, i.e. wouldn’t these changes in expectations transmit to households’ decision making through market institutions, such as changes in interest rates (see also Dräger, Chapter 12 in this volume)?

Recent research shows that this transmission is not always operative; that is, even if monetary policy measures and communication can successfully manage financial market participants’ expectations, the transmission to household choices is limited. This constrained transmission occurs because household expectations are not successfully managed in the same way as those of financial market participants, and hence households make choices that differ from those postulated by standard economic models. Because the transmission of monetary policy to the real economy ultimately operates through the purchasing decisions of households and the price-setting decisions of firms, which are often determined by non-financial-market experts, the lack of reaction by households limits the transmission of monetary policy.

The FIRE hypothesis has been very successful in macroeconomics for decades largely because it provides a disciplining framework that facilitates the life of researchers: models based on it postulate that the representative agent has all available information and forms expectations rationally at each point in time. A direct implication of these models is that individuals should form forward-looking expectations. Thus, inflation expectations should be on average unbiased and forecast errors should be unpredictable. Moreover, no dispersion should exist across individuals and no systematic differences in inflation expectations should exist across demographic groups (see Born, Enders, and Müller, Chapter 10 in this volume).

But as early as the 1980s—if not before—, researchers were producing ample evidence that is in total contrast with these implications of FIRE. For instance, Jonung (1981) documented for the first time that individuals’ perception of past inflation is the strongest predictor of what individuals expect inflation to be going forward. Moreover, he documented substantial dispersion in the cross-sectional distribution of individuals’ inflation expectations and that inflation expectations are on average biased upward—a bias whose size varies systematically across demographic groups. For instance, although both men and women have biased expectations relative to ex post realizations, women’s expectations are on average substantially higher than those of men.

Understanding what drives the formation and update of subjective inflation expectations is therefore central to explaining these systematic cross-sectional differences and therefore to understanding consumers’ heterogeneous reactions to the same monetary policy measure. Recent research documents that an important driver of subjective inflation expectations is the individual price signals to which consumers are exposed in their

daily lives, which indeed vary dramatically and systematically across economic groups. Price signals related to goods frequently purchased by consumers, and hence signals to which they are exposed often, play a special role, rather than the price signals of the goods on which consumers spend larger shares of their budget. D'Acunto et al. (2021) document these facts by surveying a large cross-section of 43,036 US consumers about the top three sources that came to mind when consumers were asked to form aggregate inflation expectations. By far the most important source of information indicated by respondents was their own shopping experience, followed by that of family and friends (see Figure 7.1). TV and newspapers, which provide easily-accessible information about expert forecasters' expectations, only followed as third and fourth sources by importance, which speaks to the fact that consumers would have easy access to experts' expectations if they wanted and they could form expectations as postulated by models based on FIRE, but in fact they do not.

As we discuss below, the variation of price signals to which different consumers are exposed can help to jointly rationalize the upward bias in average expectations, the differences in inflation expectations across consumers, as well as the systematic differences across several demographic groups.

In the following, after discussing stylized facts about inflation expectations and the nascent literature on how individuals form inflation expectations, we discuss how they use their inflation expectations in their economic decision making. Economists and policymakers care about inflation expectations to the extent that they matter for actual choices and through these choices, shape future realized inflation. We conclude this chapter by summarizing the key takeaways from this literature, their policy implications, and the open questions on which future research endeavors should focus.

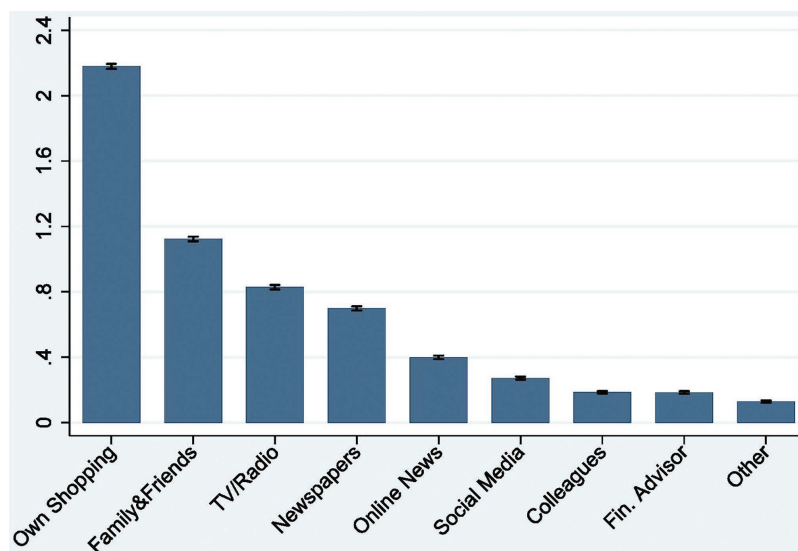


Figure 7.1 This figure reports the ranking of 43,036 Americans that participated in the Chicago Booth Expectations and Attitudes Survey in June 2016 on the sources of information individuals use to form inflation expectations. Survey participants could choose their top three sources out of a randomized list of options with the top choice receiving a score of 3.

Source: Author creation

Stylized Facts about Inflation Expectations

As we discussed above, under FIRE, inflation expectations should be unbiased on average and forecast errors should be unpredictable. And yet, the literature has established that even the most sophisticated agents in the economy, such as professional forecasters, form expectations that deviate from the FIRE benchmark (see, e.g., Coibion and Gorodnichenko, 2012, 2015). It should thus not appear surprising that the inflation expectations of most households are not consistent with the FIRE paradigm. Across different surveys, sample periods, and countries, researchers find that on average households' inflation expectations are biased upward relative to ex post realized inflation as well as relative to the forecasts of financial market participants and the inflation targets of central banks (D'Acunto et al. 2022b).

Inflation expectations are not only biased upward on average, but substantial dispersion is also present in the cross-section of individuals. Mankiw et al. (2004) document that at any point in time, the dispersion in expectations is large and often larger than the average level of inflation expectations. This high degree of dispersion is *prima facie* evidence that the inflation expectations of households deviate from FIRE. But then why do individuals that are similar across demographic characteristics disagree so much in their outlook for future inflation? Models in which agents do not continuously update their information set (sticky information models), or models in which individuals receive noisy signals (noisy information models), have the potential to rationalize these patterns (Mankiw and Reis 2002; Woodford 2003; Mackowiak et al. 2023).

Because of the dramatic departure of measured subjective expectations from the implications of FIRE, for decades economists have been skeptical of the possibility that expectations elicited through surveys are a good indication of consumers' actual beliefs, often implying that, in fact, consumers do form expectations in a way that is consistent with FIRE, but because measuring and hence eliciting subjective expectations is hard, the data produced at the individual level through surveys include substantial measurement errors and are unreliable.

It is precisely to counteract this criticism that, over the last 20 years, the methodological literature has dedicated extensive resources and research efforts to improving the design of questions that aim to elicit several moments of consumers' subjective expectations. That is, they can elicit not only a point estimate but also a full-blown probability distribution, from which dimensions such as individual-level uncertainty of expectations can be derived (see Manski 2003). For example, the Survey of Consumer Expectations (SCE), run by the Federal Reserve Bank of New York, elicits inflation expectations via subjective probability distributions. Survey participants are asked to assign probabilities to pre-specified bins of potential values for future inflation, ranging from 12 percent or more to minus 12 percent or less. Bruine de Bruin et al. (2011) and Fermand et al. (2024) document substantial uncertainty in individuals' inflation expectations, with an average standard deviation for expected inflation almost as high as the level of expected inflation.

One concern with eliciting subjective uncertainty using subjective probability distributions is the high cognitive cost that this question format requires from respondents (see also the discussion in Weber et al. 2022). D'Acunto et al. (2020) found in a pilot study that 15 percent of the initial sample dropped out of the survey when answering a question intended to elicit subjective uncertainty using these probability distribution questions, and these dropped observations are not evenly distributed across the distribution by cognitive abilities and education.

Another potential disadvantage of this elicitation method is the fact that the ordering of the choices matters. Coibion et al. (2021) find that the average probability-distribution implied mean of inflation expectation is one percentage point lower when deflation bins are randomly ordered before inflation bins. Moreover, researchers typically choose ranges for bins that are narrower for potential values close to zero than further away from zero, and the bins are typically symmetric around 0. These two survey design features might guide survey participants to infer that the developer of the survey considers answers close to 0 more plausible than other answers and might therefore put more weight on these bins. Comparing average inflation expectations from point estimates and from subjective probability distributions, D'Acunto et al. (2022b) indeed show that individuals report an average expected inflation rate that is two percentage points lower for the distribution-implied mean as compared to the point estimates (see also Becker et al. 2023).

Another response to the criticism (that the large dispersion in individuals' inflation expectations detected in the data mainly reflects noise and measurement error) is that, if this were the case, no systematic patterns by demographic groups should arise in the formation and update of expectations. But the literature finds several systematic patterns in forecast errors for inflation by demographic groups that recur consistently across countries and time periods (D'Acunto and Weber 2024). For instance, women tend to have higher average inflation expectations than men, a pattern that has been confirmed around the world and across different time periods since the original documentation in Jonung (1981) (see, e.g., Bruine de Bruin et al. 2010; Meyer and Venkatu 2011). Moreover, socioeconomic status correlates with inflation expectations and individuals with lower formal education and lower incomes have higher inflation expectations (Das et al. 2020; D'Acunto et al. 2022b). Younger individuals tend to have lower levels of inflation expectations and Black people tend to expect higher levels of inflation compared to white (D'Acunto et al. 2022b).

Another dimension that is possible to compute following recent survey design advances is the term structure of consumers' inflation expectations. For instance, the New York Fed SCE and the European Central Bank's Consumer Expectations Survey elicit inflation expectations across different time horizons, such as over the next 12 months and the 12-month period starting in three years from the time of the survey. One key stylized fact about inflation expectations at different horizons is that most of the time no term structure emerges at all, that is, the average expectation for inflation over the next 12 months equals the average expected inflation rate over the 12-month horizon starting in three or five years' time. One exception to this common pattern emerged during the recent surge of inflation expectations that started in April 2020 following the outbreak of the coronavirus pandemic. With prices of everyday goods rising and consumers experiencing stock shortages in grocery stores, many individuals immediately updated their inflation expectations upward for the next 12 months, whereas longer-term inflation expectations only followed suit later and to a lesser extent (Weber et al. 2023a). Throughout the episode of heightened realized inflation until at least mid-2023, short-term inflation expectations were above mid-term and long-term inflation expectations, and expectations at both horizons slowly decreased again but stayed elevated relative to pre-pandemic levels.

The large deviations from FIRE and the strong co-movement between short-term and long-term inflation expectations are also relevant for central banks. Nowadays, most central banks in developed countries follow an explicit inflation target. A conventional policy narrative is that consumers' short-term inflation expectations can deviate from the inflation target of the central bank due to temporary shocks, but given the high trust in and

credibility of central banks, long-term inflation expectations should remain well anchored at the respective inflation target, because consumers understand that the central bank will take the necessary action to bring inflation back to target. Hence, this narrative implies that long-term and short-term inflation expectations should be largely uncorrelated. The recent surge of inflation and subsequent surge in inflation expectations might question the extent to which consumers trust central banks' ability and willingness to bring inflation back to target, which imposes on central banks the need to take even starker action in terms of increasing policy rates than would be needed if this form of distrust were absent (D'Acunto, Fuster, and Weber 2022). Weber et al. (2022) provide additional evidence consistent with this concern. They find in panel data that when individuals update their short-run inflation expectations, their longer-run inflation expectations tend to move in lockstep, providing direct evidence that individuals do not have well-anchored inflation expectations. In fact, Coibion et al. (2022) show that among 25,000 Americans they surveyed, more than 40 percent think that the Federal Reserve tries to achieve an average inflation rate of more than 10 percent over longer periods of time, substantially above the actual inflation target of 2 percent.

Finally, many surveys not only elicit expectations for inflation over the next 12 months but also elicit what people think inflation was over the previous 12 months. Consistent with the evidence for households in Sweden in Jonung (1981), Candia et al. (2023) show for households in the US that perceptions of current inflation (i.e., the change in price level between today and 12 months ago) and expectations of future inflation are very highly correlated, consistent with the average flat term structure of future inflation expectations over different horizons.

The Formation of Inflation Expectations

The high correlation between what individuals think inflation has been in the recent past and what they think it will be in the future is a direct indication that understanding how individuals perceive inflation, and which signals they use as a basis for these perceptions, is central to our understanding on how they form inflation expectations. In this section, we will review the literature that has studied how the price signals observed by individuals directly feed into their expectations of aggregate inflation; the role of cognition; and the extent to which these effects can be counteracted by policy communication and the provision of information about aggregate inflation.

Price Signals Observed Directly through Purchases

"Inflation is the overall increase in the level of prices and is typically measured by the consumer price index." This definition of inflation introduces the block on eliciting inflation perception and expectations across many surveys (see, e.g., Coibion et al. 2020). The first part of the sentence is inserted to guarantee that every respondent thinks about the same variable when asked about inflation rather than using a subjective definition of inflation, which might vary across respondents based on their economic and financial literacy. The second part explicitly mentions the consumer price index and is in fact targeted to more savvy respondents; it is intended to reduce ambiguity as to which price index the survey wants respondents to forecast among the many price indices of which savvy respondents might be aware.

Despite the explicit reference to all prices in the economy as well as to a precise price index, which includes all the price changes in a representative consumer's consumption basket, certain prices and price changes are not salient to consumers because consumers only observe them when they purchase goods and services (such as larger ticket items and electronics) that they would not normally buy. Most respondents tend to focus on the price signals that are easy to observe directly in their daily lives. Consistent with the celebrated Lucas (1975) island parable, in which he writes "the history of prices [...] observed by an individual is his source of information on the current state of the economy and [...] of information on future price," many households tend to focus on easily observable prices of goods such as grocery items and gasoline (see Figure 7.1 and Coibion and Gorodnichenko 2015a; Cavallo et al. 2017).

D'Acunto et al. (2021) propose a setting in which the assumption in Lucas (1975) can be finally tested empirically. The setting allows researchers to observe, at the individual level, the price signals individuals see when making purchases and also the inflation expectations they form at the same point in time, preferably for a large and representative population. Moreover, the setting includes a panel dimension, so that the researchers can keep constant all dimensions that are time-invariant at the individual level when assessing the role of price signals for the formation of inflation expectations. Specifically, D'Acunto et al. (2021) ran surveys on the Nielsen Homescan panel (of around 60,000–80,000 households)¹ for the first time. They observed the nondurable goods purchased by consumers and the prices they paid for each good weekly through optical scanners that track all these consumers' purchases with bar codes. The authors created measures of realized inflation at the household level, following Kaplan and Schulhofer-Wohl (2017). They documented substantial dispersion in realized inflation at the household level, both due to differences in prices paid but also to differences in the composition of households' purchasing bundles.

The authors then showed that realized inflation at the household level is strongly correlated with inflation expectations. Individuals that have a realized inflation that is by one standard higher, expect overall inflation to be higher by around 0.2 percentage points. This association holds in the raw data but is also conditional on a rich set of sociodemographic characteristics, such as income, education, and family structure, among others, as well as conditional on other co-determined expectations such as expectations about own income or about the aggregate unemployment rate. The data also make it possible to saturate specifications with a rich set of fixed effects, including individual fixed effects that only exploit variation in realized inflation and inflation expectations within individuals across two survey waves 12 months apart from each other.

Nielsen estimates that the Homescan panel tracks around 25 percent of the consumption bundles of households in the panel. The dataset contains all goods that have a barcode as well as fruits and vegetables. The findings thus open the door to the possibility that ordinary households might not weight the price changes of the goods they purchase based on the expenditure share of those goods, which is what statistical agencies do when computing consumer price indices in their countries. Rather, consumers seem to focus their perceptions and expectations of inflation on the prices changes of the goods they purchase frequently, because they perceive these signals as more precise or salient (Georganas et al. 2014; Angelatos and Lian 2016). When D'Acunto et al. (2021) created a *Frequency CPI* through weighing price changes by the frequency of purchase in a base period, they found that the correlation between this measure of realized inflation at the household level and inflation expectations is larger than the baseline association with the expenditure-share weighted

household-level inflation measure. Moreover, in an econometric “horse race”, they showed that the predictive power of the weighted household-level measure for inflation expectations vanishes when the Frequency CPI is added as a control in the same specifications, whereas the Frequency CPI maintains its ability to predict overall inflation expectations at the household level. They also documented that individuals place a higher weight on price increases relative to equal-size cuts. Hence, their findings suggest that initial price impulses in narrow categories can trigger immediate increases in the average inflation expectations of consumers if these price movements occur in categories that are salient to them. These implications are consistent with the spike in consumer inflation expectations at the onset of the Covid-19 pandemic and after the reopening of the economy, when most central banks still preached the gospel of temporary inflationary pressures in narrow categories. Moreover, these results also suggest that inflation expectations of consumers will stay elevated for some time even after realized inflation recedes, because price decreases are less salient to most consumers.

Finally, Coibion and Gorodnichenko (2015a) have shown that the level of gasoline (petrol) prices also has a strong impact on the average inflation expectations of individuals. Indeed, large dispersion in the level of gasoline prices is present across locations in the US but changes in gas prices are almost perfectly correlated across localities. Moreover, given their prominent display, gasoline prices are salient to the overall population, even for individuals that do not drive a car. Hence, gasoline prices are an important determinant of the level of inflation expectations but are an unlikely determinant of the large dispersion in inflation expectations that is present in the data.

The Role of Cognition

Besides large differences in observed price signals, heterogeneous cognitive abilities have been shown to be an important determinant of individuals’ processing and usage of price signals, which leads to large cross-sectional variation in perceived and expected inflation. D’Acunto et al. (2019, 2023a) exploit data from a Nordic country, Finland, that permit the linking of different registry-based administrative data on income, taxes, asset and debt holdings, and demographic characteristics at the individual level and combine them with individual-level measures of cognitive abilities for all adult males in Finland based on results from their compulsory military entrance tests. The authors finally link, again at the individual level, these data with the responses to the Finnish Consumer Survey from Statistics Finland, which are the micro data used as input for the official consumer confidence survey of the European Commission.

Based on these comprehensive data, the authors find that men at the bottom of the distribution of cognitive abilities have mean absolute forecast errors that are 2.5 times greater than those of men at the top of the distribution. Crucially, though, forecast errors decline monotonically with cognition and the cross-sectional variation is not only driven by men with very low or very high cognitive abilities. These results hold in the raw data but also when conditioning on income and formal education at the individual level. The IQ measure is a combination of three subcomponents—verbal, arithmetic, and visuospatial cognition—and the authors find that all three subcomponents matter for how individuals perceive inflation and form inflation expectations.

In auxiliary analyses and using customized surveys, the authors show that differences by cognitive abilities arise for several reasons. First, high and low IQ individuals differ in their

general forecasting ability in relation to any random variable, including but not limited to inflation. Second, high and low IQ men have different types of goods in mind when forming their inflation expectations. Low IQ men are more likely to think about concrete goods like groceries or gasoline, whereas high IQ men think about the aggregate definition of inflation. Third, high and low IQ men also differ in their understanding of the concept of inflation and its implications for the economy. For example, low IQ men are more likely to think that persistent deflation is desirable and that unexpected inflation benefits savers, as compared to high IQ men. Finally, high and low IQ men consume different sources of information and media types (D'Acunto et al. 2020).

These findings provide empirical support for recent macroeconomic models featuring agents with limited cognition. Such models have been proposed to solve puzzles in macroeconomics, such as the forward guidance puzzle (the fact that agents react less strongly in their inflation forecasts and consumption decisions to announcements that interest rates will be kept low until after the end of the liquidity trap). While differing in their microfoundations, such as finite planning horizons, level- k thinking, lack of common knowledge, or behavioral discounting, most recent models proposing resolutions to the forward guidance puzzle suggest a prominent role for cognitive frictions (Farhi and Werning 2019; Woodford 2019; Gabaix 2020; Ilut and Valchev 2023).

Long-Run Persistence

Surges in inflation encountered during individuals' lifetime can trigger upward revisions of inflation expectations (Goldfayn-Frank and Wohlfahrt 2020). Malmendier and Nagel (2016) build on the literature on adaptive learning (e.g., Evans and Honkapohja 2003) and argue that individuals do not use all available data to form inflation expectations but only focus on realized data during their lifetime, with weights on realizations in the recent past that are larger than on realizations in the distant past. They find that this form of learning can rationalize differences in average expected inflation rates across cohorts over time. Their baseline setting does not allow the disentangling of age, cohort, and time effects directly and the authors derive additional predictions about the differences in the updating process across cohorts at each point in time to tackle this issue. The authors' framework predicts that younger individuals update their expectations more strongly after unexpected shocks to inflation based on the fact that they have a shorter lifetime experience relative to older individuals. For the case of the post-Covid surge in inflation, recent work by Pedemonte et al. (2023) argues that this prediction has not (yet) materialized in the data. Pedemonte et al. (2023) propose and test an alternative framework for the updating of inflation expectations across cohorts that builds on the representativeness heuristic as introduced in recent work on diagnostic expectations.²

Also, as discussed above, average inflation expectations of households have been biased upward relative to ex-post realizations and central banks' targets, despite the fact that inflation rates have been low and stable for decades. In a recent study, Braggion et al. (2024) propose that inflation shocks even in the more distant past shape contemporary inflation expectations, potentially explaining why inflation expectations are higher than implied by lifetime inflation experiences. To study the long-term effects of inflation shocks in detail, they focus on Germany. Germany provides close to an ideal setting for such an investigation for two main reasons. First, the country experienced severe hyperinflation in 1922–1923, and rich anecdotal evidence suggests that this time period shapes Germans' attitudes

toward inflation to this day. However, only very few individuals alive today experienced the hyperinflation themselves. Thus, this setting allows Braggion et al. to study potential long-term effects of a major inflation shock. Second, they draw on granular data on realized inflation at the local level during the German hyperinflation for 633 towns and on today's inflation expectations of households.

They find that individuals living in towns with high inflation in the 1920s expect higher inflation today. Moving from the quintile with the lowest realized inflation in the 1920s to the quintile with the highest inflation increases expected inflation today by 0.7 percentage points, which corresponds to around 90 percent of the average realized annual rate of inflation during the time period covered in their surveys. More formal regression-based analyses confirm this result. Additional tests suggest that the documented effect is not driven by local inflation being persistent over time or by historical inflation proxying for other macroeconomic experiences. Thus, their analysis points toward a long-lasting effect of inflationary shocks on inflation expectations.

There are at least two, not mutually exclusive mechanisms through which the experience of the German hyperinflation could persist locally across generations. The first channel is the intergenerational transmission of the experience of the hyperinflation from parents to their children. Existing research provides evidence for intergenerational transmission of economic preferences and norms (e.g. D'Acunto et al. 2019). The second channel that could drive the results is the transmission of inflation experiences over time through local institutions that create a collective memory. One such local institution is the media, which is known to shape public narratives and beliefs about historical events (e.g., Andre et al. 2023). Moreover, media coverage of inflation also matters for inflation expectations (e.g., Lamla and Lein 2014 and discussion below). The authors provide evidence for both channels contributing to the transmission of inflation experiences across generations.

Consistent with this evidence, D'Acunto and Weber (2023c) document that exposure to communist institutions leads individuals to form persistently higher inflation perceptions and expectations relative to individuals who have always been exposed to market-based economies. They find that, as a result of not being exposed to market-based volatile price changes during communism, individuals who lived in planned economies are less able to interpret and process volatile market-based price changes. D'Acunto and Weber (2023c) support this conjecture with a set of direct and falsification tests. For example, individuals in former communist countries that experienced more volatile inflation during the transition period form more biased present-day perceptions and beliefs about inflation. Moreover, the bias declines with the portion of one's life spent under a market-based economy, even though the "long shadow of communism" on economic beliefs arises even for the youngest individuals in their sample. The effect of exposure to communism and its aftermath survives the people who have actually lived under communism, which is consistent with a large interdisciplinary literature on the vertical transmission of economic perceptions and beliefs.

Finally, D'Acunto and Weber (2023c) find that individuals in former communist countries who have better access to information about the economy form more accurate perceptions and beliefs relative to other individuals in former communist countries. This result suggests that providing targeted information about the economy to people who were not exposed to market-based price volatility in their formative years might help reduce the long shadow of communism on their economic perceptions and beliefs (see discussion below on policy communication).

Policy Communication and the Media

The average upward bias in inflation expectations and the large cross-sectional dispersion are direct indicators that most households do not actively follow policy communications from central banks or the coverage of these by newspapers, television, or social media. Carroll (2003) estimates a model in which individuals update their expectations probabilistically based on news coverage of inflation and finds that individuals, on average, update their inflation expectations about once a year.

Dräger (2015), instead, shows that media reports on inflation have a small role in explaining the average inflation expectations of a Nordic population. Lamla and Vinogradov (2019) improve on causality and borrow from the high-frequency event study literature in monetary economics (e.g., Gorodnichenko and Weber 2016) to study the change in inflation expectations in the days around the monetary policy announcements of the Bank of England. They document that on average, most survey participants have not heard any news about monetary policy after the announcement and even those that have heard news do not have systematically different inflation expectations than those who have not and relative to survey participants before the announcement.

The average non-response to policy announcements in these papers is consistent with some form of rational inattention, given that the inflationary environment during which these studies were conducted was low and stable. But households do not even appear to pay attention to some of the most dramatic policy announcements, such as the change in policy framework by the Federal Reserve in 2020. Coibion et al. (2023a) show that most US households had not heard any news about monetary policy in the days surrounding that particular announcement and those that had heard news were not more likely to choose the announcement from a pre-specified list of options relative to those who had not heard any news.

The average non-response to even dramatic policy announcements is consistent with the previously discussed evidence that most households rely on the price changes in their daily life to form inflation expectations (D'Acunto et al. 2021). In fact, for a long time, central banks considered the fact that ordinary households did not even know what a central bank does as a sign of their success. Inflation was low and stable for decades so that ordinary people did not have to worry about it. This large degree of inattention is, however, not innocuous in times of heightened inflation when central banks aim to manage the expectations of ordinary people through communication and policy actions but cannot reach them with these communications.

A recent literature has started to study which type of policies and which type of communication are most successful in managing the expectations of ordinary people. Consistent with the premise that policies should be “simple, salient, and actionable” to be effective (Ramey 2021), D'Acunto et al. (2018, 2022c) compare the effectiveness of unconventional fiscal policy and forward guidance announcements. They find that only unconventional fiscal policy measures can manage inflation expectations and durable goods purchases effectively. Unconventional fiscal policy engineers an increasing price path through changes in consumption taxes, either via unexpected temporary cuts in current consumption taxes or via preannounced increases in future consumption taxes. Forward guidance instead makes promises to keep interest rates low until after the time that would be prescribed by a Taylor rule, hence generating inflation in those future periods. Through the lens of the New Keynesian model, both policies operate identically via the consumer Euler equation: they should raise inflation expectations and hence current spending. And yet, while unconventional fiscal policy is

easy to grasp, salient, and advertised by retailers and hence accessible to consumers during purchases, forward guidance is more difficult to understand except for those with high levels of education in macroeconomics. Consistent with this premise, D'Acunto et al. (2022c) show that unconventional fiscal policy is indeed very powerful in increasing the inflation expectations of a representative sample of Germans after such an announcement and these Germans also become more likely to purchase larger ticket items. For forward guidance, however, they do not find any reaction, neither for inflation expectations nor for durable goods purchases, neither on impact, nor with a delay. More recently, the German government implemented another measure of unconventional fiscal policy. Bachmann et al. (2021, 2023) confirm the previous evidence and show the power of this type of policy to stimulate consumption through changing the intertemporal path of prices.

Incentives to Gather and Process Information about Inflation

The large cross-sectional dispersion in inflation expectations is typically rationalized through models of rational inattention, in which individuals do not have large incentives to gather and process information about inflation when the costs of being uninformed are small (such as in times of low and stable inflation). For households, direct evidence for this mechanism is rather limited but Cavallo, Cruces, and Perez-Truglia (2017) find that households in countries with higher and more volatile inflation, such as consumers in Argentina, are better informed about inflation than households in the US in the decades before the post-pandemic inflation surge.

The rational inattention model can possibly explain why we observe the large cross-sectional dispersion in inflation expectations, but it cannot explain the upward bias in average inflation expectations that was present in the last decades. The recent rise in inflation provides an interesting opportunity for researchers to study this mechanism. Weber et al. (2023a) find that in the early phase of the pandemic, when prices of groceries started to increase substantially, those households with the highest increases in groceries expenditure were the ones with the largest increase in their inflation expectations, which does not directly support the rational inattention hypothesis.

At the same time, Weber et al. (2022) show that no upward bias relative to other forecasters and relative to realized inflation existed in the early 1980s after a period of high and volatile inflation in the US. Weber et al. (2023) instead apply randomized control trials (RCTs) over time in different countries, to study how the economic environment affects how agents learn from new information. They find that as inflation has recently risen in advanced economies, both households and firms have become more attentive and informed about inflation, leading them to respond less to exogenously provided information about inflation and monetary policy. They also study the effects of RCTs in countries where inflation has been consistently high (Uruguay) and low (New Zealand) as well as what happens when the same agents are repeatedly provided with information in both low- and high-inflation environments (Italy). Their results broadly support models in which inattention is an endogenous outcome that depends on the economic environment.

Inflation Expectations and Economic Choices

Despite the original skepticism of many academics, who considered survey-based data as largely reflecting noise, a growing body of work documents the importance of subjective

inflation expectations to help explain several household choices such as consumption and savings decisions, debt choices, but also portfolio investments.

Inflation Expectations and Consumption and Savings Choices

The key transmission mechanism of monetary policy in standard New Keynesian models is the consumer Euler equation. In normal times, with anchored inflation expectations, higher nominal rates transmit into higher real rates through the Fisher equation and consumers delay consumption and save more today, as the Euler equation prescribes. But when interest rates are stuck at an effective lower bound, central banks can stimulate consumption to the extent that they can raise the inflation expectations of consumers. In the last decade, a growing body of work has tested this mechanism using micro data from surveys. Bachmann et al. (2015) initiated this literature using data from the Michigan Survey of Consumers (MSC). On average, they found a zero relationship between a willingness to purchase larger ticket items as elicited in the survey and individuals' inflation expectations, and a slight negative association in the period during which the zero lower bound on nominal interest rates was binding. They discuss several mechanisms for this null result. First, higher expected inflation lowers expected real incomes if individuals do not think their nominal income will keep up with higher inflation. Moreover, higher expected inflation is also a tax on nominal assets, which could offset the positive effect due to intertemporal substitution (Schnorpfel et al. 2023). Further, in the data, higher realized inflation tends to go hand in hand with higher inflation volatility and households might become more uncertain about their future consumption and therefore increase their savings for precautionary reasons (D'Acunto et al. 2023c; Coibion et al. 2024; Fermand et al. 2024). Finally, the MSC is largely a cross-sectional survey and the large dispersion in inflation expectations might camouflage the association between inflation expectations and spending plans. Consistent with this explanation, Bachmann et al. (2015) found that among those survey participants that have ex post reasonable inflation expectations, a positive association existed between the two, in line with the consumer Euler equation. Moreover, after absorbing individual fixed effects and therefore focusing on changes in inflation expectations within individuals over time, Vellekoop and Wiederholt 2019 documented a positive association between inflation expectations and consumption choices. Burke and Ozdagli (2022) used the panel data from the pilot phase of the New York Fed SCE and also found no correlation between spending plans and inflation expectations, which is also confirmed in Coibion et al. (2023), likely due to a perceived negative income effect.

D'Acunto et al. (2022c) use micro data from the European Commission Consumer Survey for Germany and several other European countries and find a robust positive association between whether people think inflation will be higher, lower, or the same in the next 12 months and people's willingness to purchase larger ticket items. They document that this qualitative question format is akin to within-individual changes in inflation expectations, a property that allows them to exploit within-individual variation even in purely cross-sectional data. They are also the first to provide causal evidence for the mechanism exploiting a pre-announced increase in future value-added taxes for identification. Draeger and Nghiem (2021) and Crump et al. (2022) confirm the positive association using German survey data and the panel data underlying the New York Fed SCE respectively.

Using data from Finland, D'Acunto et al. (2023a) document facts that reconcile these results in the literature. First, they find that controlling for heterogeneous characteristics is

central to establish a positive association between inflation expectations and the willingness to purchase durable goods (see also Hesse, Knake, and Lehmann-Hasemeyer, Chapter 23 in this volume). Second, cognitive abilities shape the strength of the association between inflation expectations and consumption decisions. This result is independent of financial constraints, formal education, or other observable characteristics and could be interpreted as “human friction” (D’Acunto et al. 2023b), which limits the transmission of economic policy interventions that operate through households’ inflation expectations.

Coibion et al. (2022) ran customized surveys on the Nielsen Homescan panel in which they provided different pieces of information relevant to future inflation in a randomized fashion to panelists. Individuals in the control group did not receive any information. They then studied how survey participants updated their inflation expectations. Using the information treatments as instruments, they found both in survey data but also in actual spending data (collected through the scanners panelists have at home) that those with exogenously higher inflation expectations are indeed spending more on non-durable goods, in line with the consumer Euler equation.

Inflation Expectations and Other Choices

The consumption-savings decision is the one most directly affected by inflation expectations, and most of the recent literature on subjective expectations has studied how consumption responds to individual-level inflation expectations. A small and growing body of work, however, also studies how inflation expectations shape other choices. Malmendier and Steiny (2023) correlate the inflation realized during individuals’ lifetime with the decision to buy a house and find that those who experienced higher inflation are more likely to buy a house to protect against inflation. Schnorpfel et al. (2023) study the wealth erosion channel of inflation (Doepke and Schneider 2006). They implemented an information provision experiment for customers of a large German bank and showed that those customers with a large negative net nominal position (net debtors) increased their consumption in actual administrative bank data when they learned that inflation erodes the real value of the nominal debt. Philosoph and Ryngaert (2023) and Hajdini et al. (2023) instead study how inflation expectations shape individuals’ wage expectations, their bargaining, and labor supply decisions.

Open Questions and Directions for Future Research

Inflation expectations have taken center stage in the public debate and policy discourse since the post-Covid-19 reopening surge in inflation around the globe. We review a blossoming literature that has produced several stylized facts on how individuals form expectations and explains these patterns with price signals observed by individuals in their daily life (D’Acunto et al. 2021) and the memory of these price signals. The literature has also made progress in linking these expectations to individuals’ choices, largely by relying on high quality administrative data linked at the individual level to inflation expectations and sometimes paired with randomized information provision experiments for causal interpretation.

The next generation of work should study how individuals update their expectations jointly. Coibion et al. (2023b) show that those that have exogenously higher inflation expectations also expect higher nominal interest rates, partially offsetting the effects of

information treatments on perceived real interest rates. Mental models of agents (Andre et al. 2023) might play a crucial role for how individuals perceive the co-movement of different variables.

Another area that needs more research is the question of how individuals change their investment behavior and debt choices based on changes in their inflation expectations in addition to evidence, ideally linked to administrative data, on how people's labor supply decisions change when they update their inflation expectations. Finally, the recent proliferation of surveys of inflation expectations across countries and populations provides a unique opportunity for researchers to shed light on models of rational inattention and to better understand whether the deep foundational mechanism for how people collect, perceive, and process price signals changes as the inflation regime changes.

Notes

- 1 <https://www.chicagobooth.edu/research/kilts/research-data/nielseniq>.
- 2 Note that augmenting the original framework of Malmendier and Nagel (2016) by allowing different perceived degrees of persistence of inflation across cohorts can make the form of learning proposed by the authors consistent with the data.

References

- Andre, Peter, Carlo Pizzinelli, Christopher Roth, and Johannes Wohlfart. 2022. "Subjective Models of the Macroeconomy: Evidence from Experts and Representative Samples." *The Review of Economic Studies* 89, no. 6: 2958–2991. DOI: 10.1093/restud/rdac008.
- Angeletos, George-Marios, and Chen Lian. 2016. "Incomplete Information in Macroeconomics: Accommodating Frictions in Coordination." In *Handbook of Macroeconomics*, edited by John B. Taylor, and Harald Uhlig, 2: 1065–1240. Amsterdam: Elsevier. DOI: 10.1016/bs.hesmac.2016.04.011.
- Bachmann, Rüdiger, Tim O. Berg, and Eric R. Sims. 2015. "Inflation Expectations and Readiness to Spend: Cross-Sectional Evidence." *American Economic Journal: Economic Policy* 7, no. 1: 1–35.
- Bachmann, Rüdiger, Benjamin Born, Olga Goldfayn-Frank, Georgi Kocharkov, Ralph Luetticke, and Michael Weber. 2021. "A Temporary VAT Cut as Unconventional Fiscal Policy." *AEA Papers and Proceedings* 113, no. 5: 61–63. URL: <https://www.aeaweb.org/articles?id=10.1257/pandp.20231036>.
- Bachmann, Rüdiger, Benjamin Born, Olga Goldfayn-Frank, Georgi Kocharkov, Ralph Luetticke, and Michael Weber. 2021. "A Temporary VAT Cut as Unconventional Fiscal Policy." National Bureau of Economic Research Working Paper 29442. URL: <https://www.nber.org/papers/w29442>.
- Becker, Christoph, Peter Duersch, and Thomas Eife. 2023. "Measuring Inflation Expectations: How the Response Scale Shapes Density Forecasts." Unpublished manuscript. December 31, 2023. SSRN: DOI: 10.2139/ssrn.4323706.
- Bernanke, Ben S. 2007. "Inflation Expectations and Inflation Forecasting." Speech given at the Monetary Economics Workshop of the National Bureau of Economic Research Summer Institute, Cambridge, MA. July 10, 2007. URL: <https://www.federalreserve.gov/newsevents/speech/bernanke20070710a.htm>.
- Bernanke, Ben S., and Kenneth N. Kuttner. 2005. "What Explains the Stock Market's Reaction to Federal Reserve Policy?" *Journal of Finance* 60, no. 3: 1221–1257. DOI: 10.1111/j.1540-6261.2005.00760.x.
- Braggion, Fabio, Felix von Meyerinck, Nic Schaub, and Michael Weber. 2024. "The Long-Term Effects of Inflation on Inflation Expectations." National Bureau of Economic Research Working Paper 32160. DOI: 10.3386/w32160.
- Bruine de Bruin, Wandí, Charles F. Manski, Giorgio Topa, and Wilbert van der Klaauw. 2011. "Measuring Consumer Uncertainty about Future Inflation." *Journal of Applied Econometrics* 26, no. 3: 454–478. DOI: 10.1002/jae.1239.

- Bruine de Bruin, Wandí, Wilbert Van Der Klaauw, Julie Downs, Baruch Fischhoff, Giorgio Topa, and Olivier Armantier. 2010. "Expectations of Inflation: The Role of Demographic Variables, Expectation Formation, and Financial Literacy." *Journal of Consumer Affairs* 44, no. 2: 381–402. DOI: 10.1111/j.1745–6606.2010.01174.x.
- Burke, Marie, and Ali Ozdagli. 2023. "Household Inflation Expectations and Consumer Spending: Evidence from Panel Data." *Review of Economics and Statistics* 105, no. 4: 948–961. DOI: 10.1162/rest_a_01118.
- Candia, Bernardo, Olivier Coibion, Yuriy Gorodnichenko, and Michael Weber. 2023. "Perceived and Expected Rates of Inflation of U.S. Firms." *AEA Papers and Proceedings* 113: 52–55. DOI: 10.1257/pandp.20231034.
- Carroll, Christopher D. 2003. "Macroeconomic Expectations of Households and Professional Forecasters." *Quarterly Journal of Economics* 118, no. 1: 269–298. DOI: 10.1162/00335530360535207.
- Cavallo, Alberto, Guillermo Cruces, and Ricardo Perez-Truglia. 2017. "Inflation Expectations, Learning, and Supermarket Prices: Evidence from Survey Experiments." *American Economic Journal: Macroeconomics* 9, no. 3: 1–35. DOI: 10.1257/mac.20150147.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2012. "What Can Survey Forecasts Tell Us about Information Rigidities?" *Journal of Political Economy* 120, no. 1: 116–159. DOI: 10.1086/665662.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2015. "Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts." *American Economic Review* 105, no. 8: 2644–2678. DOI: 10.1257/aer.20110306.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2015a. "Is the Phillips Curve Alive and Well after All? Inflation Expectations and the Missing Disinflation." *American Economic Journal: Macroeconomics* 7, no. 1: 197–232. DOI: 10.1257/mac.20130306.
- Coibion, Olivier, Dimitris Georgarakos, Yuriy Gorodnichenko, and Maarten Van Rooij. 2023. "How does Consumption Respond to News about Inflation? Field Evidence from a Randomized Control Trial." *American Economic Journal: Macroeconomics* 15, no. 3: 109–152. DOI: 10.1257/mac.20200445.
- Coibion, Olivier, Dimitris Georgarakos, Geoff Kenny, Yuriy Gorodnichenko, and Michael Weber. 2024. "The Effect of Macroeconomic Uncertainty on Household Spending." *American Economic Review* 114, no. 3: 645–677. DOI: 10.1257/aer.20221167.
- Coibion, Olivier, Yuriy Gorodnichenko, Edward S. Knotek II, and Raphael Schoenle. 2023a. "Average Inflation Targeting and Household Expectations." *Journal of Political Economy: Macroeconomics* 1, no. 2: 403–446. DOI: 10.1086/722962.
- Coibion, Olivier, Dimitris Georgarakos, Yuriy Gorodnichenko, and Michael Weber. 2023b. "Forward Guidance and Household Expectations." *Journal of the European Economic Association* 21, no. 5: 2131–2171. DOI: 10.1093/jea/jvad003.
- Coibion, Olivier, Yuriy Gorodnichenko, and Michael Weber. 2020. "Political Polarization and Expected Economic Outcomes." National Bureau of Economic Research Working Paper 28044. URL: <https://www.nber.org/papers/w28044>.
- Coibion, Olivier, Yuriy Gorodnichenko, and Michael Weber. 2021. "Fiscal Policy and Households' Inflation Expectations: Evidence from a Randomized Control Trial." National Bureau of Economic Research Working Paper 28485. URL: <https://www.nber.org/papers/w28485>.
- Coibion, Olivier, Yuriy Gorodnichenko, and Michael Weber. 2022. "Monetary Policy Communications and their Effects on Household Inflation Expectations." *Journal of Political Economy* 130, no. 6: 1537–1584. DOI: 10.1086/718982.
- Crump, Richard K., Stefano Eusepi, Andrea Tambalotti, and Giorgio Topa. 2022. "Subjective Intertemporal Substitution." *Journal of Monetary Economics* 126: 118–133. DOI: 10.1016/j.jmoneco.2021.11.008.
- D'Acunto, Francesco, Andreas Fuster, and Michael Weber. 2022. "A Diverse Fed Can Reach Underrepresented Groups." Working Paper, University of Chicago, Becker Friedman Institute for Economics. DOI: 10.2139/ssrn.3901975.
- D'Acunto, Francesco, Ulrike Malmendier, and Michael Weber. 2022b. "What Do the Data Tell us about Inflation Expectations?" In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 133–161. Cambridge, MA: Academic Press. DOI: 10.1016/B978-0-12-822927-9.00012-4.

- D'Acunto, Francesco, Daniel Hoang, Maritta Paloviita, and Michael Weber. 2019. "Cognitive Abilities and Inflation Expectations." *AEA Papers and Proceedings* 109, no. 5: 562–566. DOI: 10.1257/pandp.20191050.
- D'Acunto, Francesco, Daniel Hoang, Maritta Paloviita, and Michael Weber. 2020. "Effective Policy Communication: Targets versus Instruments." Working Paper, University of Chicago, Becker Friedman Institute for Economics. DOI: 10.2139/ssrn.3713355.
- D'Acunto, Francesco, Daniel Hoang, Maritta Paloviita, and Michael Weber. 2023a. "IQ, Expectations, and Choice." *The Review of Economic Studies* 90, no. 5: 2292–2325. DOI: 10.1093/restud/rdac075.
- D'Acunto, Francesco, Daniel Hoang, Maritta Paloviita, and Michael Weber. 2023b. "Human Frictions in the Transmission of Economic Policies." Unpublished manuscript. December 31, 2023.
- D'Acunto, Francesco, Daniel Hoang, and Michael Weber. 2018. "Unconventional Fiscal Policy." *AEA Papers and Proceedings* 108: 519–523. DOI: 10.1257/pandp.20181061.
- D'Acunto, Francesco, Daniel Hoang, and Michael Weber. 2022c. "Managing Households' Expectations with Unconventional Policies." *The Review of Financial Studies* 35, no. 4: 1597–1642. DOI: 10.1093/rfs/hhab083.
- D'Acunto, Francesco, Ulrike Malmendier, Juan Ospina, and Michael Weber. 2021. "Exposure to Grocery Prices and Inflation Expectations." *Journal of Political Economy* 129, no. 5: 615–1639. DOI: 10.1086/713192.
- D'Acunto, Francesco, Marcel Prokopczyk, and Michael Weber. 2019. "Historical Antisemitism, Ethnic Specialization, and Financial Development." *The Review of Economic Studies* 86, no. 3: 1170–1206. DOI: 10.1093/restud/rdy021.
- D'Acunto, Francesco, and Michael Weber. 2023. "Memory and Beliefs: Evidence from the Field." Unpublished manuscript. December 31, 2023. Available at: https://www.dropbox.com/scl/fi/v6o6ork7izkykm1n2j7m/memory_beliefs.pdf?rlkey=dgx09grbl7fv3uzsik0iziixf&st=rbr4p3kn&dl=0.
- D'Acunto, Francesco, Thomas Rauter, and Michael Weber. 2023c. "Perceived Precautionary Savings Motives: Evidence from Digital Banking." Working Paper, University of Chicago, Becker Friedman Institute for Economics. DOI: 10.2139/ssrn.3499013.
- D'Acunto, Francesco, and Michael Weber. 2024. "Why Survey-Based Subjective Expectations Are Meaningful and Important." *Annual Review of Economics* 16: 329–357. DOI: 10.1146/annurev-economics-091523-043659.
- Das, Sreyoshi, Camelia Kuhnen, and Stefan Nagel. 2020. "Socioeconomic Status and Macroeconomic Expectations." *The Review of Financial Studies* 33, no. 1: 395–432. DOI: 10.1093/rfs/hhz041.
- Doepke, Matthias, and Martin Schneider. 2006. "Inflation and the Redistribution of Nominal Wealth." *Journal of Political Economy* 114, no. 6: 1069–1097. DOI: 10.1086/508379.
- Dräger, Lena. 2015. "Inflation Perceptions and Expectations in Sweden—Are Media Reports the Missing Link?" *Oxford Bulletin of Economics and Statistics* 77, no. 5: 681–700. DOI: 10.1111/obes.12078.
- Dräger, Lena, and Giang Nghiem. 2021. "Are Consumers' Spending Decisions in Line with an Euler Equation?" *Review of Economics and Statistics* 103, no. 3: 580–598. DOI: 10.1162/rest_a_00909.
- Evans, George W., and Seppo Honkapohja. 2003. "Expectations and the Stability Problem for Optimal Monetary Policies." *The Review of Economic Studies* 70, no. 4: 807–824. DOI: 10.1111/1467-937X.00268.
- Farhi, Emanuel, and Ivan Werning. 2019. "Monetary Policy, Bounded Rationality, and Incomplete Markets." *American Economic Review* 109, no. 11: 3887–3928. DOI: 10.1257/aer.20171400.
- Ferland, Elyas, Camelia Kuhnen, Geng Li, and Itzhak Ben-David. 2024. "Extrapolative Uncertainty and Household Economic Behavior." *Management Science* (March). DOI: 10.1287/mnsc.2023.00820.
- Gabaix, Xavier. 2020. "A Behavioral New Keynesian Model." *American Economic Review* 110, no. 8: 2271–2327. DOI: 10.1257/aer.20162005.
- Georganas, Sortiris, Paul J. Healy, and Nan Li. 2014. "Frequency Bias in Consumers' Perceptions of Inflation: An Experimental Study." *European Economic Review* 67: 144–158. DOI: 10.1016/j.euroecorev.2014.01.014.
- Goldfayn-Frank, Olga, and Johannes Wohlfart. 2020. "Expectation Formation in a New Environment: Evidence from the German Reunification." *Journal of Monetary Economics* 115: 301–320. DOI: 10.1016/j.jmoneco.2019.08.001.

- Gorodnichenko, Yuriy, and Michael Weber. 2016. "Are Sticky Prices Costly? Evidence from the Stock Market." *American Economic Review* 106, no. 1: 165–199. DOI: 10.1257/aer.20131513.
- Hajdini, Ina, Edward Knotek, John Leer, Mathieu Pedemonte, Robert Rich, and Raphael Schoenle. 2023. "Low Passthrough from Inflation Expectations to Income Growth Expectations: Why People Dislike Inflation." Federal Reserve Bank of Cleveland Working Paper No. 22-21R. DOI: 10.26509/frbc-wp-202221r.
- Ilut, Cosmin, and Rosen Valchev. 2023. "Economic Agents as Imperfect Problem Solvers." *The Quarterly Journal of Economics* 138, no. 1: 313–362. DOI: 10.1093/qje/qjac027.
- Jonung, Lars. 1981. "The Perceived and Expected Rates of Inflation in Sweden." *The American Economic Review* 71, no. 5: 961–968. <https://www.jstor.org/stable/1803477>.
- Kaplan, Greg W., and Sam Schulhofer Wohl. 2017. "Inflation at the Household Level." *Journal of Monetary Economics* 91 (November): 19–38. DOI: 10.1016/j.jmoneco.2017.08.002.
- Lamla, Michael, and Sarah M. Lein. 2014. "The Role of Media for Consumers' Inflation Expectation Formation." *Journal of Economic Behavior and Organization* 106 (October): 62–77. DOI: 10.1016/j.jebo.2014.05.004.
- Lamla, Michael J., and Dmitri V. Vinogradov. 2019. "Central Bank Announcements: Big News for Little People?" *Journal of Monetary Economics* 108 (December): 21–38. DOI: 10.1016/j.jmoneco.2019.08.014.
- Lucas, Robert E. Jr. 1975. "An Equilibrium Model of the Business Cycle." *Journal of Political Economy* 83, no. 6: 1113–1144. DOI: 10.1086/260386.
- Mackowiak, Bartosz, Filip Matejka, and Mirko Wiederholt. 2023. "Rational Inattention: A Review." *Journal of Economic Literature* 61, no. 1: 226–273. DOI: 10.1257/jel.20211524.
- Malmendier, Ulrike, and Stefan Nagel. 2016. "Learning from Inflation Experiences." *The Quarterly Journal of Economics* 131, no. 1: 53–87. DOI: 10.1093/qje/qjv037.
- Malmendier, Ulrike, and Alexandra Steiny. Forthcoming. "Rent or Buy? Inflation Experiences and Homeownership Within and across Countries." *Journal of Finance*. SSRN: <https://ssrn.com/abstract=4394555>.
- Mankiw, N. Gregory, and Ricardo Reis. 2002. "Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve." *The Quarterly Journal of Economics* 117, no. 4: 1295–1328. DOI: 10.1162/003355302320935034.
- Mankiw, N. Gregory, Ricardo Reis, and Justin Wolfers. 2003. "Disagreement about Inflation Expectations." *NBER Macroeconomics Annual* 18: 209–270. DOI: 10.1086/ma.18.3585256.
- Manski, Charles. 2004. "Measuring Expectations." *Econometrica* 72, no. 5: 1329–1376. DOI: 10.1111/j.1468-0262.2004.00537.x.
- Meyer, Brent, and Guhan Venkatu. 2011. "Demographic Differences in Inflation Expectations: What Do They Really Mean?" *Cleveland Fed Economic Commentary* 2011, no. 7: 1–6. DOI: 10.26509/frbc-ec-201107.
- Pedemonte, Mathieu, Hiroshi Toma, and Esteban Verdugo. 2023. "Aggregate Implications of Heterogeneous Inflation Expectations: The Role of Individual Experience." Federal Reserve Bank of Cleveland Working Paper No. 23–04. DOI: 10.26509/frbc-wp-202304.
- Philissoph, Laura, and Jane Ryngaert. 2023. "Job Search, Wages, and Inflation." Unpublished manuscript. December 31, 2023. Available at: https://janeryngaert.github.io/app/resources/wages_inflation.pdf.
- Powell, Jerome. 2021. "Transcript of Chair Powell's Press Conference September 22, 2021." Federal Reserve. URL: <https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20210922.pdf>.
- Ramey, Valery A. (2021). "Anticipations in macro: the importance of salience, comprehensibility, and actionability". *Keynote Lecture at RIDGE Forum on International Macro*. <https://econweb.ucsd.edu/~vramey/research/Ramey-Keynote-Ridge-Conference-2021.pdf>
- Schnorpfel, Philip, Michael Weber, and Andreas Hackethal. 2023. "Households' Response to the Wealth Effects of Inflation." NBER Working Paper 31672. URL: <https://www.nber.org/papers/w31672>.
- Vellekoop, Nathanael, and Mirko Wiederholt. 2019. "Inflation Expectations and Choices of Households." SAFE Working Paper No. 250. URL: https://www.nvellekoop.nl/data/Inflation_wp_web.pdf
- Weber, Michael, Bernardo Candia, Tiziano Ropele, Rodrigo Lluberas, Serafim Frache, Brent Meyer, Saten Kumar, Yuriy Gorodnichenko, Dimitris Georgarakos, Olivier Coibion, Jeff Kenny, and Jorge

- Ponce. 2023. “Tell Me Something I Don’t Already Know: Learning in Low and High-Inflation Settings.” NBER Working Paper 31485. DOI: 10.3386/w31485.
- Weber, Michael, Francesco D’Acunto, Yuriy Gorodnichenko, and Olivier Coibion. 2022. “The Subjective Inflation Expectations of Households and Firms: Measurement, Determinants, and Implications.” *Journal of Economic Perspectives* 36, no. 3: 157–184. DOI: 10.1257/jep.36.3.157.
- Weber, Michael, Yuriy Gorodnichenko, and Olivier Coibion. 2023a. “The Expected, Perceived, and Realized Inflation of U.S. Households.” *IMF Economic Review* 71, no. 1: 326–368. DOI: 10.1057/s41308-022-00175-7.
- Woodford, Michael. 2003. “Imperfect Common Knowledge and the Effects of Monetary Policy.” In *Knowledge, Information, and Expectations in Modern Macroeconomics: In Honor of Edmund S. Phelps*, edited by Philippe Aghion, Roman Frydman, Joseph Stiglitz, and Michael Woodford, 25–58. Princeton, NJ: Princeton University Press.
- Woodford, Michael. 2019. “Monetary Policy Analysis when Planning Horizons Are Finite.” *NBER Macroeconomics Annual* 33, no. 1: 1–50. DOI: 10.1086/700892.

8

CONTINGENT EXPECTATIONS

Alexander Nützenadel and Jochen Streb

A Toolbox of Expectation Models

Whenever economic actors are about to make decisions with long-term consequences they must form and factor in expectations about how relevant economic, technological, or social variables might develop in the future. Take, for example, a high school graduate who faces a choice between different university programs: to gauge her future job prospects and earnings potential she would have to estimate the demand for her academic skillset that would exist in the labor market by the time of her graduation. A family looking to purchase a home will try to assess how property prices, mortgage interest rates, and their own earnings are likely to change over the next few decades. A prudent entrepreneur will carefully weigh potential risks and rewards before undertaking a costly investment project. Hence, economists who wish to predict how economic actors will behave in such decision-making situations must therefore make assumptions about how their expectations are formed.

In the first half of the twentieth century, economists usually followed a rather simplistic approach by assuming that economic actors believe that the actual conditions also apply in the future. In the late 1950s, this assumption was replaced by the more sophisticated concept of adaptive expectations, which is premised on the idea that actors form their expectations based on a weighted average of their historical experiences (Nerlove 1958). This backward-looking approach does not imply that actors stubbornly stick to their original expectations in the face of surprising developments. Instead, they are capable of learning. Whenever a variable deviates from the expected value, actors update their expectations. Only a few years later, however, adaptive expectations came under increasing pressure from John Muth's seminal paper (1961) on rational expectations. Muth's concept was a groundbreaking methodological innovation. In contrast to adaptive expectations, the rational expectations theory acknowledges that forward-looking agents are able to respond quickly to exogenous shocks or unexpected policy changes by adequately adjusting their expectations to the new information set (Lucas 1976). Crucially, the speed of adjustment of rational expectations, unlike adaptive expectations, is not slowed down by the baggage of experience. Regardless of their past experience, agents use appropriate models to predict how a surprising change in relevant parameters may affect the future development of certain target

variables. It was mainly to the influence of Robert E. Lucas (1972, 1973, 1976; see also Sargent and Wallace 1975) that rational expectations subsequently superseded the theory of adaptive expectations in mainstream economics. This triumph was facilitated decisively by the fact that the stagflation of the 1970s could be more accurately explained with the help of rational expectations than with adaptive expectations.

To date, many macroeconomic studies that rely on rational expectations assume that all agents have complete information, which includes knowledge of the (econometric) model needed to estimate the future impact of an unexpected change in certain parameters. In particular, fully informed agents are thought to use the same models as the economists who seek to explain their expectation formation. Thus, the assumption of full-information rational expectations (FIRE) provides economists with the ability to predict actors' expectations "that tend to be distributed, for the same information set, about the prediction of the theory" (Muth 1961, 316). That is why FIRE has long formed the undisputed basis of modern macroeconomics (see Born, Enders, and Müller, Chapter 10 in this volume).

The Great Recession from late 2007 to 2009 has cast doubt on many old certainties. Economists have since increasingly experimented with models of expectation formation that either dispense with the assumption of full information or the assumption of rational expectations. In reality, actors often have diverse incomplete information because they either receive private signals or deliberately choose to ignore or only irregularly update certain public information (Mankiw and Reis 2002; Sims 2003). Diverse information will lead to heterogeneous expectations that are dampened in response to surprising changes compared to FIRE (Angeletos and Lian 2018). The assumption of rational expectations is violated when actors fail to fully consider the influence of their own expectations on the expectations (and the behavior) of the other market participants. The formation of iterative higher beliefs about the expectations of others presupposes that the actors are capable of calculating like game theorists—which is certainly not the rule (Fahri and Werning 2019). On the contrary, behavioral economists have found that people frequently use simple rules of thumb and other practical yardsticks to make decisions, and furthermore, the process of expectation formation has been shown to be distorted in many ways by cognitive biases (Kahneman and Tversky 1974). In light of so much contradictory evidence, Gennaioli and Shleifer (2018, 204f.) have argued that the model of rational expectations is doomed. They have suggested that more evidence-based models of expectation formation should be developed, "so [that] the inaccurate though aesthetically attractive ones can be honorably retired." At the moment, a whole range of alternative expectation models are on offer. These include, for example, epidemiological expectations (Caroll and Wang 2023), diagnostic expectations (Bordalo et al. 2018), fictional expectations (Beckert 2016), biases in expectations due to personal experience (Malmendier and Nagel 2016), or myopia (Gabaix 2020). To date, however, all attempts to bring about a paradigm shift and establish a new dominant theory of expectation formation have failed. The resulting wilderness of competing expectation models is currently causing palpable uncertainty among many social scientists. If it is not possible to reliably predict which expectation model actors will use, it follows that it is also not possible to forecast their expectations and subsequent actions.

In this chapter, we will argue that it is misleading to look for a single optimal model of expectation formation that can be applied in each and every decision-making situation. Instead, we will suggest that economic agents have at their disposal a toolbox of different types of expectation formation from which they usually select the most appropriate

one for a particular decision situation. We refer to this approach as “contingent expectations.”¹ By defining the concept as “contingent” we wish to stress that the selection of expectation models depends on context. We need to know the particular circumstances of a given decision-making situation in order to assess which expectation formation model is most likely to be selected by an actor.

Our concept of contingent expectations is supported by research in experimental psychology that suggests that, during human evolution, individuals have developed the cognitive skills to choose between different available methods to achieve a given goal. Gert Gigerenzer (2008), for example, argues that individuals draw on different techniques to optimize their decision-making. With the concept of the “adaptive toolbox,” Gigerenzer (2008) introduced a metaphor that describes the “rational ecology” of human decision-making, which is very often based on simple heuristics instead of complex probability calculations or algorithms. This is especially true for “affective-rich” situations when circumstances have strong personal or emotional implications. In such situations, actors often neglect information-seeking and make their decisions spontaneously (see also Spiliopoulou and Hertwig 2020). Gigerenzer’s approach—even though not directed at historical analysis—provides an interesting reference for our model of contingent expectations, as it points to the trade-off between optimal decisions with comparatively high information cost and “only” satisfactory decisions that often allow for higher marginal returns.

Our argumentation takes place in three main steps. First, we show that the variety of competing methods of expectation formation can be brought to order by a concept that does justice to the complexity of decision-making situations and yet remains simple, clear, and generally applicable. To meet this requirement, we develop the idea of contingent expectations. Second, we elaborate the theoretical structure of contingent expectations, which can be represented in the form of a flowchart. We assume that the method of expectation formation an actor finds suitable for the specifics of a given decision situation depends on the degree of uncertainty, personal experience, the influence of third parties, and the level of information costs. Third, to provide empirical evidence that actors choose between different methods of forming expectations in real-life decision-making situations as if they were following this flowchart of contingent expectations, we discuss a number of historical case studies.

Bringing Order into the Toolbox

In order to develop our model of contingent expectations, we must first understand why mainstream economists have persistently defended the concept of full-information rational expectations (FIRE) and refused to use other, more complex models of expectation formation. For this purpose, it is worth remembering the older debate about the assumption of profit maximization as the sole objective of all entrepreneurial activity. This idea has often been challenged by economists and other social scientists who have usually pointed out that, in reality, many entrepreneurs and managers also pursue other goals. Moreover, it has been argued that maximizing profits is no easy task: entrepreneurs often fail to accomplish their goals because they lack sufficient information to identify the most suitable profit-maximizing strategy in a world of irreducible uncertainty (see, e.g., Alchian 1950). Despite all this criticism, however, the assumption of profit maximization has remained a core element of economic theories to this day. A justification for this persistence was offered by Milton Friedman (1966) in his influential essay “The Methodology of Positive

Economics.” Herein, he reminds his readers of the principle known as “Occam’s razor”: this contends that an essential feature of any good theory is the simplicity, parsimony, and clarity of its basic assumptions. In other words, economic models should not seek to represent the real world in all its complexity—which would render the model just as unmanageable as the reality. Instead, economic models should concentrate only on those aspects of human behavior from which plausible hypotheses can be derived with regards to the questions at hand. Friedman claimed that the assumption of profit maximization has met these requirements and proved itself in the long run: “Yet the continued use and acceptance of the hypothesis over a long period, and the failure of any coherent, self-consistent alternative to be developed and widely accepted, is strong indirect testimony to its worth” (Friedman 1966, 23). To strengthen his point of view, Friedman also refers to arguments from evolutionary economics: only those companies survive competition in the long run that regularly achieve above-average profits, and from this empirical observation it can be concluded that entrepreneurs act *as if* they were pursuing the goal of profit maximization (Friedman 1966, 21f).

In economic models, the assumptions about actors’ expectation formation have a similar fundamental importance as the assumptions about their objectives. Therefore, it might make sense to adopt the conclusions from the debate about profit maximization for expectation formation and assume that actors act *as if* they had formed full-information rational expectations. This analogy would help explain why behavioral economists have so far failed to establish a new generally accepted theory of expectation formation. Admittedly, this task poses many challenges. To begin with, the list of cognitive biases that can distort perceptions and lead to erroneous expectations encompasses dozens of different types. Any economic model attempting to account for all these different biases could hardly meet the criteria of simplicity, parsimony, or clarity—it would certainly not lend itself for application as a general workhorse model in the way that FIRE has been used. Therefore, it is understandable if scholars like Thomas Sargent (1999, 9) have argued with conviction that we should hold on to the concept of rational expectations: “I adhere to the rational expectations benchmark and economize on free parameters. I embrace minimalism to discipline my venture into the wilderness of bounded rationality.”

In this chapter, we argue that it is not necessary to decide for or against certain concepts of expectation formation. Instead, we try to fit the competing approaches into the overarching framework of contingent expectations. To achieve this goal, it is useful to analyze when specific models of expectation formation emerged, under what circumstances they were found to be viable, and why they sometimes failed or were discarded.

At first glance, such a historical approach seems to lead to a teleological narrative of continued progress in expectation formation theory. There is no denying the advances that were first made in mathematics, especially in probability theory, and later in the social sciences and information technologies, significantly improved human capacities to form precise expectations about the future. At the beginning of this development were, among others, the attempts of Italian insurance entrepreneurs in the late Middle Ages to assess the risks involved in maritime trade by collecting information as current as possible about weather conditions or the activities of pirates (Ceccarelli 2007; see also Huang and Spoerer, Chapter 20 in this volume). Today, we find complex computer-based forecasting models that are routinely used to predict macroeconomic trends or fluctuations in stock market prices. Thus, we can observe a long-term trend of “scientization” and “professionalization” in the formation of expectations, apparently culminating in the theory of full-information

rational expectations that places the highest demands on information-gathering and processing by decision-makers.

However, this success story must be called into question because of recent events and historical evidence. First, the history of financial crises provides many insights (see, for example Kindleberger and Aliber 2005) that should have enabled fully informed rational actors to correctly predict the financial collapse of the Great Recession of late 2007 through 2009. That most investors, bank managers, and forecasters overlooked all the ominous parallels with previous financial crises, has cast doubt on the adequacy and usefulness of FIRE. That is why the experience with the Great Recession gave rise to a new variety of competing models of expectation formation, inspired by behavioral economics and with a renewed focus on experience, which are seen as progress compared to FIRE. Second, a more detailed look at economic history reveals that from as early as the Middle Ages, historical actors have recurred to different forms of expectation formation. There is no neat distinction between a “pre-modern” and a “modern” mode of predicting the future, as Koselleck (1985) has argued. We find that even pre-modern economic agents selected between different approaches to make expectations about future outcomes. Instead of a linear evolution toward an optimal model of expectation formation we find a more complex, contingent, and at times cyclical progression of different guiding concepts.

Discussing the tensions and competition between different methods of expectation formation will help us to elaborate our concept of contingent expectations. The concept is premised on three different but related observations. First, historical processes are open and often accidental by nature, which makes predictions about the future extremely difficult and uncertain. Gathering all relevant information is often impossible for individual households, managers, or investors, and it is usually associated with high information costs. Second, the specific form of making predictions is highly variable as changing historical contexts require different forecasting strategies. Third, predictions and decisions are embedded in complex processes in which agents must regularly revise their information and beliefs. Updating one’s knowledge is again costly and requires intellectual effort. That is why economic learning is itself a dynamic—and highly contingent—process (for different learning technologies assumed in economics, see Baley and Veldkamp 2023).

The term “contingent expectations” has been used in the literature only sporadically and in a narrower sense than we do. Roman Frydmann and Michael D. Goldberg (2013) referred to this concept as a model that combines rational forecasting strategies in financial markets with insights from behavioral economics. From a sociological viewpoint, Jens Beckert (2012) argued that the contingent nature of evolution in capitalist societies requires narrative strategies to cope with uncertainty.

In our chapter, we aim to provide a complex concept of contingent expectations that combines economic with historical perspectives. The challenge lies in achieving two difficult objectives at the same time: doing justice to the empirical complexity of history *and* meeting the demand for a clear-cut model that would avoid the wilderness feared by scholars such as Sargent (1999). To meet this challenge, we draw inspiration from the theory of rational inattention (Sims 2003; Wiederholt 2018).

The theory of rational inattention is based on the observation that processing information requires time and attention. These are limited resources that any economic actor does not like to turn away from other activities. The scarcity of time and attention means that, in practice, no actor can handle all available information in any given decision-making situation. Instead, actors will try to make their decisions based on a limited

selection of data. Importantly, this technique is conceptualized as a rational process: actors are well aware that ignoring some available facts can increase the likelihood of making a wrong decision. However, they might be willing to accept this risk if it leaves them with more time and attention that can be devoted to their other activities. The decision-making process thus proceeds in two clearly distinctive steps. In the first step, economic actors decide which information they will use and what can be neglected in a particular situation. In a second step, they acquire and process the selected information to reach a decision.

The basic problem can be illustrated by the example of student admissions. University administrators are required to decide which of the many applicants should be given a place in their program. A plethora of information is available to assess the quality of applicants. Processing some of it is very time-consuming, such as conducting selection interviews or reading long letters of motivation. University faculty may decide to dispense with this information and spend the time saved on research. Rational inattention in this case may mean that only school grades are used as a selection criterion. This procedure may lead to minor errors, e.g., when a less suitable applicant is chosen over a more suitable one. However, major errors are unlikely to occur because poor school grades seldom conceal very good students, and brilliant school records rarely predict academic failure.

Maćkowiak et al. (2021) have systematized the economic implications of the theory of rational inattention. Two insights seem to be of particular importance for our context. First, agents will draw on more information in high-stakes decision-making situations than in situations where they have little to lose. Second, actors will focus their attention on economic variables that display high volatility, because large fluctuations may mean that bad decisions can incur large losses.

The Model of Contingent Expectations

From what has been said so far, it should be clear that expectation formation can be interpreted as an application of the theory of rational inattention. Every economic actor who wishes to form realistic expectations about the future will have to engage in intelligence-gathering. To this end, she can read newspapers, economic textbooks, or academic journals, she can seek personal advice from knowledgeable friends, follow the columns of famous economists, or browse the depths of the Internet to get a better idea of how relevant economic variables might develop in the future. Researching and processing this information absorbs time, money, and attention and thus entails considerable (opportunity) costs. Economic agents will have to weigh the benefits of such information costs. In conventional economic reasoning, the optimum is reached when the marginal cost of obtaining and processing information roughly equals the marginal benefit.

In some decision-making situations, actors may not attribute any value at all to information acquisition because their stakes are low relative to their income or wealth. We observe this behavior, for example, in lottery players who, even if they are not addicted to gambling, ignore the well-known very low probabilities of winning. Another example is offered by many German savers, who held on to their savings accounts even when the real interest rates on this form of investment were negative for many years, as was the case during the stagflation period of the 1970s (Knake 2023; see also Hesse, Knake, and Lehmann-Hasemeyer, Chapter 23 in this volume). Instead of updating their expectations on the basis of easily obtainable information on nominal interest and inflation rates and then searching

for better investment opportunities, many German savers clung stubbornly to routines and traditions such as “in our family, we have always relied on a savings book to accumulate some wealth.” The conclusion seems obvious that actors only bother to think about information acquisition and the choice of an appropriate expectation model when they believe that the stakes are high. The problem, however, is determining when the stakes are high. For a low-income household, the loss of a certain amount of assets may mean a dramatic loss, while the same event may not be noticed at all by a wealthy person. For this reason, we avoid the subjective concept of high or low stakes in our model. Instead, we compare the benefits and costs of obtaining information.

The marginal benefit of information acquisition depends on one factor in particular. It hinges on the fundamental epistemological question of to what extent any additional information can improve the accuracy of a given estimate. To explore this issue further, Frank Knight’s (1921) clear distinction between calculable risk and incalculable uncertainty is helpful. In the latter case, where the possible future consequences of a present action cannot be predicted, let alone expressed in probabilistic terms, it is impossible to calculate reliable forecasts for any specific variable. Hence, it makes little sense for the decision-maker to invest in the acquisition of further (useless) information—he will have to find other ways of dealing with the irreducible uncertainty.

In order to understand and structure the considerations that may run through an actor’s head when choosing his strategy of expectation formation, it is helpful to formalize the decision-making situation in a simple way. We assume that the future outcome of a present decision is affected by the future state of the world. To make the analysis easier, we assume that there is only a good scenario and a bad scenario to be reckoned with. In the good scenario, the future returns will be high ($\bar{X}$); in the bad scenario, the future returns will be low ($\underline{X}$). If the actor is able to assign the probability p to the good scenario, he can calculate the expected value of the returns $E(X)$:

$$E(X) = p\bar{X} + (1 - p)\underline{X}$$

The actor will decide to take the economic action today if the expected value of the future return is at least as large as the reservation value X_0 he would realize if he refrained from this action:

$$E(X) \geq X_0$$

To perform these calculations, an actor needs to know the probabilities of the good scenario and the bad scenario (and the returns occurring in both cases). In practice, this necessary precondition is not given in every real-life decision-making situation. In a situation of Knightian uncertainty an actor might not be able to predict both the alternative returns and the probabilities of their occurrence. Hypothetically speaking, this would apply, for example, to an entrepreneur who is trying to develop a basic innovation of which he knows neither the technical properties nor the viability and profitability. Incomplete information in this case is not a conscious decision as described by the theory of rational inattention but an unavoidable fact due to the unpredictability of things that do not yet exist. Under such kind of uncertainty, the simple decision model as described above would not work and we will have to consider how the actor would remain capable of deciding under these circumstances.

However, let us first contemplate expectation formation under risk when the alternative returns are known, and the probabilities of both scenarios can be estimated in advance. It is unlikely that an actor knows the true probabilities of occurrence from the beginning. However, he will have a preliminary idea of their value, which we denote by $\tilde{p}$. This prior belief may result from experiences that the actor has had in similar situations in the past or from assessments that are derived from the actions or narratives of third parties. The actor must now decide whether to rely on his beliefs $\tilde{p}$ or to obtain a better idea of the true value p by gathering and processing additional information. The identification and processing of this information incurs costs C , the amount of which also depends on the actor's personal characteristics, such as education, professional experience, or economic literacy. For example, it may be very difficult for a financial illiterate to interpret readily available data on inflation and interest rates, even if this is easy for a trained economist. Therefore, it will not be worthwhile for the actor to use additional information under all circumstances. Regardless of the true probabilities of the good and the bad scenario, the worst thing that can happen to an actor would be the occurrence of $\underline{X}$ instead of $\bar{X}$. It therefore makes no sense to accept information costs that are greater than the difference of ΔX .

Figure 8.1 shows the options available to an actor when selecting his strategy of expectation formation. If the information costs C are higher than the maximum difference in outcomes ΔX , most actors will rely on past experiences to determine the probabilities of occurrence. If the information costs are lower, it is reasonable to supplement the experiential knowledge with further information from external sources. In this situation, agents gravitate toward the information-based expectations models, which in some extreme cases might also lead to full-information rational expectations. In contrast, an actor who has no experience of his own and is also reluctant to gather information from other sources in light of high information costs will often use simple heuristics or just follow the behavior of other agents. We observe such herd effects, for example, during a speculative bubble. Inexperienced investors enter the market because they follow the lead of their peers or trust the enthusiastic narratives that are publicly disseminated. In summary, these strategies of

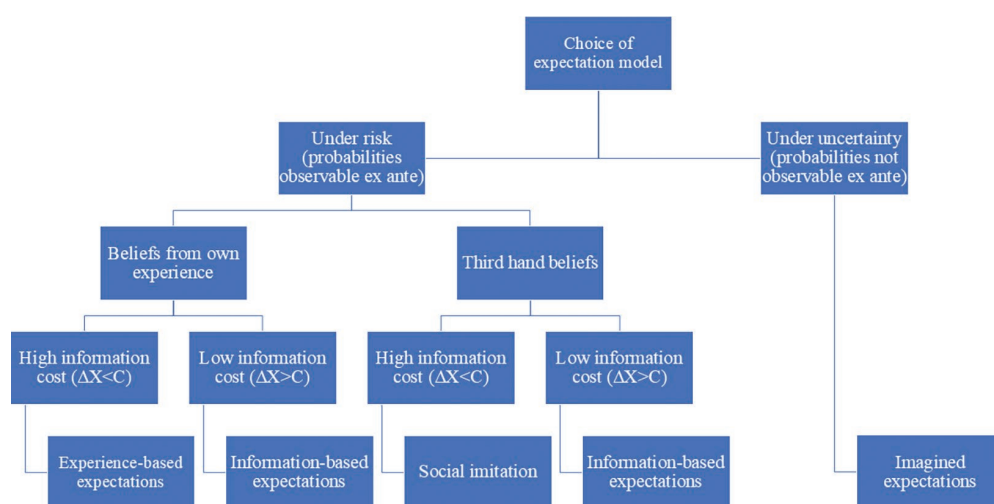


Figure 8.1 The menu of contingent expectations.

Source: Author creation.

expectation formation can be called social imitation. Of course, even those actors without experience of their own may improve their knowledge on future outcomes by processing more information. This may happen if such information is easily accessible, i.e., if the costs of obtaining information are low.

Actors who must make important decisions under uncertainty have no possibility of gathering reliable information and assessing the probabilities of future outcomes. What will actors do in such a situation of fundamental ambiguity? Gilboa and Schmeidler (1989; see also Hansen and Sargent 2001) suppose that actors who cannot determine the probabilities of the good and bad states of the world will instead consider a whole set of different probability distributions. In order to predict which decision actors with such multiple beliefs will reach, Gilboa and Schmeidler (1989) assume uncertainty aversion. Actors with uncertainty aversion are supposed to be primarily concerned that a scenario that is bad for them will occur. That is why uncertainty-averse actors apply the *maximin principle*: they first identify the probability distribution that they believe could lead to the worst outcome and then act in a way that maximizes their own payoff in this worst-case scenario. In practice, uncertainty aversion often leads to excessive caution, to inaction and inertia (Ilut and Schneider 2023). Therefore, this concept is usually not particularly helpful in explaining why actors remain capable of acting despite uncertain expectations.

Imagined expectations, on the other hand, meet this requirement. This concept of expectation formation assumes that uncertain actors tend to form expectations based on fictions and narratives of an imagined future which transcend factual knowledge. Sociologists Jens Beckert's (2016) idea of "fictional expectations" provides an example for this kind of expectation model. The starting point of Beckert's argument is that people in modern capitalist societies share the basic idea that they are empowered to take their destiny into their own hands and create a better future for themselves and others. This optimism would certainly be expressed most strongly in the "American Dream," which gives Americans hope of being able to climb far up the social ladder through hard work (Beckert 2016, 26, 87). This positive attitude, combined with people's inherent creativity, causes economic actors to dream up future achievements and thereby fill the void of an uncertain future. In the absence of reliable quantitative data on outcomes or probability distributions, these fictional expectations usually take the form of a believable story that foretells the longed-for course of future events. These narratives are often sufficient to enable economic actors to take practical action because, according to Beckert (2016, 10), people possess another useful ability. They are able to suppress the awareness that their imagined futures are only fictions rather than definite facts.

Dreaming of a positive outcome in the future may seem like an irrational form of motivation from today's perspective. In fact, such dreams usually lead to failure. Not everyone who dreams of it becomes a successful inventor, company founder, or artist. Many have to realize that their expectations of themselves were too high and settle for mediocre results. Without these dreams of success, however, nobody would even make the attempt. In the rare cases of success, it was precisely thanks to imagined expectations that progress could be made that went beyond the previous state of knowledge.

To avoid an overly complicated model, we assume that actors choose their strategy of expectation formation *as if* they were following the flowchart shown in Figure 8.1. This assumption gives us the ability to predict this choice depending on the particular circumstances of the decision-making situation and to take this prediction into account when designing macroeconomic and microeconomic theories. The precondition for this procedure

is to give up the view that there is an optimal expectation model that fits under all circumstances. Note that contingent expectations do not require actors to have complete information. Contingent expectations are based on the idea that reasonable people try to form expectations in a way that best fits the current decision-making situation. This, of course, does not preclude mistakes that can occur when decisions are based on wrong assumptions and information assessments. Actors might misjudge future returns. They might also miscalculate the information costs needed to estimate more precise probabilities and therefore select an inadequate expectation model. If they recognize these mistakes, this might lead to learning effects in the sense that they may choose a different mode of expectation formation in the event of a similar decision-making scenario in the future. This openness to error and learning processes makes contingent expectations a suitable approach for the study of historical expectation formation. To substantiate this hypothesis, we will discuss some instructive examples in the following section.

Contingent Expectations in Practice

After the triumph of FIRE in the course of the debate about the Phillips curve in the 1970s, experience-based expectation models were discredited for a long time. More recently, however, Ulrike Malmendier and Stefan Nagel (2011, 2016) have contributed much to the renaissance of this class of expectations models by showing that actors' risk aversion and inflation expectations both depend on their personal experiences in the past. This observation holds true even for experts who should know better. Malmendier et al. (2021), for example, demonstrate that personal experiences can trump information even when it comes to the inflation expectations of well-advised central bankers.

An illuminating example of how personal experience affects people's expectations is provided by Gallagher (2014) using an example from the American insurance industry. An American homeowner who was thinking about insuring his home against flooding in the late twentieth century had extensive statistics at his disposal to estimate the likelihood of flooding in that particular geographical region. We can therefore safely assume that it was possible for homeowners to determine the true probability of a flood event at low information costs and to use this knowledge to decide whether or not to take out flood insurance. Current events with no impact on the long-term probability of flooding should not change this decision. Gallagher (2014), however, has pointed to the case of affected American communities where the number of flood insurance policies per capita increased by up to nine percent after a flooding had occurred. Homeowners who endured flooding or saw it happening to their neighbors obviously rated the likelihood of this negative event to occur (again) in the future significantly higher than before the recent disaster. After about a decade, the effects of this personal experience faded, so that the average number of insurance policies per capita between flood-affected and unaffected communities of the same risk class converged again. How can these observations be explained? It is possible that experiencing a flood firsthand changed the probability that homeowners assigned to this kind of disaster. Homeowners with recent flood experience might have adjusted the probability of the bad scenario ($1 - \tilde{p}$) upward because they either had underestimated the true probability ($1 - p$) of flood events until they were proven wrong by their actual occurrence, or, after witnessing the disaster, they now believed that the probability of the bad scenario was even higher than the statistically correct value. Either case would emphasize the empirical relevance of experience-based expectation models in the insurance business.

To complicate matters further, an alternative interpretation of Gallagher's (2014) observations is conceivable. The personal experience of a flood may have reminded homeowners that they had a great deal to lose in the event of a disaster, namely their house and their possessions, and that it was therefore prudent to take out flood insurance. This interpretation would mean that it was only through the personal experience of the flood that homeowners understood the importance of forming information-based expectations about the likelihood of such an event and then responded accordingly. In this case, personal experience and external information would be neither opposites nor complements, but causally related. The perceived need to gather information in order to better predict the future would have been triggered by a personal experience.

In the economic life cycle of a given household, the purchase of a house represents one of the most important decisions, which can be associated with considerable losses, if, for example, buyers overlook major defects of the house or overestimate their financial abilities to pay the mortgage. The comparatively large difference between owning and losing a good home—implying that potential losses are higher than any reasonable information cost ($\Delta X > C$)—makes home-buying a scenario in which buyers should form their expectations based on the most accurate information possible. Predictions on the development of property prices are, however, extremely difficult. Real estate markets are often characterized by long cycles due to migration effects, local regulations, and a low supply elasticity. Land speculation often increases price fluctuations, with the danger of a bubble. Kuchler and Zafar (2019) suggest, based on US data, that actors simplify the problem by basing their expectations about house price developments on local market experience. In the case of such a lifetime investment, however, expectations about future house prices are not enough. Actors also have to consider the long-term development of general inflation and interest rates, as mortgage loans play an important role in financing home purchases.

To find out which public sources of information households primarily rely on when they form their inflation expectations, Conrad et al. (2022), for example, surveyed more than 2,500 German households in 2019. They were asked whether they obtained information about the European Central Bank's (ECB) monetary policy from traditional media, from social media, directly via ECB communication channels, from other sources, or not at all. Multiple answers regarding the sources of information were possible. It turned out that only ten percent of the respondents said that they were not interested in monetary policy. The vast majority of households (85 percent) indicated that they used traditional media as a source of information on monetary policy. Social media and ECB communication channels played only a minor role, each accounting for about 6 percent of the responses.

The empirical analysis by Conrad et al. (2022) reveals that users of traditional media have lower, less dispersive, and more accurate inflation expectations than users of social media. Moreover, the survey of Conrad et al. confirms the logic of contingent expectations. Households that were planning to finance a house purchase with the help of a mortgage loan and therefore had a particularly strong interest in forming correct inflation expectations were more likely to rely on the ECB's communication channels than other respondents who had less to lose in a bad scenario when real interest rates were high.

People who cannot rely on personal experiences to assess a particular decision-making situation often look to the example of other contemporaries. To explain this form of herd behavior, Shiller (2005, 160) points to the instructive example of choosing between restaurants. Let us imagine that two new restaurants have opened on Main Street, and little is

known about their quality. The first visitor, Ann, has no choice but to select one of the two empty restaurants based on external appearances. The second visitor, Bob, on the other hand, has another piece of information: a glance through the window shows him that one of the two restaurants already has a visitor: Ann. Bob might now assume that Ann knows more than he does and therefore has a good reason to prefer one restaurant over the other. It is therefore likely that Bob follows the example set by Ann. In this case, the third visitor Charles will observe one restaurant with two customers and one without, and he will therefore be even more inclined than Bob to follow his predecessors' lead. The result is an information cascade that can end with a crowded restaurant and an empty one, although there exists no known difference in quality between the two.

If actors have good reason to believe that third parties may have better private information than they do, herd behavior is perfectly rational. This also applies to financial markets, where inexperienced investors will strive to follow the lead of those considered to be better informed (Bikhchandani and Sharma 2001). The problem is that the inexperienced investors often cannot tell whether they are following the lead of experts or other newcomers. In the first case, the resulting information cascade may not cause major damage. In the second case, on the other hand, there is a risk that a speculative bubble will be created by the unidirectional transactions of many clueless people. As early as the mid-nineteenth century, Charles Mackay (1841) interpreted the tulip mania of 1636–1637 as the result of inexperienced speculators following the misleading example of their neighbors and friends and buying tulip bulbs because they hoped for further price increases.² Since then, every speculative bubble has probably contained an element of herd behavior. Only after the bursting of a speculative bubble do inexperienced investors realize that it would have been better to inform themselves about the fundamentals of the assets they were feverishly buying. The question remains why this insight usually comes too late. Contingent expectations suggests that inexperienced investors consider the information costs to be too high. This may be true. Many participants in a speculative bubble lack the economic knowledge to estimate the future performance of assets, be it tulip bulbs or stocks, with sufficient accuracy.

Furthermore, it is not only the example of their peers but also the influence of popular narratives that leads many poorly informed investors to buy certain assets. A striking example of this effect is the digital currency Bitcoin, whose technological properties are understood only by a small minority of buyers. What made people buy Bitcoins despite this fact were the numerous newspaper articles that appeared in the 2010s about this mysterious innovation, emphasizing the anarchistic character of this currency and its supposedly outstanding stability in value (Shiller 2019). As with the tulip bulbs centuries earlier, the rising value of this speculative object was partly due to the fact that many people were seduced by these narratives and demanded Bitcoins on a large scale. The narratives functioned as a self-fulfilling prophecy insofar as they triggered the very investor behavior that led to the realization of Bitcoin's imagined future.

In many cases, such narratives are used to challenge consumers' pre-existing experiential knowledge. Many investors are aware that speculative bubbles, like other economic crises, are a regular phenomenon of capitalist economies. To prevent this knowledge from leading to cautious behavior in times when a bull market may tip into a speculative bubble, storytellers with vested interests try to convince market participants that the current situation cannot be compared to the past. To emphasize the uniqueness of the economic development at hand, these storytellers often use the adjective "new." For example, in the run-up to the Great Depression, the American economy was ostensibly in a "new era" of continued

economic growth. Similarly, before the dotcom bubble burst in March 2000, it was claimed that a “new economy” had emerged. The purpose of this rhetorical trick is clear. If a situation is new, it cannot be explained with reference to past experience. Hence the ironic title of Carmen Reinhart and Kenneth Rogoff’s book (2009) on the frequent recurrence of crises: *This Time is Different*.

These examples illustrate that it will not always end well if actors heed popular narratives. However, this is a retrospective insight. Without the benefit of hindsight, it will seem sensible to some actors to rely on existing narratives rather than on an information-based model of expectations, considering the high information costs. Making this selection comprehensible is the task of the concept of contingent expectations that we propose in this chapter.

Let us now turn finally to expectation formation under irreducible uncertainty. In business administration, many decision-making models only work if the decision-maker knows what will happen in the future. Popular investment models, for example, suggest that an investment project should only be undertaken if the discounted present value of all future net returns is greater than the initial expenditure. According to this theory, perfectly predicted future events determine the decisions made in the present. In practice, however, company owners and managers are rarely in a position to reliably predict the development of their business over several years, because this would require them to know exactly how competitors, suppliers, and customers will behave in the future, how technological progress will develop, what exogenous crisis will occur, and how politicians will react to all these changes.

An investment activity that takes place under particularly high uncertainty is the founding of a company. Data published by the US Bureau of Labor Statistics show that around 20 percent of new American companies had to be abandoned again just one year after being founded. After five years, only about 50 percent of new businesses still exist, and after ten years, only one third do.³ Cooper et al. (1988) wanted to find out in the mid-1980s whether company founders were aware of the high probability of their future failure. Therefore, in May 1985, they surveyed nearly 3,000 fresh American business founders who had opened their businesses in 1984 or early 1985. The first question was related to their assessment of their own prospects for success. The entrepreneurs surveyed were asked to rate on a scale of 0 to 10 how likely they thought it was that their business would be successful. One third of the entrepreneurs had no doubts at all and gave the prospects of success the highest possible value of 10. The mean value of expectations was also high at 8.1. The second question asked the entrepreneurs to rate how likely it was that “any business like yours” would be successful. The mean of the responses was 5.9, a clear and significant downward deviation from the mean of the likelihood of success of their own business. In view of the fact that only about half of all start-ups survived the first five years, the American founders surveyed certainly demonstrated some realism when it came to assessing the prospects of success of their competitors. However, they had much more confidence in their own company. Cooper et al. (1988) explain this over-optimism by the assumption that the business founders tried to “rationalize” their decision to establish a company by exaggerated positive expectations in retrospect. In our opinion, it is also conceivable that this over-optimism was already present before the company was founded because it was needed to trigger the foundation process at the first place.

How to explain the fact that everyday “naïve” investment models are fed with inadequate data and used for decision-making? The answer is that this approach enables

decision-makers to act. Setting out into an uncertain future requires courage and confidence, which is provided by the apparently objective numbers from investment models, regardless of whether they are right or wrong. This is particularly true for ambitious innovation projects when neither the future characteristics of a new product or process nor its future profitability can be predicted at the start.

Many innovation projects will turn out to be a failure. This bitter truth is proven, for example, by German patent statistics in the late nineteenth century, a time when German companies worked their way up to global leadership, with numerous innovations in the technologies of the Second Industrial Revolution (chemistry, electrical engineering, mechanical engineering). Acquiring a patent was evidence of an inventor's optimism that he would be able to turn his invention into a commercial success in the foreseeable future. However, the German Patent Act of 1877 stipulated that a patent holder had to pay an annual renewal fee in order to keep his patent in force, and this fee increased over time with an initial fee of 50 marks at the beginning of the second year, increasing in stages up to 700 marks at the beginning of the 15th year, the longest possible patent term. A patent-holder who no longer wanted to pay this annual renewal fee because his patent did not turn out to be as profitable as initially imagined could abandon it prematurely. For this reason, we can infer from the distribution of the life spans of the historical patents how many of the inventors were originally too optimistic about the future profitability of their inventions. The result is unambiguous. Streb et al. (2006) have found that about 70 percent of all German patents granted between 1891 and 1907 were cancelled after just five years. After the fifth year, the speed of patent cancellation slowed down. About ten percent of all patents were still in force after ten years, but only about five percent of all patents reached the maximum age of 15 years. Even contemporaries in the late nineteenth century were probably aware of the fact that only a small proportion of all patents would generate high profits. At the time of the patent grant, however, all patent holders were united by the hope that their invention would belong to this elite group, and only this optimistic imagination drove the inventors, both the successful and the unsuccessful ones, to develop inventions and seek patents. In Chapter 21 of this volume, Magazzini, Nuvolari, and Vasta show that many of the Italian inventors of the late nineteenth century were also overoptimistic.

We refer to expectation models that enable people to act under great uncertainty as imagined expectations (see Figure 8.1). Only individuals who have a high level of confidence in their own abilities or who are enthusiastic about their innovative projects might be able to form imagined expectations as a necessary precondition for venturing into the unknown. An obvious, if extreme, example is an entrepreneur such as Elon Musk, who has been trying against all odds to advance electromobility and even manned space travel. One or two levels below that are all the other Schumpeterian entrepreneurs (Schumpeter 1926) who are willing to venture into the realm of the uncertain and incalculable despite the high danger of failure.

One example of this is the German entrepreneur Berthold Leibinger, who decided in the late 1970s to first develop and then produce at his own company, "Trumpf," the novel laser cutters that he had previously purchased from the USA for installation in his sheet-metal cutting machines (see Streb 2019, Chapter 4). The medium-sized company Trumpf, which had previously been involved in the production of run-of-the-mill machine tools, did not actually have the technological expertise for such a basic innovation. In the run-up to the ambitious project, it must have seemed very likely that it would fail. Leibinger, who was driven by the vision of making his company a world market leader, nevertheless ventured

into this innovation project and, contrary to expectations, was successful. Today, the Trumpf company is one of the largest manufacturers of industrial lasers in the world.

In this context, it is interesting to note that cognitive biases are usually described in economics as an inadequacy of the actors. At least in the case of Schumpeterian entrepreneurs, this assessment is misleading because over-confidence or belief in grandiose visions sometimes enable action in the first place and, to that extent, are prerequisites for innovation and growth.

Imagined expectations are not the only approach that can explain why uncertain actors venture innovation projects. Dorian Beauchêne (2019) believes that some innovation projects are motivated by uncertainty aversion. In Beauchêne's view, the worst-case scenario that an uncertainty-averse entrepreneur has to imagine is that a competitor succeeds in realizing an innovation. In this case, there would be a great danger that the non-innovative entrepreneur would be forced out of the market with his now outdated products. To prevent this worst-case scenario, it might seem sensible to the uncertainty-averse entrepreneur to initiate more innovation projects himself. Interestingly, Beauchêne (2019) concludes that uncertainty fosters innovation.

Conclusion

We argued in this chapter that a universal model of expectation formation that accurately describes the behavior of managers, investors, and households in all (historical) decision situations is inconceivable. We pointed out that, instead, actors usually select between different models of expectation formation to predict future outcomes, according to their experience, the cost of acquiring and processing additional information, the variation in possible outcomes, and the degree of irreducible uncertainty. That is why we suggest that both social scientists and historians should consider this high variability in expectation practices when explaining or predicting individual decisions and their economic effects.

To bring order into the toolbox of the various strategies of expectation formation, we have developed the idea of contingent expectations. The simplicity and the level of abstraction in the historically informed concept of contingent expectation formation is an important desideratum, even though it may not fully reflect all details of individual decisions in a given historical moment. We are more interested in historical *ideal types* than in explaining all nuances of human behavior. We are not interested, for example, in the personal shortcomings that may have caused a particular investor not to foresee the bursting of the speculative bubble on the New York stock market in the run-up to Black Thursday in 1929. Our ambition is to find out what kind of expectations are formed by the *average* or *typical* investor and how this behavior might lead to speculative bubbles.

Moreover, contingent expectations allow us to identify situations in which the basic assumptions of rational expectations or other versions of information-based strategies of expectation formation are plausible. Despite all criticism, the full-information rational expectation hypothesis (FIRE) should not be banned from historical and economic research because it provides a theoretical "best practice" benchmark needed to assess the results of "more realistic" concepts of expectation formation. A final implication of contingent expectations is that, at a given point in time, different people will choose different strategies of expectation formation depending on their individual experiences and the information cost they face. The different strategies almost automatically lead to heterogeneous expectations. Contingent expectations thus offer us the opportunity to do justice to the empirical

diversity of expectation models in (historical) reality without losing sight of the broader picture.

Notes

- 1 The term *contingent expectations* has been used twice in the literature so far, each time serving as a transitional name for concepts that would soon be called fictional expectations or the Knightian Uncertainty Hypothesis. See Beckert (2012, 2016), Frydman and Goldberg (2013), and Frydman et al. (2019).
- 2 For a more recent interpretation of the tulip mania see Garber (2000).
- 3 See https://www.bls.gov/bdm/us_age_naics_00_table7.txt, accessed on August 25, 2023.

References

- Alchian, Armen A. 1950. "Uncertainty, Evolution, and Economic Theory." *Journal of Political Economy* 58, no. 3: 211–221. DOI: 10.1086/256940.
- Angeletos, George-Marios, and Chen Lian. 2018. "Forward Guidance without Common Knowledge." *American Economic Review* 108, no. 9: 2477–2512. DOI: 10.1257/aer.20161996.
- Baley, Issac, and Laura Veldkamp. 2023. "Bayesian Learning." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 717–748. London: Elsevier.
- Beauchêne, Dorian. 2019. "Is Ambiguity Aversion Bad for Innovation?" *Journal of Economic Theory* 183: 1154–1176. DOI: 10.1016/j.jet.2019.07.015.
- Beckert, Jens. 2012. "Capitalism as a System of Contingent Expectations. Toward a Sociological zMicrofoundation of Political Economy." Max-Planck-Institut für Gesellschaftsforschung Discussion Paper 12/4. URL: <https://hdl.handle.net/10419/60241>.
- Beckert, Jens. 2016. *Imagined Futures. Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Bikhchandani, Sushil, and Sunil Sharma. 2001. "Herd Behavior in Financial Markets." *IMF Staff Papers* 47, no. 3: 279–310.
- Bordalo, Pedro, Nicola Gennaioli, and Andrei Shleifer. 2018. "Diagnostic Expectations and Credit Cycles." *Journal of Finance* 73, no. 1: 199–227. DOI: 10.1111/jofi.12586.
- Carroll, Christopher, and Tao Wang. 2023. "Epidemiological Expectations." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 779–806. London: Elsevier.
- Ceccarelli, Giovanni. 2007. "The Price for Risk-Taking: Marine Insurance and Probability Calculus in the Late Middle Ages." *Electronic Journal for History of Probability and Statistics* 3, no. 1: 1–26.
- Conrad, Christian, Zeno Enders, and Alexander Glas. 2022. "The Role of Information and Experience for Households' Inflation Expectations." *European Economic Review* 143: Article 104015. DOI: 10.1016/j.euroecorev.2021.104015.
- Cooper, Arnold C., Carolyn Woo, and William C. Dunkelberg. 1988. "Entrepreneurs' Perceived Chances for Success." *Journal of Business Venturing* 3, no. 2: 97–108. DOI: 10.1016/0883-9026(88)90020-1.
- Farhi, Emmanuel, and Iván Werning. 2019. "Monetary Policy, Bounded Rationality, and Incomplete Markets." *American Economic Review* 109, no. 11: 3887–3928. DOI: 10.1257/aer.20171400.
- Friedman, Milton. 1966. "The Methodology of Positive Economics". In *Essays in Positive Economics*, edited by Milton Friedman, 3–43. Chicago, IL: University of Chicago Press.
- Frydman, Roman, and Michael D. Goldberg. 2013. "The Contingent Expectations Hypothesis. Rationality and Contingent Knowledge in Macroeconomics and Finance." *Paper given at Institute for New Economic Thinking (INET) Annual Plenary Conference*, April 2013.
- Frydman, Roman, Søren Johansen, Anders Rahbek, and Marten Nyboe Tabor. 2019. "The Knightian Uncertainty Hypothesis: Unforeseeable Change and Muth's Consistency Constraint in Modeling Aggregate Outcomes." Institute for New Economic Thinking Working Papers 92. SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3341203.

- Gabaix, Xavier. 2020. "A Behavioral New Keynesian Model." *American Economic Review* 110, no. 8: 2271–2327. DOI: 10.1257/aer.20162005
- Gallagher, Justin. 2014. "Learning about an Infrequent Event: Evidence from Flood Insurance Take-Up in the United States." *American Economic Journal: Applied Economics* 6, no. 3: 206–233. DOI: 10.1257/app.6.3.206.
- Garber, Peter M. 2000. *Famous First Bubbles: The Fundamentals of Early Manias*. Cambridge, MA: MIT Press.
- Gennaioli, Nicola, and Andrei Shleifer. 2018. *A Crisis of Beliefs. Investor Psychology and Financial Fragility*. Princeton, NJ: Princeton University Press.
- Gigerenzer, Gert. 2008. *Rationality for Mortals. How People Cope with Uncertainty*. Oxford: Oxford University Press.
- Gilboa, Itzhak, and David Schmeidler. 1989. "Maxmin Expected Utility with Non-unique Prior." *Journal of Mathematical Economics* 18, no. 2: 141–153. DOI: 10.1016/0304-4068(89)90018-9.
- Hansen, Lars Peter, and Thomas J. Sargent. 2001. "Robust Control and Model Uncertainty." *American Economic Review* 91, no. 2: 60–66. DOI: 10.1257/aer.91.2.60.
- Ilt, Cosmin, and Martin Schneider. 2023. "Ambiguity." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 749–777. London: Elsevier.
- Kahneman, Daniel, and Amos Tversky. 1974. "Judgement under Uncertainty: Heuristics and Biases." *Science* 185, no. 4157: 1124–1131. DOI: 10.1126/science.185.4157.1124.
- Kindleberger, Charles C., and Robert Aliber. 2005. *Manias, Panics, and Crashes. A History of Financial Crises*. 5th ed. Hoboken, NJ: Wiley.
- Knake, Sebastian. 2023. "The Spareckzins: the Making of Germany's Most Important Price for Household Savings 1967–1983." *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* 110, no. 1: 30–73. DOI: 10.25162/vswg-2023-0002.
- Knight, Frank H. 1921. *Risk, Uncertainty, and Profit*. Boston, MA and New York: Houghton Mifflin Company.
- Koselleck, Reinhart. 1985. *Futures Past: On the Semantics of Historical Time*. Cambridge: MIT Press.
- Kuchler, Theresa, and Basit Zafar. 2019. "Personal Experiences and Expectations about Aggregate Outcomes." *Journal of Finance* 74, no. 5: 2491–2542. DOI: 10.1111/jofi.12819.
- Lucas, Robert E. 1972. "Expectations and the Neutrality of Money." *Journal of Economic Theory* 4, no. 2: 103–124. DOI: 10.1016/0022-0531(72)90142-1.
- Lucas, Robert E. 1973. "Some International Evidence on Output-Input Tradeoffs." *American Economic Review* 63, no. 3: 326–334.
- Lucas, Robert E. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Series on Public Policy* 1: 19–46. DOI: 10.1016/S0167-2231(76)80003-6.
- Mackay, Charles. 1841. *Extraordinary Popular Delusions and the Madness of Crowds*. London: Richard Bentley.
- Maćkowiak, Bartosz, Filip Matějka, and Mirko Wiederholt. 2021. Rational Inattention: A Review. European Central Bank Working Paper Series 2570. DOI: 10.2866/417246.
- Malmendier, Ulrike, and Stefan Nagel. 2011. "Depression Babies. Do Macroeconomic Experiences Affect Risk Taking?" *Quarterly Journal of Economics* 126, no. 1: 373–416. DOI: 10.1093/qje/qjq004.
- Malmendier, Ulrike, and Stefan Nagel. 2016. "Learning from Inflation Experiences." *Quarterly Journal of Economics* 131, no. 1: 53–87. DOI: 10.1093/qje/qjv037.
- Malmendier, Ulrike, Stefan Nagel, and Zhen Yan. 2021. "The Making of Hawks and Doves." *Journal of Monetary Economics* 117, no. 1: 19–42. DOI: 10.1016/j.jmoneco.2020.04.002.
- Mankiw, Gregory N., and Ricardo Reis. 2002. "Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve." *Quarterly Journal of Economics* 117, no. 4: 1295–1328. DOI: 10.1162/003355302320935034.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movement." *Econometrica* 29, no. 3: 315–335. DOI: 10.2307/1909635.
- Nerlove, Marc. 1958. "Adaptive Expectations and Cobweb Phenomena." *Quarterly Journal of Economics* 72, no. 2: 227–240. DOI: 10.2307/1880597.
- Reinhart, Carmen M., and Kenneth S. Rogoff. 2009. *This Time is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.

- Sargent, Thomas J. 1999. *The Conquest of American Inflation*. Princeton, NJ: Princeton University Press.
- Sargent, Thomas J., and Neil Wallace. 1975. “‘Rational’ Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule.” *Journal of Political Economy* 83, no. 2: 241–254. DOI: 10.1086/260321.
- Schumpeter, Joseph Alois. 1926. *Theorie der wirtschaftlichen Entwicklung*. Abridged and revised 2nd ed. Berlin: Duncker & Humblot.
- Shiller, Robert J. 2005. *Irrational Exuberance*. 2nd ed. Princeton, NJ: Princeton University Press.
- Shiller, Robert J. 2019. *Narrative Economics*. Princeton, NJ: Princeton University Press.
- Sims, Christopher A. 2003. “Implications of Rational Inattention.” *Journal of Monetary Economics* 50, no. 3: 665–690. DOI: 10.1016/S0304-3932(03)00029-1.
- Spiliopoulos, Leonidas, and Ralph Hertwig. 2020. “A Map of Ecologically Rational Heuristics for Uncertain Strategic Worlds.” *Psychological Review* 127, no. 2: 245–280. DOI: 10.1037/rev0000171.
- Streb, Jochen. 2019. *Trumpf: The Story of a Family Business*. Cincinnati, OH: Hanser Publications.
- Streb, Jochen, Jörg Baten, and Shuxi Yin. 2006. “Technological and Geographical Knowledge Spillover in the German Empire 1877–1918.” *Economic History Review* 59, no. 2: 347–373. DOI: 10.1111/j.1468-0289.2006.00347.x.
- Wiederholt, Mirko. 2018. “Rational Inattention.” In *The New Palgrave Dictionary of Economics*, edited by Garrett Jones, 11271–11275. 3rd ed. London: Palgrave Macmillan. DOI: 10.1057/978-1-349-95189-5.

9

FROM DATA TO EXPECTATIONS IN MACROECONOMICS

Ulrich Fritsche and Jörg Döpke

Macroeconomic outcomes depend crucially on expectations. They have therefore long been at the center of various discussions.¹ Applied macroeconomics relies on the quantification of expectations from observable empirical data. This chapter aims to outline some milestones in the development of the qualitative and quantitative measurement of expectations as it has evolved in applied macroeconomics. The evolution of macroeconomic thinking in this area is often driven as much by ideological differences as by technical improvements. This chapter argues that the development can fruitfully be seen as a combination of at least two factors: on the one hand, the (gradual) adaptation of methods in macroeconomics that were previously considered to belong predominantly to other parts of economics or other social sciences. On the other hand, technological progress has greatly increased the availability of data (see also Mata, Chapter 18 in this volume). On the first point, we would argue that empirical macroeconomics has come a long way from observational methods to experiments and surveys. In recent years, more and more approaches have been mixed methods (i.e. survey experiments, content analysis based on computational methods, and text as data methods). Figure 9.1 shows a textbook version of common methodological approaches in the social sciences.

In the following, we will describe selected aspects of the discussion on the relationship between data and expectations in macroeconomics along these lines.

Observation Methods

For a long time, macroeconomic thinking took a rather agnostic view of expectations, on the premise that it is impossible to observe expectations directly. Instead, the only option is to observe the economic behavior of individuals and households and to infer expectations from this behavior. In this case, identification assumes the existence of “rational behavior.” This view goes back to Samuelson’s influential concept of “revealed preferences” (Samuelson 1948; see also Manski 2004). While this concept is microeconomic in nature, some scholars have made an analogous argument about macroeconomic expectations. The argument makes an implicit analogy between microeconomic and macroeconomic reasoning. One explicit statement in this direction is a famous quote from Prescott (1977, 30,

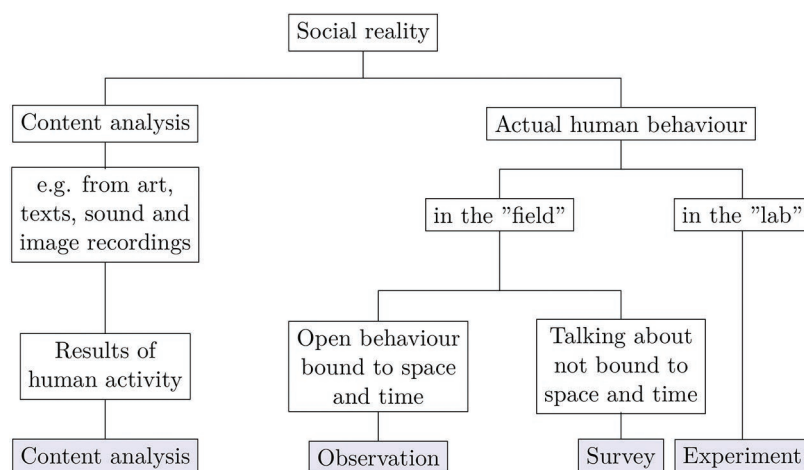


Figure 9.1 Methods in social sciences.

Source: Author creation.

emphasis in original), who draws a direct link between utility and expectations: “Like utility, expectations are unobserved, and *surveys cannot be used to test* the ‘rational expectations’ hypothesis.”

As noted in the introduction to this handbook, Keynes (1936) is a natural starting point for describing how data affect expectations in economic models. In his writings, however, expectations are treated both as eminently important for macroeconomic outcomes and as exogenously determined with respect to economic decisions. Economists analyzing the state of the economy rely on the “state of confidence” (Keynes 1936, 148) or may analyze what the “animal spirits” (Keynes 1936, 136) of firms might be for the time being, but there is no explicitly modelled mechanism in the argument for how firms and households change their expectations in response to changing data. An early attempt to model expectation formation endogenously arose from the needs of macroeconometric models constructed to estimate parameters of the early Keynesian model based on aggregate data (Taylor 1988 provides an overview of the development of expectations modelling in large-scale structural econometric models). This in turn led to various expectation hypotheses.² Limited by the econometric techniques and by the computational capabilities of the time, models used “static” expectations: for example, the expected income for the next period was simply assumed to be equal to the current value of that variable. There were many ways to refine the use of past data to model expectations.

An important turning point in the profession’s perception of the interaction between data and expectations is the seminal paper by Friedman (1968). As Mankiw and Reis (2018) point out, this paper laid out much of the subsequent developments in macroeconomics. In particular, Friedman emphasized the distinction between short-run and long-run expectations. Thus, instead of relying solely on past time-series information, economic agents have some idea of the long-run outcomes of the model. As a result, the effects of expected and unexpected events, such as changes in economic policy, differ. Moreover,

the deviation of reality from expectations was what allowed the economy to deviate from its classical benchmark. But as people become aware of what is happening over

time, expectations and reality must eventually converge, ensuring that these deviations are only temporary.

(Mankiw and Reis 2018, 18)

A prominent example is the related interpretation of the inflation-unemployment trade-off often found in the data (the so-called (modified) Phillips curve). An unexpected rise in inflation makes real wages look low to firms, which would lead them to hire people. Unemployment falls, but only as long as firms have factored in the actual path of inflation. After expectations have adjusted to the actual data, the perception of real wages is corrected and unemployment returns to its previous level, but inflation expectations remain at the higher level. In econometric applications, the dynamics of adjustment have typically been modelled using a partial adjustment model. Inflation expectations adjust to the new rate, but only partially in each period, in proportion to the errors implied by the expectation in the previous period:

$$\text{Expectation}_t = \text{Expectation}_{t-1} + \lambda (\text{Actual}_t - \text{Expectation}_{t-1})$$

In other words, economic agents start from the expectations they had in the previous period $t-1$ for t and adjust these expectations depending on the forecast error that this expectation implies for the current period ($\text{Actual}_t - \text{Expectation}_{t-1}$). The adjustment depends on a parameter λ . A high value corresponds to a fast adjustment to the forecast error, a low value to a slow adjustment. At first sight, a value of λ between 0 and 1 seems quite natural: an underestimation of the actual value leads to a downward revision of the expectation for the next period and vice versa. Several econometric techniques have been proposed to estimate the value of λ from actual data. This has also led to the idea of modelling expectation(s) as depending on various lagged actual values, sometimes referred to as “autoregressive expectations.” Of course, one could assume that learning is eventually complete: in other words, the long-run coefficient in the adaptive expectation model or the sum of the coefficients in the autoregressive expectation model is then equal to one. This idea can be used either to estimate the equation under the assumption that this a priori restriction holds, or to test the notion that expectations eventually adjust to the actual variables.

The model of “adaptive” expectations became relatively influential (Nerlove 1958). The idea that expectations are corrected in proportion to the errors implied by those expectations for previous periods could be interpreted as a simple form of learning behavior. However, while adaptive expectations models have their merits, they also have several shortcomings. First, the assumed adjustment process is rather simple. For example, the overshooting of expectations—i.e., the value of the expected inflation may temporarily exceed the value of the new inflation—is not possible. Second, it is worth noting that expectations in these models always follow the data with a lag, which can be interpreted and criticized as a form of systematic error. For example, adding this expectations model to a standard model of a market leads to the “cobweb theorem” (Kaldor 1938), which implies that market participants’ expectations are always “too little, too late”—that is, always behind the curve, albeit with diminishing divergences. Similarly, it might be quite natural to assume that agents understand the implications of the new policy which raises the inflation rate, and adjust immediately to the new level of inflation.

Thus, from an epistemological point of view, Friedman added some additional “data” to the list of data that determine expectations: economic agents do not only rely on the past values of a time series, but also have some knowledge about the long-run behavior of the system. This also introduced the idea that economic agents may be better informed about the situation in the markets in which they operate than about developments at the macroeconomic level. This led to the “island parable,” an intuitive illustration of the idea of “rational” expectations, to which we turn in the next part.

In one of the most influential economic papers of modern times, Lucas (1976) persuaded much of the profession to subscribe to a new model of aggregate expectations: “rational expectations,” a term coined by Muth (1961). Lucas gives an intuitive explanation in his “island parable.” In this model, the economy consists of many independent islands on which an individual lives and produces a quantity of a particular good. This quantity depends on the price of the good, with a higher price leading to more production. However, each person only observes the price on his or her own island. If the total money supply for all islands is increased, the nominal price on each island will rise and, at least for a while, be confused with an increase in the relative price of the good produced on each island. This confusion of nominal with relative prices reinforces a temporary increase in output on all islands. Agents in this model therefore react differently to data on their own island and to changes in overall monetary policy. These changes in the money supply have real consequences only to the extent that agents are surprised by the change in policy. The result is the proposition of policy ineffectiveness: monetary policy cannot affect real variables, but can only increase their variance. Policy changes that are anticipated by rational expectations, on the other hand, have no real effect on the economy.

In addition to the controversy over the merits of an active stabilization policy based on the assumption of rational expectations, the idea has also led to methodological discussions. For econometric work the consequences are crucial. Interestingly for our purpose, one of the most influential researchers of the time, before the “rational expectation revolution,” justified his skepticism about the rational expectation hypothesis explicitly with a hint on the relation of models and underlying data:

I believe that the approach of rational expectations (or, better expressed, own-model-generated expectations) is asking too much of the data. It asks the data both to generate the expectations and provide the model estimates with simulation. That is overworking the data.

(Klein 1987, 442; see also Svetlova, Chapter 11 in this volume)

When expectations are estimated under the assumption of full information rational expectations (FIRE), the General Method of Moments (GMM, Hansen 1982) has become the most widely used estimation technique. Specifically, the GMM is a generalization of the moment estimation approach that incorporates some other methods (e.g., the instrument variable method or the maximum likelihood method) as special cases. It models the so-called moments of the distribution of random variables—a terminology commonly used in statistics to describe properties of distributions. The system of equations is usually over-determined, i.e., more information is used than is necessary for identification (i.e., more information is available than is necessary to solve the underlying system of equations). To obtain a unique solution for the parameters to be estimated, the sum of the squared

deviations between the theoretical and empirical moments of the distribution is minimized. In models of a “perfectly” functioning market (e.g. financial markets with perfect information, perfect competition, etc.), under rational expectations, all information should be reflected in the market price as soon as it becomes known to all agents (usually very quickly). It follows implicitly that information cannot be systematically exploited to make arbitrage profits. Translated into the terminology of the GMM, this implies that a condition of non-influence of the expected value by exogenous information (covariance equal to zero) can be established, which in turn serves as a condition for empirical estimation in GMM. The same idea has usually been applied to the estimation of models with latent expectation variables in macroeconomic models. In that case, the rationality of expectations is assumed in the theoretical model, the resulting moment conditions are derived, and these are used as assumptions in the GMM estimation.

Examples can be found in the work of Clarida, Gali, and Gertler (1999) and Galí, Gertler, and López-Salido (2005). Here we find examples of observational methods on aggregate data based on theoretical identifications. It is worth noting that the expectations derived from such approaches require a relatively high level of aggregation. Often it is assumed that all agents in the model share the same expectation formation process, or at least large groups of agents do, as in the work of Campbell and Mankiw (1990), who argue that a certain fraction of households is “liquidity constrained”—that is, these households do not have access to credit—and therefore cannot act according to their rational expectations.

The most common application of expectations modelling in macroeconomics is its use in larger models to capture the dynamics of important aggregated time series such as real economic activity, inflation, monetary variables, and others. The dominant approach for a long time and even recently has been Dynamic Stochastic General Equilibrium (DSGE) modeling. While the FIRE model has been the most often used model of expectations in this class of models, over time several refinements have been considered (for a respective survey see Milani 2012). One of these has been to allow for the same forms of bounded rationality in expectation-building as outlined in Beqiraj (2018). The authors also emphasize that models with alternative expectation hypotheses often outperform rational expectation models in terms of forecasting accuracy. Some authors combine the arguments of DSGE models with “agent-based” models. A recent contribution is that of Hommes und Poledna (2023), who assume boundedly rational agents who may be either relatively short-sighted or long-horizon oriented.

While all these lines of reasoning can be seen as attempts to modify and enrich the DSGE framework to bring it closer to the data, there are researchers who argue that rational expectations is a fundamentally inappropriate concept and therefore, DSGE models that rely heavily on rational expectations are also inappropriate as a modelling strategy in macroeconomics. Hendry and Mizon (2014) for example argue that DSGE models “take a form in which a variable today, say incomes (...), depends inter alia on its ‘expected future value’.” This, they emphasize, is not a reasonable assumption since the underlying distribution may shift unexpectedly, which, in turn violates any assumption of stationarity. In certain situations, there is extrinsic unpredictability (or ambiguity). In contrast to intrinsic unpredictability, which can be captured as a random draw from a known distribution, the extrinsic version “is an ‘unknown unknown’ such that the conditional and unconditional probabilities of outcomes cannot be accurately calculated in advance” (Mizon and Hendry 2014). Thus, the distribution shows a location shift and the expectation variable in the

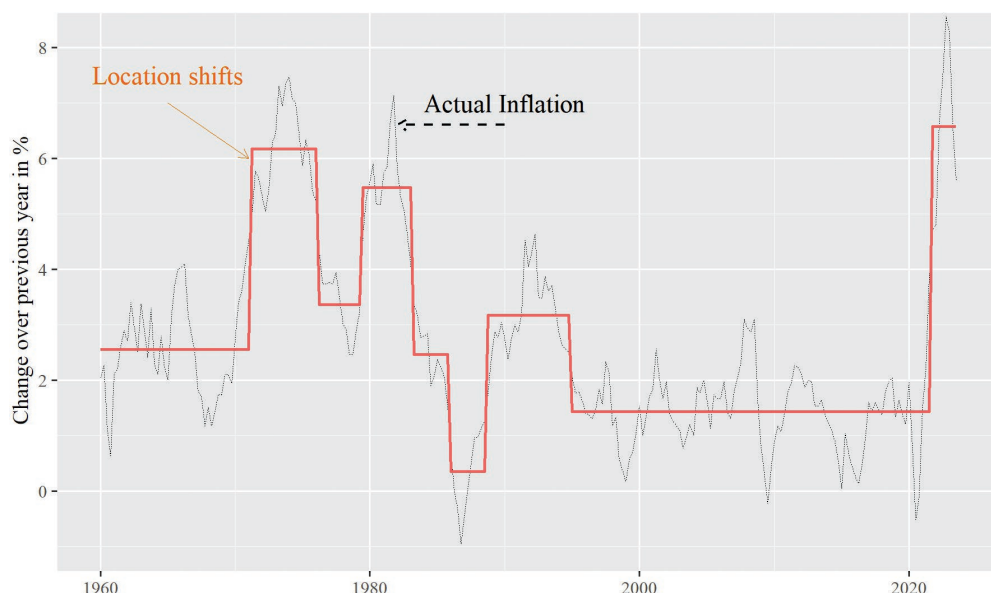


Figure 9.2 Estimated location shifts in the German inflation rate, 1960, first quarter, to 2022, third quarter.

Source: Author creation.

econometric model becomes irretrievably wrong. Figure 9.2 uses an empirical technique, the step-indicator saturation test proposed by Castle et al. (2017), which may help to illustrate the point. Using the inflation rate for Germany, the “invariance test” relating to possible location shifts for which the assumption underlying rational expectation does not hold, indicates several shifts over the period considered.

Survey Methods and Experiments

Surveys

Instead of measuring expectations indirectly through observational methods combined with certain assumptions and econometric techniques, it seems a natural alternative to seek direct evidence for reported expectations through surveys. After all, the use of this tool is widespread, if not dominant, in neighboring sciences such as psychology, sociology, or political science. However, the economics profession has been, and perhaps still is, relatively skeptical of survey evidence. Take, for example, the quote from Prescott above, or the impression of Thaler (2015, 47): “To this day, the phrase ‘survey evidence’ is rarely heard in economic circles without the necessary adjective ‘mere,’ which rhymes with ‘sneer.’” However, this view has never been fully shared by practitioners, for example in the field of business cycle forecasting. As outlined in Manski (2004), there is a long tradition in applied business cycle and consumer sentiment analysis of incorporating household, business, and expert surveys into the practitioner’s toolbox. But also in academic circles, surveys, especially on inflation expectations, have gained considerably more attention. The first major

advantage of relying on this type of data is that it allows for heterogeneous expectations: not everyone has the same view of future developments.

Three types of surveys are used to measure expectations: (i) surveys of households, (ii) surveys of enterprises, and (iii) surveys of professionals. Each of these sub-groups has its own specific problems and provides a certain, different type of information. In addition, the expectations of the groups may interact. For example, Carroll's (2001, 2003) epidemiological model of expectation formation argues that forecasts issued by experts can influence a wider audience than that of the expert community. In such models, professional forecasters provide forecasts that are the "best available" (not necessarily unbiased and efficient) forecasts. Firms and households, on the other hand, do not pay as much attention to economic fluctuations as forecasters and therefore update their expectations stochastically with a given probability. As a result, the expectations of firms and households (i.e. non-professional forecasters) adjust slowly to a benchmark set by professionals (Döpke et al. 2008). The speed of adjustment itself may be state-dependent. Dräger (2016) investigates the state-dependency of expectation adjustment in a theoretical model.

Surveys of Households

Surveying households about their individual assessments of their own economic prospects or those of the economy as a whole has a long history in economics, dating back to the Michigan Consumer Survey, which was initiated in the 1940s. A first important purpose of these surveys was forecasting: consumer sentiment has remained an influential—though not uncontroversial—leading indicator of the business cycle. From a methodological point of view, however, the main achievement is arguably the possibility of different individual expectations rather than the restrictive assumption of identical expectations for all agents in the model. In addition, these data make it possible to obtain a distribution of forecasts and, hence, measure expectations in a probabilistic form. This, in turn, allows us—in principle—to access the uncertainty of an expectation at a certain scale (i.e. answers in the form of, say, "increases strongly", "increases," "remains constant," and so on) into quantitative point forecasts, which is only one of the many methodological challenges associated with this kind of data. A result from this strand of the literature that has gained considerable attention is the difference in inflation as perceived by the households and the officially-measured inflation rates (Weber et al. 2022). As Juster (1966) pointed out (see also Manski 2004, 1339) the surveys make it possible to switch from verbal questioning about concrete intentions to the assessment of subjective probabilities of future events. This in turn makes it possible to test the consistency of individual expectations.

Surveys among Firms

Asking firms about, among other things, the prospects of either their own business or about macroeconomic perspectives, has been a tool of practical business cycle forecasting for a long time. As such, however, the quality of such surveys has always been and is still questionable. One possible reason for this relatively poor performance of firm surveys as predictors of real economic activity may be seen in some specific methodological challenges in this area. For example, many surveys rely on qualitative assessment of the future development (with answers such as "better," "unchanged," "worse," or something similar) rather than on quantitative responses. This raises the question of how to convert and aggregate many

different qualitative answers. In addition, seemingly neutral answers like “unchanged” are often chosen by a large proportion of the responding firms, and it is sometimes not clear how to interpret such answers correctly. Also, it is often difficult to obtain a good sample representing the whole economy or specific sectors. For example, getting enough small and medium-sized enterprises to participate in the survey can sometimes be a challenge.

Surveys among Professionals

There is a long tradition in economics of surveying individuals, firms, or other institutions that regularly produce business cycle forecasts. The (recent) Survey of Professional Forecasters conducted by the Federal Reserve System for the US and its European counterpart provided by the European Central Bank are two prominent examples of this type of survey. Also, news agencies or specialized firms offer such data. It is quite reasonable to assume that professionals (i.e., experts in the respective field) are better informed on macroeconomic data and have a deeper insight into the structure of the economy. Therefore, the hypothesis of rational expectations seems more plausible in this context than for firms and households. Since expectations are directly observable in such datasets, e.g. in the form of a forecast for the next period, it is possible to test some aspects of the rational expectation hypothesis (Sheffrin 1996; Pesaran and Weale 2006). To be “rational,” forecasts must have at least three features: (i) they should be unbiased, i.e., no systematic differences between the forecast and the actual outcome should show up and the average forecast error should be close to zero; (ii) they should be (at least weakly) efficient, i.e., the values of past forecast errors should not carry any information content for future errors; (iii) any other information available to the forecaster at the time of the forecast should also be of no value for improving forecast accuracy. Consider the estimated equation:

$$\text{Forecast Error}_{t+1} = \beta_0 + \beta_1 \cdot \text{Forecast Error}_t + \beta_2 \cdot \text{Other information}_t + \epsilon_t$$

in which β_0, β_1 , and β_2 are coefficients to be estimated from the data and ϵ_t is an error term. A certain understanding of the term “rational expectations” would require that the hypothesis

$$H_0 : \begin{cases} \beta_0 = 0 \\ \beta_1 = 0 \\ \beta_2 = 0 \end{cases} \text{ is not rejected by the data (Holden and Peel 1990)}$$

At the risk of oversimplification, most of the findings based on this concept point to a violation of the idea of rational expectations. While many forecasts have been found to be unbiased and weakly efficient, strong efficiency is often not supported by the data. The literature in this area probably began with Mincer und Zarnowitz (1969) and is summarized by Fildes and Stekler (2002): the empirical evidence for a widespread rejection of rationality is overwhelming (see Fildes and Stekler 2002; Petropoulos et al. 2022 for surveys on the state of (macroeconomic) forecasting). Furthermore, disagreement among forecasters is reported to be high (Dovern, Fritsche, and Slacalek 2012). Recently, researchers have considered why forecasters do not possess complete information, emphasizing informational rigidities. Common explanations include sticky and noisy information and the use of

heuristics (Mankiw and Reis 2002; Sims 2003; Bordalo et al. 2020). Coibion and Gorodnichenko (2015, 2012) test several models using aggregate measures such as mean errors and revisions.

Potential Differences and Interactions

One notable difference occurs, for example, between inflation expectations of households and those of professional forecasters (Weber et al. 2022). Similarly, consumer expectations also differ. Malmendier and Nagel (2015) show that these differences depend on individual experiences over the life course. A second form of analysis enabled by surveys is turning from point forecasts to the cross-sectional dispersion of expectations, which provides additional information on the uncertainty of the expectation (Weber et al. 2022). Third, while some models based on observational methods simply *assume* that agents make no systematic errors in anticipating the future, survey data render it possible to explicitly test for this proposition. Some evidence points to a systematic upward bias of at least inflation expectations (Weber et al. 2022, 165). For all its merits, however, this approach also has its limitations, as Stantcheva (2023) points out: “There are plenty of other examples of perceptions, beliefs, attitudes, or reasonings that profoundly shape our views on policy and social issues but that we do not necessarily reveal with our microeconomic, observed behavior” (Stantcheva 2023, 206).

To sum up: Survey data allow the analysis of heterogeneous and individual expectations but suffer from the well-known drawbacks of social science surveys (selection bias, socially desirable responses, or literacy problems, among others). Recent summaries of the measurement of expectations using survey data can be found in Manski (2004) (see also de Bruin, Fischhoff et al. 2000; Carstensen and Bachmann 2023 for households and firms; Clements, Rich, and Tracy 2023 for professional forecasters; de Bruin, Chin et al. 2023).

Expectations Derived from Financial Market Data

Another method of observation, which we will only briefly mention, is the possibility of using financial market prices to infer implicit expectations. To begin with, financial markets, and in particular the stock market, are inherently forward-looking, as they reflect in part the expected discounted future cash flows of firms. Macroeconomic news therefore affects stock prices through investors’ expectations of future economic activity, as economic conditions can affect cash flows and the discount rate. However, neither stock market movements nor other financial prices can be naively interpreted as expectations, as Paul Samuelson’s famous quote “the stock market has predicted nine of the last five recessions” nicely illustrates. Similarly, the so-called Fisher equation (1907) relates inflation expectations to observable interest rates. Again, the implied expectation cannot be obtained directly: it requires additional assumptions about, for example, real interest rates or risk premiums. However, for some assets there are futures markets. It is therefore possible to exploit differences between spot and futures prices to obtain information about the underlying expectations of market participants. Second, some financial markets explicitly refer to expectations, e.g. inflation-indexed bonds (Campbell et al. 2009). Another noteworthy strand of the literature attempts using the term structure of interest rates to figure out inflation expectations (see King and Kurmann (2002) for an overview).

Experimental Methods

Experiments aimed at uncovering the process of expectation formation in a laboratory setting are reviewed by Assenza et al. (2014) and Fuster and Zafar (2023). An example is the work of Hommes (2013), who tests which model of expectation formation fits the behavior of particular individuals and concludes that a “one size fits all” model is an unlikely outcome. As laboratory experiments are usually criticized in economics for having limited external validity, some papers also conduct field experiments to understand the response of, for example, households to changes in the macroeconomic environment. For example, Roth and Wohlfart (2020) study how a representative panel of US individuals responded to changes in professional forecasts. Similarly, many papers use large changes in the environment of decision-makers—“natural experiments”—to measure the impact on expectations. See, for example, Armantier et al. (2021), who use the Covid-19 pandemic to analyze the expectation response of US households surveyed by the Federal Reserve. A more recent example is the paper by Dräger, Gründler, and Potrafke (2022), who use the Russian attack on Ukraine as a natural experiment to gain insights into how quickly expectations adjust to new circumstances. One type of experiment that has recently become particularly popular for studying expectation formation is the survey experiment (see Haaland, Roth, and Wohlfart 2023 for an overview). It allows respondents to be divided into subgroups and confronted with different information. This brings the causal inference for such studies closer to the gold standard of randomized controlled trials. Fuster and Zafar (2023) have recently published a good review of the methodology. Andre et al. (2022) offer a recent example of the application of this technique to the analysis of narratives and macroeconomic expectations.

Content Analysis

Applied economics has long relied mainly on observational, survey, and experimental methods. The use of content analysis in economics—often used in political and social science contexts, not to mention history—is a more recent phenomenon. Given the widespread use of content analysis in fields other than economics, it is not surprising that there are numerous definitions of the concept. However, Berelson’s (1952) understanding is an often cited reference. According to him, content analysis is a “technique for the objective, systematic and quantitative description of the manifest content of communication.” (Berelson 1952, 18). The meaning of communication here is broader than is usually the case in economics, as it includes, for example, the analysis of texts, images, or transcripts of recorded interviews. Furthermore, content analysis does not only refer to manifest content, i.e. components that are clearly visible in the data; latent content is also considered. In the above definition, the term “objective” indicates that the research should, in principle, be reproducible by using the same coding as in the original study. A feature that distinguishes content analysis from other social science techniques is that it is fundamentally based on the ability to quantify and visualize results. From the methodological perspective adopted in this paper, we would subsume the “narrative approach” proposed by Romer and Romer under the label of content analysis. Romer and Romer (2023, 1396) describe the narrative approach as “an empirical technique where one gathers systematic evidence from contemporaneous qualitative sources (such as newspapers, government reports, and policy meeting transcripts), and incorporates it into statistical analysis.” Similarly, the “scoring procedure” proposed by

Goldfarb and Stekler (2005) can be counted as content analysis in the sense given above. The authors describe their approach as follows:

The individual forecasts gave qualitative assessments both about the current situation and about the direction the economy would take in the near future. We paraphrased the forecast summaries from each source, and developed a scoring system which we applied to these paraphrased qualitative statements.

(Goldfarb and Stekler 2005, 519)

A meaningful codification of the information is particularly important when conducting a content analysis. Holsti (1969) is a standard reference for the requirements of a successful coding scheme (for a more recent overview, see Krippendorff 2018). To make things more concrete, Table 9.1 provides an example of a simple coding scheme used by Stekler and Symington (2016) in their paper on forecasts on the eve of the Great Depression.

The seminal work of Romer and Romer (1989) is an influential exception to the reluctance to use this method in economics, which helped to make the use of (qualitative) content analysis more acceptable in applied macroeconomics—at least in the field of economic policy communication. It also sparked a lively debate about the usefulness of using this method (see, for example, Hoover and Perez 1994, 1994b and the rebuttal by Romer and Romer 1994). It is noteworthy, however, that the controversies did not focus on the content analysis part per se, i.e. the use of qualitative information from newspapers, government reports, meeting reports, and so on. Rather, the discussion focused on the possibility of using such information to identify shocks or natural experiments. Looking back, Romer and Romer (2023, 1369) summarize their intention: “We used the records of the Federal Reserve to identify a subset of monetary actions that were not motivated by other factors affecting output.” Whether this is possible with these data has been disputed.

An instructive example of the usefulness of content analysis for economists is the ability to include in analyses periods for which macroeconomic data in the modern sense do not exist. For example, the aforementioned paper by Goldfarb et al. (2005) uses newspaper texts to construct forecasts for the period of the “Great Depression,” for which quantitative forecasts are not available.

Table 9.1 Example of a simple coding scheme used by Stekler and Symington (2016)

<i>Outlook</i>	<i>Assessment</i>	<i>Score</i>	<i>Recurring words from the minutes used for scoring</i>
Optimistic	Strong growth	+1	Strong, robust, considerable, upbeat, brisk, surge
	Normal growth	+3/4	Normal, solid, sustainable
	Modest growth	+1/2	Slow, gradual, subdued, muted
Neutral	Unclear	0	Unclear, mixed
	Decelerating growth	−1/4	Decelerating, stabilizing, ongoing adjustment, levelling out
	Continued weakness	−1/2	Continued weakness, sluggish, slack, below potential
Pessimistic	Decline	−3/4	Declining, deteriorating
	Recession	−1	Recession, contraction, sharp and widespread decline

Source: Stekler and Symington (2016).

Another justification for content analysis as a methodology in macroeconomics relates to the study of written material on exceptional past events as natural experiments. The seminal work in this context is Friedman (1968), as Bordalo et al. (2020) argue. They interpret the seminal *A Monetary History of the United States* (Friedman and Jacobson Schwartz 1963) as an early example of a “narrative approach” in macroeconomics. The natural experiment analogy refers to Friedman (1953) who argues “[o]ccasionally, experience casts up evidence that is about as direct, dramatic, and convincing as any that could be provided by controlled experiments. Perhaps the most obviously important example is the evidence from inflation” (Friedman 1953, 11).

Another important justification relates to the role that communication about policy—especially monetary policy—plays in modern macroeconomics. Due to the fact that expectations are very important in modern macroeconomics and the role of policy communication changed dramatically in the 1990s and early 2000s (e.g. with the adoption of inflation targeting regimes), “managing expectations” became part of central banks’ responsibilities (Blinder et al. 2008, 911). With Shiller’s (2019) influential book, qualitative and quantitative textual analysis gained even more attention within the profession. The book argues that changing narratives could help to understand economic fluctuations. One possible channel through which narratives might influence real economic developments is the interaction between narratives and expectations. However, Shiller also draws attention to possible problems in analyzing this concept. For example, he argues that it is not easy, if it is even possible, to rule out reverse causality from economic fluctuations to narratives. He therefore calls for experimental evidence of the link between the two variables.

An arguably large part of the recent literature refers to the “text as data” (Gentzkow, Kelly, and Taddy 2019) line of reasoning, i.e., uses text-mining (quantitative) approaches to approximate expectations or related variables (e.g., “sentiment”) out of textual data. This is amplified by the fact that the big data revolution has largely been driven by the growth of unstructured text, which now makes up the vast majority of the world’s data (Rydning 2021)

The “uncertainty indices” of Baker, Bloom, and Davis (2016) can be seen as a breakthrough in the application of such methods in economics. A recent application based on narratives from social networks is the work of Angelico et al. (2022). Within the German Research Foundation (DFG) priority program “Experience & Expectation: Historical Foundations of Economic Behaviour,” some work has been done on computational text analysis to extract forecasters’ expectations from texts related to business cycle forecasts (Fritzsche and Puckelwald 2018; Müller 2022), to measure inflation expectations as reflected in public discourses (Daniel and Steege 2020), or to evaluate and classify the signals sent by central banks (Diaf 2022).

So far, most applications of computational linguistics in the field of economic expectations research often remain on the level of descriptive methods or unsupervised dimension reduction procedures (e.g., latent Dirichlet allocation topic models, Blei 2003). However, here too development is rapid. In a recent survey, Ash and Hansen (2023) discuss the possibilities of modern AI and of “large language models” (LLM) for economic analyses. They mention four areas where computational linguistic techniques can come into play: examining similarities in documents and statements, concept recognition, analyzing the relationship between concepts, and linking textual data with metadata.

It is precisely the creative combination of different methods, rarely seen in economic research so far, that characterizes various modern empirical works in macroeconomic research. Andre et al. (2022) in their study on narratives and their effect on expectations, for example, use survey *and* experimental methodology in combination with both qualitative *and* quantitative textual analysis to investigate the relationships between narratives and macroeconomic outcomes.

Conclusion

There is an age-old debate about whether there is scientific progress in economics (see Rosner 2012). One rather pessimistic view is that of “circular” progress. Over and over again, economists have debated the same questions (e.g. “Is stabilization policy effective?”) with changing normative positions, but without any tendency toward consensus. Much more optimistic is the idea of “substitutive progress”: new, better models or ideas displace older and worse ones. As a result, the profession ends up with an ever-improving toolbox. Given the growing database for empirical analysis and technological advances, one can even hope for “cumulative progress”: knowledge of the economic system gets better and better over time. What is the state of the debate on the relationship between data and expectations in macroeconomics? We would argue that there has been at least some cumulative progress in the measurement of expectations. In particular, the expansion of the underlying databases and the ability to combine methods for measuring expectations have made the empirical basis of expectations hypotheses more robust. However, this has come at the cost of making the modelling of expectations more complex.

Notes

- 1 The authors thank an anonymous referee, the editor in charge, Alexander Nützenadel, Victoria Hünnewaldt, Karsten Müller, Lars Tegtmeier, Gabi Waldhof, Lisa Marie Wegner, and Max Weinig for helpful comments on a previous draft of this paper, and Ida Rockenbach and Max Weinig for research assistance.
- 2 Given the limited space, we omit several expectation hypotheses that are arguably worth mentioning. For example, Svetlova (2022) distinguishes up to 15 different expectation models considered in the literature she reviewed.

References

- Andre, Peter, Ingar Haaland, Christopher Roth, and Johannes Wohlfart. 2022. “Narratives about the Macroeconomy.” ECONtribute Discussion Papers Series No. 127, University of Bonn and University of Cologne, Germany. URL: <https://ideas.repec.org/p/ajk/ajkdps/127.html>.
- Angelico, Cristina, Juri Marcucci, Marcello Miccoli, and Filippo Quarta. 2022. “Can We Measure Inflation Expectations Using Twitter?” *Journal of Econometrics* 228, no. 2: 259–277.
- Armantier, Olivier, et al. 2021. “How Economic Crises Affect Inflation Beliefs: Evidence from the Covid-19 Pandemic.” *Journal of Economic Behavior & Organization* 189: 443–469.
- Ash, Elliott, and Stephen Hansen. 2023. “Text Algorithms in Economics.” *Annual Review of Economics* 15: 659–688.
- Assenza, Tiziana, Te Bao, Cars Hommes, and Domenico Massaro. 2014. “Experiments on Expectations in Macroeconomics and Finance.” In *Experiments in Macroeconomics*, edited by John Duffy, 11–70. Leeds: Emerald Group Publishing Limited.
- Atteslander, Peter. 2010. *Methoden der empirischen Sozialforschung*. 13th ed. Berlin: Erich Schmidt Verlag.

- Baker, Scott R., Nicholas Bloom, and Steven J. Davis. 2016. "Measuring Economic Policy Uncertainty." *Quarterly Journal of Economics* 131, no. 4: 1593–1636.
- Beqiraj, Elton, Giovanni Di Bartolomeo, Marco Di Pietro, and Carolina Serpieri. 2018. "Bounded-Rationality and Heterogeneous Agents: Long or Short Forecasters?" European Commission Joint Research Center Technical Report No. JRC111392. Luxembourg: Publications Office of the European Union. URL: <https://publications.jrc.ec.europa.eu/repository/handle/JRC111392>.
- Berelson, Bernard. 1952. *Content Analysis in Communication Research*. Glencoe, IL: The Free Press.
- Blei, David M., Andrew Y. Ng, and Michael I. Jordan. 2003. "Latent Dirichlet Allocation." *The Journal of Machine Learning Research* 3: 993–1022.
- Blinder, Alan S., Michael Ehrmann, Marcel Fratzscher, Jakob De Haan, and David-Jan Jansen. 2008. "Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence." *Journal of Economic Literature* 46, no. 4: 910–945.
- Bordalo, Pedro, Nicola Gennaioli, Yueran Ma, and Andrei Shleifer. 2020. "Overreaction in Macroeconomic Expectations." *American Economic Review* 110, no. 9: 2748–2782.
- Campbell, John Y., and N. Gregory Mankiw. 1990. "Permanent Income, Current Income, and Consumption." *Journal of Business & Economic Statistics* 8, no. 3: 265–279.
- Campbell, John Y., Robert J. Shiller, and Luis M. Viceira. 2009. "Understanding Inflation-Indexed Bond Markets." *Brookings Papers on Economic Activity* 2009: 79–120. URL: <https://www.jstor.org/stable/25652715>.
- Carroll, Christopher. 2001. "The Epidemiology of Macroeconomic Expectations." NBER Working Paper No. 8695. URL: <https://econpapers.repec.org/RePEc:nbr:nberwo:8695>.
- Carroll, Christopher. 2003. "Macroeconomic Expectations of Households and Professional Forecasters." *Quarterly Journal of Economics* 118, no. 1: 269–298.
- Carstensen, Kai, and Rüdiger Bachmann. 2023. "Firm Expectations." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 33–70. Cambridge, MA: Elsevier.
- Castle, Jennifer L., David F. Hendry, and Andrew B. Martinez. 2017. "Evaluating Forecasts, Narratives and Policy using a Test of Invariance." *Econometrics* 5, no. 3: 39.
- Clarida, Richard, Jordi Gali, and Mark Gertler. 1999. "The Science of Monetary Policy: A New Keynesian Perspective." *Journal of Economic Literature* 37, no. 4: 1661–1707.
- Clements, Michael P., Robert W. Rich, and Joseph S. Tracy. 2023. "Survey of Professionals." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 71–106. Cambridge, MA: Elsevier.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2012. "What Can Survey Forecasts Tell us about Information Rigidities?" *Journal of Political Economy* 120, no. 1: 116–159.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2015. "Is the Phillips Curve Alive and Well after All? Inflation Expectations and the Missing Disinflation." *American Economic Journal: Macroeconomics* 7, no. 1: 197–232.
- Daniel, Volker, and Lucas ter Steege. 2020. "Inflation Expectations and the Recovery from the Great Depression in Germany." *Explorations in Economic History* 75: 101305. DOI: 10.1016/j.eeh.2019.101305.
- de Bruin, Wändi Bruine, Alycia Chin, Jeff Dominitz, and Wilbert van der Klaauw. 2023. "Household Surveys and Probabilistic Questions." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 3–32. Cambridge, MA: Elsevier.
- de Bruin, Wändi Bruine, Baruch Fischhoff, Susan G. Millstein, and Bonnie L. Halpern-Felsher. 2000. "Verbal and Numerical Expressions of Probability: It's a Fifty-Fifty Chance." *Organizational Behavior and Human Decision Processes* 81, no. 1: 115–131.
- Deutsche Bundesbank. 2023. *Time Series Data Base: German Consumer Price Index*. URL: https://www.bundesbank.de/dynamic/action/en/statistics/time-series-databases/time-series-databases/745582/745582?tsId=BBDP1.M.DE.Y.VPI.C.A00000.I20.A&listId=www_ssb_b4_pr_vpi&dateSelect=2023.
- Diaf, Sami. 2022. "Policy Preference at Central Banks: Quantifying Monetary Policy Signals Using Keyword Topic Models." WiSo-HH Working Paper Series 69, University of Hamburg, Faculty of Business, Economics and Social Sciences, WISO Research Laboratory. URL: <https://ideas.repec.org/p/zbw/uhhwps/69.html>.

- Döpke, Joerg, Jonas Dovern, Ulrich Fritsche, and Jiri Slacalek. 2008. "The Dynamics of European Inflation Expectations." *The B.E. Journal of Macroeconomics* 8, no. 1: 1–23.
- Dovern, Jonas, Ulrich Fritsche, and Jiri Slacalek. 2012. "Disagreement among Forecasters in G7 Countries." *Review of Economic and Statistics* 94, no. 4: 1081–1096.
- Dräger, Lena. 2016. "Recursive Inattentiveness with Heterogeneous Expectations." *Macroeconomic Dynamics* 20, no. 4: 1073–1100.
- Dräger, Lena, Klaus Gründler, and Niklas Potrafke. 2025. "Political Shocks and Inflation Expectations: Evidence from the 2022 Russian Invasion of Ukraine." *Journal of International Economics* 153, no. 2: 104029. DOI: 10.1016/j.jinteco.2024.104029.
- Fildes, Robert, and Herman Stekler. 2002. "The State of Macroeconomic Forecasting." *Journal of Macroeconomics* 24, no. 4: 435–468.
- Fisher, Irving. 1907. *The Rate of Interest: Its Nature, Determination and Relation to Economic Phenomena*. New York: Macmillan.
- Friedman, Milton. 1953. "The Methodology of Positive Economics." In *Essays in Positive Economics*, edited by Milton Friedman, 3–42. Chicago, IL: University of Chicago Press.
- Friedman, Milton. 1968. "The Role of Monetary Policy. Presidential Address Delivered at the 80th Annual Meeting of the American Economic Association." *American Economic Review* 58, no. 1: 1–17.
- Friedman, Milton, and Anna Jacobson Schwartz. 1963. *A Monetary History of the United States, 1867–1960*. Princeton, NJ: Princeton University Press.
- Fritsche, Ulrich, and Johannes Puckelwald. 2018. "Deciphering Professional Forecasters' Stories—Analyzing a Corpus of Textual Predictions for the German Economy." Department of Economic (Socioeconomics) Discussion Papers—Macroeconomics and Finance Series No. 201804, University of Hamburg. URL: <https://econpapers.repec.org/paper/hepmacppr/201804.htm>.
- Fuster, Andreas, and Basit Zafar. 2023. "Survey Experiments on Economic Expectations." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 107–121. Cambridge, MA: Elsevier.
- Gali, Jordi, Mark Gertler, and J. David López-Salido. 2005. "Robustness of the Estimates of the Hybrid New Keynesian Phillips Curve." *Journal of Monetary Economics* 52, no. 6: 1107–1118.
- Gentzkow, Matthew, Bryan Kelly, and Matt Taddy. 2019. "Text as Data." *Journal of Economic Literature* 57, no. 3: 535–574.
- Goldfarb, Robert S., Herman O. Stekler, and Joel David. 2005. "Methodological Issues in Forecasting: Insights from the Egregious Business Forecast Errors of Late 1930." *Journal of Economic Methodology* 12, no. 4: 517–542.
- Haaland, Ingar, Christopher Roth, and Johannes Wohlfart. 2023. "Designing Information Provision Experiments." *Journal of Economic Literature* 61, no. 1: 3–40.
- Hansen, Lars Peter. 1982. "Large Sample Properties of Generalized Method of Moments Estimators." *Econometrica* 50, no. 4: 1029–1054.
- Hendry, David F., and Grayham E. Mizon. 2014. "Why DSGEs Crash During Crises." VOX CEPR Policy Portal. URL: <https://cepr.org/voxeu/columns/why-dsges-crash-during-crises>.
- Holden, Kenneth, and David A. Peel. 1990. "On Testing for Unbiasedness and Efficiency of Forecasts." *The Manchester School* 58, no. 2: 120–127.
- Holsti, Ole R. 1969. *Content Analysis for the Social Sciences and Humanities*. Reading, MA: Addison-Wesley.
- Hommes, Cars. 2013. *Behavioral Rationality and Heterogeneous Expectations in Complex Economic Systems*. Cambridge: Cambridge University Press.
- Hommes, Cars, and Sebastian Poledna. 2023. "Analyzing and Forecasting Economic Crises with an Agent-based Model of the Euro Area." Tinbergen Institute Discussion Paper No. 23-013/II, Tinbergen Institute, Amsterdam. URL: <https://ideas.repec.org/p/tin/wpaper/20230013.html>.
- Hoover, Kevin D., and Stephen J. Perez. 1994. "Money May Matter, But How Could You Know?" *Journal of Monetary Economics* 34, no. 1: 89–99.
- Hoover, Kevin D., and Stephen J. Perez. 1994. "Post Hoc Ergo Propter: Once More an Evaluation of 'Does Monetary Policy Matter?' in the Spirit of James Tobin." *Journal of Monetary Economics* 34, no. 1: 47–74.

- IDC. 2021. "Worldwide Global Datasphere and Global Storasphere Structured and Unstructured Data Forecast 2021–2025." Doc. #US47998321, July 2021. Market Forecast, Int. Data Corp., Needham, MA.
- Juster, F. Thomas. 1966. "Consumer Buying Intentions and Purchase Probability: An Experiment in Survey Design." *Journal of the American Statistical Association* 61, no. 315: 658–696.
- Kaldor, Nicholas. 1938. "The Cobweb Theorem." *Quarterly Journal of Economics* 52, no. 2: 255–280.
- Keynes, John Maynard. 1936. *The General Theory of Employment, Interest, and Money*. London: MacMillan.
- King, Robert G., and Andre Kurman. 2002. "Expectations and the Term Structure of Interest Rates: Evidence and Implications." *FRB Richmond Economic Quarterly* 88, no. 4: 49–95.
- Klein, Lawrence R. 1987. "The Econometric Theory Interview: Professor L.R. Klein (Interviewer: R. Marino)." *Econometric Theory* 3, no. 3: 409–460.
- Krippendorff, Klaus. 2018. *Content Analysis: An Introduction to its Methodology*. 4th ed. Thousand Oaks, CA: Sage Publications.
- Lucas, Robert E. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 1: 19–46.
- Malmendier, Ulrike, and Stefan Nagel. 2015. "Learning from Inflation Experiences." *Quarterly Journal of Economics* 131, no. 1: 53–87.
- Mankiw, N. Gregory, and Ricardo Reis. 2002. "Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve." *Quarterly Journal of Economics* 117, no. 4: 1295–1328.
- Mankiw, N. Gregory, and Ricardo Reis. 2018. "Friedman's Presidential Address in the Evolution of Macroeconomic Thought." *Journal of Economic Perspectives* 32, no. 1: 81–96.
- Manski, Charles F. 2004. "Measuring Expectations." *Econometrica* 72, no. 5: 1329–1376.
- Milani, Fabio. 2012. "The Modeling of Expectations in Empirical DSGE Models: A Survey." In *DSGE Models in Macroeconomics: Estimation, Evaluation, and New Developments*: 28 (Advances in Econometrics, 28), edited by Nathan Balke, Fabio Canova, Fabio Milani, and Mark Wynne, 3–38. Bingley: Emerald.
- Mincer, Jacob A., and Victor Zarnowitz. 1969. "The Evaluation of Economic Forecasts." In *Economic Forecasts and Expectations: Analysis of Forecasting Behavior and Performance*, edited by Jacob A. Mincer, 3–46. Cambridge, MA: NBER.
- Müller, Karsten. 2022. "German Forecasters' Narratives: How Informative Are German Business Cycle Forecast Reports?" *Empirical Economics* 62, no. 5: 2373–2415.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica* 29, no. 3: 315–335.
- Nerlove, Marc. 1958. "Adaptive Expectations and Cobweb Phenomena." *Quarterly Journal of Economics* 72, no. 2: 227–240.
- Pesaran, M. Hashem, and Martin Weale. 2006. "Survey Expectations." In *Handbook of Economic Forecasting*, edited by Graham Elliott, Clive Wilfred James Granger and Allan Timmermann, 1: 715–776. Cambridge, MA: Elsevier.
- Petropoulos, Fotios, et al. 2022. "Forecasting: Theory and Practice." *International Journal of Forecasting* 38, no. 3: 705–871.
- Prescott, Edward C. 1977. "Should Control Theory be used for Economic Stabilization?" *Carnegie-Rochester Conference Series on Public Policy* 7: 13–38.
- Pretis Felix, James J. Reade, and Genaro Sucarrat. 2018. "Automated General-to-Specific (GETS) Regression Modeling and Indicator Saturation for Outliers and Structural Breaks." *Journal of Statistical Software* 86, no. 3: 1–44.
- R Core Team. 2023. "R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing." Vienna, Austria. URL: <https://www.R-project.org/>.
- Romer, Christina D., and David H. Romer. 1989. "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz." *NBER Macroeconomics Annual* (MIT Press) 4: 121–170.
- Romer, Christina D., and David H. Romer 1994. "Monetary Policy Matters." *Journal of Monetary Economics* 34, no. 1: 75–88.
- Romer, Christina D., and David H. Romer 2023. "Presidential Address: Does Monetary Policy Matter? The Narrative Approach after 35 Years." *American Economic Review* 113, no. 6: 1395–1423.

- Rosner, Peter. 2012. *Die Entwicklung ökonomischen Denkens: ein Lernprozess*. Berlin: Duncker & Humblot.
- Roth, Christopher, and Johannes Wohlfart. 2020. "How Do Expectations about the Macroeconomy Affect Personal Expectations and Behavior?" *Review of Economics and Statistics* 102, no. 4: 731–748.
- Samuelson, Paul A. 1948. "Consumption Theory in Terms of Revealed Preference." *Economica* 15, no. 60: 243–253.
- Sheffrin, Steven M. 1996. *Rational Expectations*. 2nd ed. Cambridge: Cambridge University Press.
- Shiller, Robert J. 2019. *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*. Princeton, NJ: Princeton University Press.
- Sims, Christopher A. 2003. "Implications of Rational Inattention." *Journal of Monetary Economics* 50, no. 3: 665–690.
- Stantcheva, Stefanie. 2023. "How to Run Surveys: A Guide to Creating Your Own Identifying Variation and Revealing the Invisible." *Annual Review of Economics* 15: 205–234.
- Stekler, Herman, and Symington, Hilary. 2016. "Evaluating Qualitative Forecasts: The FOMC Minutes, 2006–2010." *International Journal of Forecasting* 32, no. 2: 559–570.
- Svetlova, Ekaterina. 2022. "AI Meets Narratives: the State and Future of Research on Expectation Formation in Economics and Sociology." *Socio-Economic Review* 20, no. 2: 841–861.
- Taylor, John B. 1988. "The Treatment of Expectations in Large Multicounty Econometric Models." In *Empirical Macroeconomics for Interdependent Economies*, edited by Ralph C. Bryant, Dale W. Henderson, Gerald Hotham, Peter Hooper, and Steven A. Symansky, 161–182. Washington, DC: Brookings Institution.
- Thaler, Richard H. 2015. *Misbehaving: The Making of Behavioural Economics*. New York: Allen Lane.
- Weber, Michael, Francesco D'Acunto, Yuriy Gorodnichenko, and Olivier Coibion. 2022. "The Subjective Inflation Expectations of Households and Firms: Measurement, Determinants, and Implications." *Journal of Economic Perspectives* 36, no. 3: 157–184.

10

ON FIRE, NEWS, AND EXPECTATIONS

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Rational expectations have dominated mainstream macroeconomics for the last 40 years or so (see, for instance, Taylor 2001; Evans and Honkapohja 2005; Duarte, Chapter 2 in this volume). This is most likely for three reasons. First, they feature prominently in a compelling narrative of why established models failed to account for the effects of the economic policies in the 1970s. This, in turn, gave rise to the rational expectations revolution in the first place. Second, rational expectations are a conceptually attractive disciplining device in economic modeling. Under rational expectations, economic agents share the same view of the world as their modelers, eliminating potential degrees of freedom which can otherwise easily be abused to fit the data. Third, for a very long time, there has been a broad consensus that one may not test the rational expectations assumption empirically without additional auxiliary assumptions which, in turn, are unlikely to be satisfied in most data sets. Hence, it seemed impossible to directly reject the assumption on empirical grounds.

This chapter develops the hypothesis that the modeling of expectations in macroeconomics is currently undergoing a paradigm shift¹. This shift—a second expectations revolution—is centered around a simple idea, namely to take survey measures of economic expectations at face value and to investigate their response to news, in turn, approximated by survey participants' forecast revisions. This yields a rather straightforward test. Under the rational expectations hypothesis, the forecast errors of survey participants about future developments are not predictable based on how the same participants currently react to news (that is, their forecast revision). However, by now there is overwhelming evidence that agents do not necessarily revise their forecasts in a “rational” sense based on news; that is, future forecast errors are indeed predictable on the basis of current forecast revisions. This evidence is based on many surveys and emerges in various contexts. What is more, rather than simply rejecting rational expectations, testing how forecast errors respond to forecast revisions or news provides useful clues as to how rational expectations fail empirically. This, in turn, serves as input for alternative models of the expectation-formation process.

It is perhaps no coincidence that the ongoing, second expectations revolution took off in the decade after the financial crisis which disrupted the world economy during the years 2007–2008. Part of the intellectual response to the crisis was to identify rational expectations as one of the key limitations of existing models, which had a hard time accounting

for what was going on in real time (see, for instance, Stiglitz 2011). That intellectual shifts in economics take place against the background of disruptive economic events is a familiar pattern. After all, macroeconomics “was born as a distinct field in the 1940s, as a part of the intellectual response to the Great Depression” (Lucas 2003). The (first) rational expectations revolution is another example. While the concept of rational expectations goes back to Muth (1960, 1961), the rational expectations revolution took off only during the following decade. And while the work of Lucas (1972, 1973, 1976) is commonly understood to have been pivotal in this regard, so too is the macroeconomic crisis of the 1970s. The persistent surge of inflation was partly understood as the failure of Keynesian macroeconomics that had been put into practice during the 1960s and 1970s (Mishkin 1995). As Sheffrin (1996) puts it: “Stagflation and persistent inflation created a receptive environment for new ideas in the field.”

With hindsight, it appears plausible that a climate of general uneasiness with the state of macroeconomics that emerged in the wake of the global financial crisis made the profession similarly more open to new ideas and approaches (Krugman 2009). Taking a historical perspective, this chapter is therefore premised on the idea that economic modeling trends are themselves grounded in the experience of crises—that is, when models are confronted with an unyielding reality, or when they inform policies that eventually fail to achieve what they are supposed to deliver, or both.

The chapter is organized as follows. The next section introduces the full-information rational expectations (FIRE) paradigm which has been—and still is—the dominant framework of mainstream macroeconomics. It complements rational expectations with the assumption of full information and yields rather stringent predictions which differ depending on the level of aggregation. This is key to appreciating the recent empirical work which relies on survey data. A first set of studies focuses on the behavior of average expectations and finds that current forecast revisions predict future forecast errors. This is inconsistent with FIRE but may still be consistent with rational expectations, assuming that information is incomplete. Later studies, however, turn to individual forecasts and find likewise that forecast revisions predict forecast errors, in contrast to what rational expectations imply. The section “This Time is Different, Maybe” provides a historical perspective. In particular, it highlights an earlier strand of the literature which by and large also rejected rational expectations on the basis of survey data. Yet this research, which was published in the 1970s and 1980s, left the profession largely unimpressed. Looking at recent trends in publications, we suggest that this time is different, either because of the sense of failure of macroeconomics during the global financial crisis or because more viable alternatives are becoming available. The subsequent section, “Alternative Models of Expectation Formation,” provides a brief overview of these alternatives. A final section offers a short conclusion.

FIRE under Fire

For the largest part, macroeconomics today relies on the full-information rational expectations (FIRE) assumption in order to model the expectation-formation process. Under FIRE, one obtains stringent predictions for how expectations respond to news.² During the last couple of years, a rich empirical literature has developed which uses survey data to assess these predictions. It turns out that FIRE can be rejected at different levels. In what follows, we first clarify basic concepts and provide an illustrative example before discussing the evidence.

Rational Expectations and the Reaction to News

The empirical literature which we discuss below is centered on the notion of overreaction and underreaction of expectations to news. Rational expectations yield different predictions depending on whether (a) one assumes full information or (b) one considers aggregate or individual expectations. We discuss these aspects in what follows. Table 10.1 offers a summary: Column 1 shows the predictions of the FIRE benchmark, Column 2 relaxes the full-information assumption, while the last column departs from rational expectations altogether. In the following, we explain how predictions vary across columns and across aggregate and individual expectations (top vs. bottom row).

The theory of rational expectations imposes restrictions at the level of *individual* actors, notably that they make the best possible forecast given the available information. In addition, rational expectations stipulate that both the forecaster and the econometrician know the data-generating process (see, for instance, Sargent 2008).³ Still, forecasts will not necessarily come true, as future disturbances are generally not foreseen. Put differently, rational expectations differ from perfect foresight, an assumption that is sometimes imposed for pedagogical purposes. Under rational expectations, agents (and econometricians alike) will make expectation errors by over- or underestimating the variable of interest at different points in time. Such prediction errors are consistent with rational expectations as long as forecast errors themselves are not predictable based on the information set that is available to agents in real time. Clearly, these information sets may be very limited. What matters for rational expectations is that forecast errors are not *systematically* related to individual information available at the time the forecast is made: over time, errors in one direction are offset by errors in the other direction. Instead, we speak of over- and underreactions to news only if such a systematic link exists and forecast errors are indeed predictable by current information.

If all actors possess the same (even if incomplete) information and form expectations in the same way, aggregating expectations does not make any difference, as individual and average expectations coincide. In this case, rational expectations imply that neither individual nor aggregate expectation errors can be predicted *ex ante*: see Column 1 of Table 10.1. Expectations no longer coincide once agents have access to different information. Information is then also necessarily incomplete for some agents. Such an environment of “dispersed information” represents a specific deviation from the assumption of full information (where “full” does not include realizations of future disturbances, as would be the case under perfect foresight) and leads to heterogeneous expectations, even if agents form expectations in the same way. Crucially, an individual might receive less information than

Table 10.1 Predicted reactions to news at different levels of aggregation

Level of aggregation	(1) FI & RE	(2) ~FI & RE	(3) ~FI & ~RE
Aggregate	Correct reaction	Underreaction	Underreaction
Individual	Correct reaction	Correct reaction	Under-/Overreaction

Notes: Reaction of aggregate (upper row) and individual (lower row) expectations to news as predicted by combinations of full information (FI) and rational expectations (RE). Entries in the second and third columns are not universally valid but refer to the specific predictions discussed in this section.

what is available in the aggregate. This is the case if the correlation of information across agents (or the number of agents receiving similar information) helps to predict the future. Individual expectations are nevertheless formed independently of this correlation, as the information available to others is unknown to the individual.

The information structure in a rational expectations model of “noisy (and dispersed) information,” as developed in Lorenzoni (2009), generates a specific correlation of the average forecast revision with the aggregate forecast error (Column 2 of Table 10.1). In the model, agents adjust their expectations only partially in reaction to new information, as this information might be incorrect. In this scenario, the expectation will be too pessimistic if the positive news turns out to be correct and too optimistic if it doesn’t (and vice versa for negative news), but will be correct on average. The additional (quite natural) model assumption that correct news is correlated across agents while incorrect news is not implies that the average information picks up the informative news, while the so-called “noise” averages out. As agents (rationally) underreact to correct information due to their inability to extract the full information content, aggregate expectations will hence underreact to the aggregate, and therefore informative, news.

Predictable forecast errors at the aggregate level despite rational expectations at the individual level do not only emerge under noisy information. Models of rational inattention (e.g., Sims 2003; Mackowiak and Wiederholt 2009) assume a different information structure but deliver the same outcome. Here, agents do not pay full attention to relevant information because of information processing costs. This limited attention renders information, as processed by the agents, noisy, which again leads to an underreaction at the aggregate level (see Fuster et al. 2022 for a demonstration of this equivalence). Individual forecast revisions, however, are still not systematically linked to future forecast errors. This would violate the rational expectations assumption, as individual forecast revisions are observable at no cost.

Given the above, evidence of under- (or over-) reaction to news at the aggregate level does not pinpoint the specific deviation from FIRE, as this observation can be rationalized by two broader categories of explanations. The first one relaxes the full information assumption and focuses on the predictability of forecast errors that arises due to the aggregation of heterogeneous expectations.⁴ An underreaction at the aggregate level can, as explained above, be squared with rational expectations if coupled with, for example, dispersed information.⁵ The second type of explanation assumes that the predictability of forecast errors is already present at the individual level. Yet an over- or underreaction at the individual level implies a departure from rational expectations, as agents could improve their average forecast (that is, reduce forecast errors) based on their forecast revisions.⁶ This rejection of rational expectations at the individual level can exist alongside the discussed dispersed-information structure, giving rise to potentially opposite over- and underreactions at the individual and the aggregate level (Column 3 of Table 10.1).

An Illustrative Example

To provide further intuition for under- and overreaction at the individual and aggregate levels, we provide a simple example with noisy and dispersed information. Suppose that at a certain point in time, every individual in a population expected no change in a specific variable, say, GDP. One individual then receives idiosyncratic news that GDP will increase by 2 percent. Assume furthermore that this information is noisy in the sense that it has a

50 percent probability of being correct. With the remaining 50 percent probability, GDP will not change. The rational forecast is a prediction of a 1 percent rise; if the news turns out to be correct, the individual has underestimated GDP growth by 1 percentage point (p.p.), while she has over-predicted GDP by 1 p.p. in case of incorrect news. Since both events are equally likely, the prediction is correct on average, that is, the expected forecast error (realization minus expectation) is zero: $0.5 * 1 + 0.5 * (-1) = 0$. If, for whatever reason, the agent overestimates the likelihood that the information is correct, she would increase her forecast by more than 1 p.p., leading to a negative forecast error on average (average realizations are below average forecasts). A negative correlation with the positive forecast revision (from zero to above one upon receiving the news) obtains.

To see how an overreaction at the individual level can be squared with an underreaction at the aggregate level, assume now that if GDP will increase by 2 percent, *each* agent receives the same (correct) news about a 2 percent increase.⁷ If agents hold rational expectations and predict a 1 percent growth rate, the average forecast revision will also be 1 percent, but this will underestimate actual GDP growth. The forecast error is $2 - 1 = 1$ p.p. and therefore positively correlated with the forecast revision, representing an underreaction at the aggregate level despite the rational expectations forecasts at the individual level. However, even if agents predict GDP growth of 1.5 percent—representing an overreaction according to the discussion above—the average forecast revision of 1.5 percent will underestimate GDP growth with a forecast error of $2 - 1.5 = 0.5$ p.p. We therefore still have an underreaction at the aggregate level. In other words, because information sets are assumed to be correlated in the case of correct news but uncorrelated for incorrect news, we can obtain overreaction at the individual level simultaneously with underreaction at the aggregate level. The observation that overreaction may be observed alongside underreaction, *both* at the individual level, as documented in the next section, requires different explanations, though.

The Evidence

The FIRE benchmark discussed above provides the benchmark for a number of recent empirical studies which bring survey data to bear on the issue. This is noteworthy because, as we discuss in “This Time is Different, Maybe” below, the assessment of economic theory based on survey data has been frequently debated on methodological grounds (see also Fritsche and Döpke, Chapter 9 in this volume).

In an influential study, Coibion and Gorodnichenko (2015) propose a simple diagnostic in order to shed light on the expectation formation process.⁸ Their study has given rise to an intensive debate about this process and has motivated new explorations, both empirically and in terms of theory. Specifically, using the Survey of Professional Forecasters (SPF), Coibion and Gorodnichenko (2015) regress the upcoming forecast error on the current forecast revision. As discussed in “Rational Expectations and the Reaction to News” above, forecast errors should not be predictable based on information that is available to the forecaster in real time under rational expectations. If one assumes full information in addition to rational expectations, the average forecast error across forecasters should also not be predictable based on average news. Therefore, Coibion and Gorodnichenko (2015) test the full-information rational expectations (FIRE) assumption based on the following specification:

$$x_{t-h,t} - F_t(x_{t-h,t}) = \beta_0 + \beta_1 \cdot \text{news}_t + \varepsilon_t \quad (10.1)$$

Here, $x_{t-h,t} - F_t(x_{t-h,t})$ is the *average* forecast error and news_t is some surprise, typically proxied by the *average* forecast revisions across forecasters. Under FIRE, we have $\beta_1 = 0$. Based on the median (consensus) professional forecast for inflation, Coibion and Gorodnichenko (2015) obtain positive regression coefficients. That is, forecast revisions predict forecast errors in the same direction. An upward revision, for example, is followed by an underprediction of the same variable—forecasters seem to underreact to news. While Coibion and Gorodnichenko (2015) focus primarily on professional inflation forecasts from the SPF, they show that their finding also holds for (i) other macroeconomic variables such as real GDP, (ii) different surveys, e.g., the University of Michigan Survey of Consumers and the Livingston Survey, (iii) different forecast horizons, and (iv) different countries.⁹ Using a similar setup as in Equation 10.1, Kohlhas and Walther (2021) confirm the underreaction to average new information.¹⁰ Shintani and Ueda (2023) aim to disentangle sticky information from noisy information in the same framework and find some evidence for a noisy information model in which agents can quickly learn the underlying state.¹¹

It is important to reemphasize that underreaction at the aggregate level is consistent with rational expectations: it may simply reflect a failure of the full information assumption. However, and this point is stressed by Coibion and Gorodnichenko (2015), once Equation 10.1 is estimated at the level of individual forecasters, it yields a more stringent test. $H_0 : \beta_1 = 0$ is now a test of rational expectations instead of a test of FIRE. As explained above, rational inattention or noisy information models would predict that expectations underreact to the (unobserved) fundamental shock but respond on average correctly to the combination of shock and noise, that is, to news. The key point, therefore, is to employ news_{it} which are the observations made by forecasters in real time (where i is an index for the individual forecaster). Fuhner (2018), Bordalo et al. (2020), and Angeletos et al. (2021) estimate versions of Equation 10.1 based on *individual forecasts* and find negative coefficients, that is, they find overreaction to news. Bouchaud et al. (2019) also show this for financial analysts' forecasts. Overall, the recent evidence based on individual-level regressions points toward a rejection of rational expectations and, as discussed in "Alternative Models of Expectation Formation," has provided important inputs for the development of theoretical alternatives to the rational expectations paradigm.

Before turning to theoretical developments, we stress that news does not always lead to overreaction at the level of individual forecasters, as recent work by Broer and Kohlhas (2024) and Born et al. (2022a) shows. On the one hand, Broer and Kohlhas (2024) confirm that the forecast error of individual forecasters, especially regarding inflation forecasts, is negatively correlated with their own forecast revision, pointing to overreactions. On the other hand, forecast errors overreact to some public signals (like the consensus inflation forecast from the SPF) but underreact to other public signals (like the unemployment rate or the year-on-year change in the exchange rate). Born et al. (2022a) put forward new evidence to the debate along three dimensions. First, they consider firms instead of professional forecasters or households.¹² Second, they focus on firm-level variables, notably production (and prices), rather than macro-level variables (such as aggregate inflation). Third, they distinguish between (private) micro and (public) macro news regarding firm performance. In the tradition of the above literature, Born et al. (2022a) approximate what is news to firms by a firm's forecast revision, that is, the change in what they report as

production expectations. Importantly, these revisions may reflect firm-specific news (micro news) or news about the aggregate economy (macro news).

Formally, their baseline regression equation is given by:

$$x_{t-h,t}^i - F_t^i(x_{t+h,t}^i) = \beta_0 + \beta_1 \cdot \text{micro news}_t^i + \beta_2 \cdot \text{macro news}_t + v_t^i \quad (10.2)$$

Here, $x_{t-h,t}^i - F_t^i(x_{t+h,t}^i)$ is a firm's forecast error for its own production, micro news is the production-forecast revision once one controls for macro news, and macro news is the surprise component in the ifo business climate index of the previous month.¹³ As before, under rational expectations, these coefficients should be zero because micro and macro news are part of a firm's information set at the time the forecast is submitted to the survey.

Born et al. (2022a) find that the distinction between micro and macro news is essential: firm expectations overreact to micro news, but simultaneously underreact to macro news. This pattern emerges robustly across a variety of specifications and for all firm types that they consider (e.g., small and large, young and old). It also holds for different measures of expectations and different outcome variables. The key result is displayed in Figure 10.1. Here, Equation 10.2 is estimated for each of the 3,000 firms in their sample separately and the figure displays the distribution of estimates for β_1 and β_2 which capture the response to (a) micro and (b) macro news, respectively. There is a clear pattern: the mass of the estimates for β_1 is concentrated to the left of zero, and significantly so (dark bars). The estimates for β_2 instead are centered to the right of zero. In this case, however, estimates are not always significantly different from zero (light bars), but among the significant estimates, the macro coefficient is positive for 92 percent of firms. Overall, the results show that the micro coefficient is generally negative while the macro coefficient tends to be positive. Given our discussion above, the interpretation is straightforward: the expectations of individual firms overreact to micro news and tend to underreact to macro news. As discussed above, this

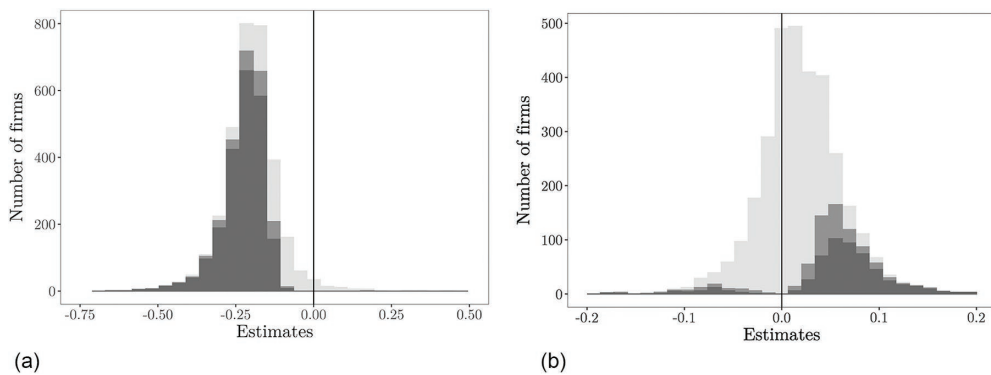


Figure 10.1 Distribution of firm-level responses to news. (a) Production expectations: micro news. (b) Production expectations: macro news.

Source: Author creation

Notes: Figure reproduced from Born et al. (2022a); gray area represents insignificant estimates, light-green area represents estimates significant at the 10% level, dark-green area indicates significance at the 5% level.

pattern testifies against rational expectations. The finding of underreaction to macro news at the level of individual firm expectations is particularly noteworthy in light of a frequently voiced concern which suggests that overreaction at the level of individual forecasters may simply reflect measurement error rather than a failure of rational expectations (Juodis and Kučinskas 2023). And indeed while in theory measurement error can account for the overreaction of individual expectations to micro news, it cannot explain the underreaction of individual expectations to macro news, nor the overreaction to lagged micro news, both documented by Born et al. (2022a).¹⁴

This Time Is Different, Maybe

Before turning to current theories which attempt to account for the failure of FIRE, a brief historical digression seems warranted. For at about the same time as the rational expectations revolution changed macroeconomics for good, a fairly large number of studies had already turned to survey data in order to test the rationality of expectations as reported by survey participants. Sheffrin (1996) reviews this literature, which tests survey expectations for unbiasedness, efficiency, and forecast error non-predictability, properties which one would expect to be satisfied under rational expectations. In an early (perhaps the first) study, Pesando (1975) rejected rationality for the Livingston survey and started a debate that was never really settled despite a large research effort spanning almost two decades (see, for instance, Mullineaux 1978; Swidler and Ketcher 1990; Bondt and Bange 1992). What is more, this debate was not limited to evidence from the Livingston survey, and the contributions to this debate were, by the standards of the profession, well-published. For instance, in an influential article published in the *American Economic Review*, Lovell (1986) discusses a number of rationality tests conducted on sales-expectations data. He writes:

My survey of a number of empirical studies of expectations is not supportive of the commonly invoked rational expectations hypothesis. Quite the contrary, **if the cumulative evidence is to be believed, we are compelled to conclude that expectations are a rich and varied phenomenon that is not adequately captured by the concept of rational expectations**; while the predictions of some forecasters may be characterized as rational, in other instances the assumption of rationality is clearly violated.

(Lovell 1986, 120, emphasis added)

This verdict is no exception. Sheffrin concludes his survey of this literature as follows: “On the whole, survey data do not support the rational expectations hypothesis” (Sheffrin 1996, 21). Even more striking in the present context, we note that some earlier work put forward evidence very similar to that discussed in “The Evidence” above. Nordhaus (1987), Ehrbeck and Waldmann (1996), and Lahiri and Sheng (2008) all estimated variants of Equation 10.1 and documented “overreaction” and “underreaction” to news in all but name. Yet, while very well published and cited, these results seem to have been largely forgotten over time—at least, they are not referenced in the more recent studies discussed above.

More importantly still, macroeconomics as a whole was unimpressed by these results, carrying on under the rational expectations banner. The likely reason is a strong tradition in economics to focus on people’s behavior rather than on what they say. It goes back to

Samuelson's revealed preference theory (1938) and has led many economists to dismiss survey evidence outright:

Like utility, expectations are not observed, and **surveys cannot be used to test the rational expectations hypothesis**. One can only test a theory on the basis of whether it is or is not consistent with observations, whether it incorporates rational expectations or, for that matter, irrational expectations.

(Prescott 1977, 30, emphasis in original)

Prescott's assertion—arguably widely shared by economists at the time—raises the question of what counts for an observation or, more generally, what science considers a relevant phenomenon. “Normal” science, as philosopher of science Thomas Kuhn explains in his influential essay on the “Structure of Scientific Revolutions,” operates under a paradigm which restricts “the phenomenological field accessible for scientific investigation at any time” (Kuhn 2012). On these grounds, it is possible to dismiss new “evidence” as irrelevant and, in fact, for good reason: “by ensuring that the paradigm will not be too easily surrendered, resistance guarantees that scientists will not be lightly distracted and the anomalies that lead to paradigm change will penetrate existing knowledge to the core” (Kuhn 2012, 65).

At the risk of making a premature judgment, it seems to us that this time is different. The evidence discussed above and the anomalies documented by this line of research may

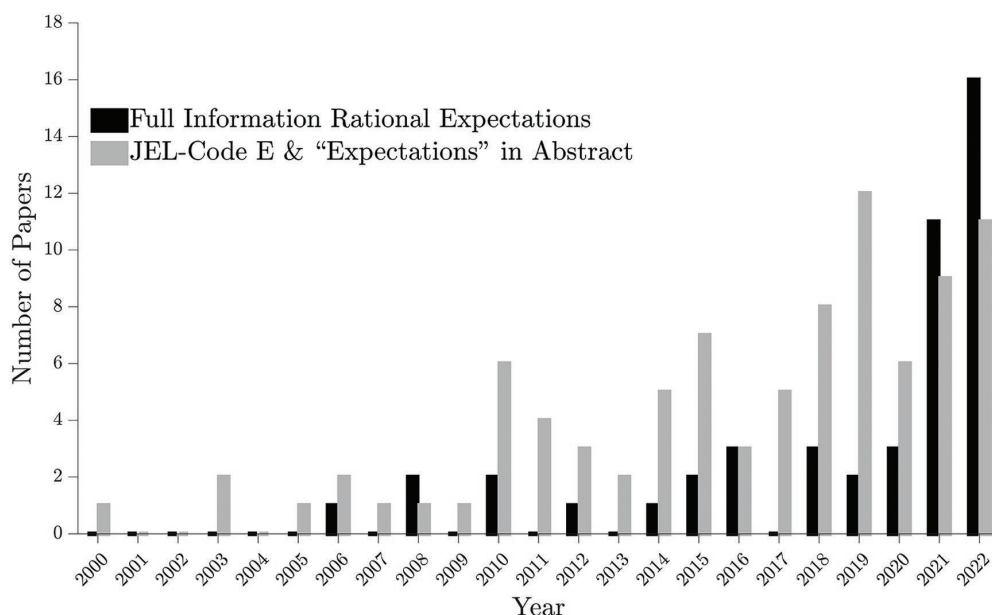


Figure 10.2 Research on expectations in macroeconomics.

Source: Author creation.

Notes: Solid bars are the number of papers in the *Quarterly Journal of Economics*, *American Economic Review*, *Journal of Political Economy*, *Journal of Finance*, *Review of Economic Studies*, *Review of Financial Studies*, *Journal of Financial Economics*, *Journal of Economic Literature*, *Review of Economics and Statistics*, and *Journal of Monetary Economics* which contain the term “Full Information Rational Expectations” according to Google Scholar; shaded bars are the number of papers in AEA journals with JEL code E (“Macroeconomics and Monetary Economics”) which feature the term “Expectations” in their abstract.

indeed “penetrate existing knowledge to the core.” Why should things turn out different this time? According to Kuhn, there “is probably no fully general answer” to the question of what “makes an anomaly seem worth concerted scrutiny” and thus eventually leads to a paradigm shift.

Our assessment is merely based on the observation that survey expectations have staged a comeback. By now, it seems fair to say, they are accepted as relevant observations (see, for instance, D’Acunto et al. 2021; Andre et al. 2022; Bachmann et al. 2022; Enders et al. 2022; Weber et al. 2022). At the same time, since the global financial crisis macroeconomic research has increased its focus on the expectation formation process. To illustrate this, Figure 10.2 shows data for the period 2000–2022. For each year, it displays the number of research papers published in highly-regarded journals about “Full Information Rational Expectations” according to Google Scholar. The list of journals is given in the figure notes. The (black) solid bars in the figure show a clear pattern. Up until the global financial crisis there were hardly any papers on the topic. During the last couple of years, the picture has changed fundamentally. A very similar pattern emerges if we consider instead the number of papers in the field of “Macroeconomics and Monetary Economics” (JEL code E) which feature the term “expectations” in their abstract. They are measured by the light-colored bars in the figure. Of course, ever since the rational expectations revolution, almost all papers in macroeconomics assume rational expectations. But to the extent that these papers take this assumption for granted—that is, it is an implicit rather than explicit assumption—the terms “expectations” or “Full Information Rational Expectations” are unlikely to feature in the abstract.

Given the increasing occurrence of these terms in the abstracts in the figure, it seems that there is indeed a strong uptick in macroeconomic research that is in one way or another concerned with the expectation formation process. What is different this time? It is perhaps no coincidence that the recent trend in research can be traced back chronologically to the global financial crisis. After all, as discussed in the introduction, economic crises tend to make the profession more open to new ideas, thus preparing the ground for an intellectual response. That said, it is clear that a new trend in research must also appear conceptually compelling, or else it would not be as persistent as it is. In the following, we summarize recent and ongoing work in order to make exactly that case.

Alternative Models of Expectation Formation

The previous section has shown that the recent literature questioning the FIRE paradigm has gained momentum since the global financial crisis. This is particularly noteworthy because the earlier survey-based work of the 1970s and 1980s did little to change the rational expectations paradigm. We are not in a position to judge whether the recent survey-based evidence is more compelling. But the regressions above—documenting overreaction and underreaction to different types of news and at different levels of aggregation—guide recent modeling efforts which depart from rational expectations. Such efforts are essential because it “takes a model to beat a model,” as it is often said in economics; or because of the way in which scientists respond to crises according to Kuhn:

Though they may begin to lose faith and then to consider alternatives, they do not renounce the paradigm that has led them into crisis... : once it has achieved the status of paradigm, a scientific theory is declared invalid only if an alternative candidate is available to take its place.

(Kuhn 2012, 77)

Against this backdrop, we now briefly discuss current attempts to develop models which may account for the empirical evidence presented in the previous section. As discussed in “Rational Expectations and the Reaction to News,” the commonly made observation of an underreaction to news at the *aggregate* level can be reconciled with the theory of rational expectations. In fact, based on their empirical evidence regarding aggregate variables, Coibion and Gorodnichenko (2015) suggest a theoretical explanation featuring noisy and dispersed information, thereby shying away from discarding rational expectations. The effects of noisy and dispersed information, including the role of resulting higher-order expectations, are studied by a large literature (see, e.g., Morris and Shin 2003; Woodford 2003; Angeletos and Lian 2016). Kohlhas and Walther (2021) extend the dispersed-information-cum-rational-expectations setup by developing a model in which agents rationally allocate costly and hence limited attention mostly to those variables that are particularly important for them. As long as these variables are procyclical, agents become overly optimistic regarding output in booms, as found in the data. At the same time, the model inherits the underreaction of aggregate expectations.

Yet, the evidence of over- or underreaction at the level of *individual* forecasters discussed in “The Evidence” above is inconsistent with rational expectations. This insight guides research efforts to account for behavioral “biases,” i.e., deviations from rational expectations, in the individual expectation formation process. A relatively large group of models introduces various cognitive limitations that induce an underreaction to news. These limitations prevent individuals from grasping the whole effect of economic disturbances or from observing these disturbances fully in the first place. In models of level- k thinking, agents do not consider the entire chain of other agents’ reactions to innovations, as each individual believes that all the others are less sophisticated than themselves (e.g., Farhi and Werning 2019; García-Schmidt and Woodford 2019). As a result, their expectations underreact to current news.¹⁵ Angeletos and Sastry (2021) disentangle the precision of agents’ information and their beliefs about the information of others, which is linked in standard models of dispersed information. Specifically, agents counterfactually assume, akin to level- k thinking, that a fraction of the other agents is less informed than themselves. This again leads to an underreaction in individual expectations. Similarly, cognitive discounting introduces a form of myopia that causes an underestimation of the current and future reactions to innovations (Gabaix 2020). Carroll et al. (2020) put forward a model of sticky expectations—imperfect attention to aggregate shocks—to account for evidence of sluggish consumption dynamics. Likewise, Bouchaud et al. (2019) demonstrate that a version of sticky expectations, modeled as partial updating, can generate stock-return predictability. Given the focus on an underreaction to current information, however, these models don’t speak to the recently observed overreaction to news at an individual level.

Models that allow for such an overreaction typically introduce a cognitive distortion that lets agents overweight the likelihood of future states of nature that are covered in the news. That is, on receiving information about the development of a certain variable, agents overestimate the probability that this information is indeed correct, the relation of this development to other variables, or its translation into the future. Early proposals include Metzler (1941), who assumed an extrapolation from past observations that can lead to overreactions and thereby contribute to economic fluctuations. In the same spirit, Fuster et al. (2010, 2012) develop a model of “natural expectations” in which agents use only recent realizations of autocorrelated variables to construct forecasts. If future actual values depend on realizations that have occurred in the more remote past, agents tend to overreact

to recent realizations. Chahrour et al. (2021) introduce distortions in the expectation-formation process through firms' reliance on potentially unrepresentative media reporting. Shiller (2017) suggests that agents react (too) strongly to narratives. Azeredo da Silveira and Woodford (2019) develop a model of noisy information, arising from a memory constraint. Similar to models of rational inattention, this constraint limits the complexity of stored memory. The authors additionally impose an information constraint concerning the memory of past cognitive states. As a result, recent news is disproportionately weighted, leading to overreactions. Similarly, diagnostic expectations (Bordalo et al. 2019, 2020) let agents overreact to news as it increases their subjectively held probabilities of those states that became more likely in light of recent news, above the objective probabilities. Thus, receiving positive news leads to an over-revision of beliefs. This theory has its psychological foundations in the assumption that news makes certain states of the world more salient to individuals.¹⁶ More generally, Ba et al. (2023) show how bounded rationality can give rise to over- or underreaction depending on the complexity of the state space, the precision of signals, and employed priors. To square the findings of an overreaction to news at an individual level with aggregate underreactions, these models can be combined with the dispersed information structure discussed in "Rational Expectations and the Reaction to News." In fact, in light of their empirical evidence, authors such as Bordalo et al. (2020) favor a combination of non-rationality with noisy information. In this way, individual expectations overreact due to behavioral biases but agents' lack of knowledge about the correlation between information sets lets aggregate expectations underreact. However, it remains a challenge for the discussed models to explain the simultaneous presence of over- and underreactions at the individual level, as recently observed by a couple of authors (see "The Evidence" above).

A few papers take up this issue by providing a theoretical framework that is able to predict overreactions to news in some instances and an underreaction in others, both at the individual level. Angeletos et al. (2021) combine absolute overconfidence with dispersed information and over-extrapolation of agents to explain under- and overreactions at different points in time. That is, agents assume that movements in certain variables are more persistent than they actually are. With this combination, the authors are also able to replicate their empirical observation of initially underreacting and then overshooting average forecasts. Broer and Kohlhas (2024) show in a partial-equilibrium model with dispersed information that over-confidence in the precision of private information can lead to over- and underreactions of expectations depending on the type of news. Specifically, agents are overly confident in the precision of their private information (absolute overconfidence), such that, relative to a rational benchmark that considers the noise present in this information, they over-revise their expectations upon receiving news. At the same time, agents are overly confident in the precision of their information relative to that of other agents (relative overconfidence). They, therefore, attach too low a weight to public news that aggregates the expectations and actions of others and hence underreact to these signals. Alternatively, misperceptions about the structure of the economy may lead to under- and overreactions, again depending on the type of news. Developing a general-equilibrium model focusing on firm expectations regarding their own output, Born et al. (2022a) theoretically show that this "island illusion," as we term it, can account for the observed differential reaction of firms to micro news (private and relating to the individual firm) and macro news (public and about aggregate variables). In particular, firms underestimate the importance of aggregate variables for their own business. Taking the general-equilibrium effects of innovations

in supply and demand into account, firms then overreact to micro news and underreact to macro news when forecasting their own sales, as found in the data.

In sum, at the current juncture, a number of alternatives to FIRE are being put forward—not least in response to the growing number of surveys. We think that these alternatives appear promising. Yet, the profession still needs to settle on an alternative theory that can, on the one hand, account for the deviations from FIRE discussed above, and is, on the other hand, simple enough to be embedded in a comprehensive model of the macroeconomy. Only time will tell whether such a unifying theory can eventually be established. It seems also conceivable that rational expectations will be succeeded by a plurality of models, each tailored to a specific economic question.

Conclusion

Survey evidence testifies against the rational expectations hypothesis. In the 1970s and 1980s, however, the profession dismissed it as irrelevant in terms of judging the validity of the hypothesis. This time may be different. We document a recent trend in research about expectations in macroeconomics that takes survey data seriously, uses it to test model predictions, and informs new models of the expectation-formation process.

We put forward two potentially complementary factors for why this time the survey evidence may have a lasting impact on macroeconomics. First, as with earlier shifts in macroeconomics, the recent developments may be understood as an intellectual response to periods of crisis, specifically the global financial crisis. Second, there is a relatively rich seam of theoretical work which puts forward specific alternatives in relation to the expectation formation process. Parts of this work, in turn, build on a rich literature in behavioral economics that has flourished largely outside of macroeconomics during the last few decades.

In conclusion, we flag a caveat. At the time of writing it is too early to tell whether we are actually witnessing a second expectations revolution in macroeconomics. The intellectual appeal of the rational expectations hypothesis that has captivated generations of researchers is still strong. After all—and despite appearances to the contrary—it reflects a humble attitude on the part of economists: that they know the world no better than the other humans that populate it.

Notes

- 1 We thank Laetitia Lenel for comments. Luis Huxel provided excellent research assistance. Financial support by the German Science Foundation (DFG) under Priority Program 1859 is gratefully acknowledged. Part of this research was conducted while Zeno Enders was visiting the Banque de France, the hospitality of which is gratefully acknowledged. The usual disclaimer applies.
- 2 We use the terms news and information interchangeably in this context, both defined as previously unknown information that is relevant for the prediction of a specific variable, where this information does not have to be correct. This is important to note as, in similar contexts, news sometimes refers to the correct part of information.
- 3 Further, we assume that survey responses reflect actual expectations (possibly subject to measurement error) and are not deliberately biased because of, say, strategic considerations due to asymmetric payoff functions (see Gemmi and Valchev 2023 for a discussion of this case).
- 4 Note in this context that under certain conditions incomplete-information models and behavioral models featuring myopia (extra discounting of the future) or anchoring of current to past behavior (such as habit persistence) give equivalent predictions regarding the reaction of average expectations and equilibrium dynamics (see Angeletos and Huo 2021).

- 5 There is no easy explanation for an overreaction at the aggregate level that still features rational expectations. Empirical studies, however, typically find an under- instead of an overreaction at this level of aggregation, see “The Evidence.”
- 6 There is no easy explanation for an overreaction at the aggregate level that still features rational expectations. Empirical studies, however, typically find an under- instead of an overreaction at this level of aggregation, see “The Evidence.” Hence, predictable forecast errors at this level allow us to reject rational expectations. But this does not imply a rejection of rationality *per se*. Predictable forecast errors may also emerge because of forecasters’ asymmetric loss function, specific constraints on information processing, or in a learning environment with parameter uncertainty (e.g., Elliott et al. 2008; Kohlhas and Robertson 2022; Farmer et al. 2023).
- 7 For completeness, the remaining probabilities of this example are as follows: if growth is nil (50 percent probability), half of the population receives news of a 2 percent increase, the other half of a 2 percent decrease. The average forecast revision is therefore zero in this case. If growth is plus or minus 2 percent (25 percent probability for each case), all agents receive the correct news.
- 8 A parallel, and likewise influential, strand of the literature documents that personal experiences matter—in conflict with FIRE—for expectations (see, e.g., Malmendier and Nagel 2016; D’Acunto et al. 2021; Conrad et al. 2022).
- 9 The Livingston Survey was started already in 1946 by the columnist Joseph Livingston. It is now run semi-annually by the Federal Reserve Bank of Philadelphia and includes individual inflation forecasts from, e.g., academic institutions, commercial banks, and non-financial firms. Another survey that has been regularly used is the Blue Chip Survey based on professional forecasters at financial firms (see, e.g., Angeletos et al. 2020).
- 10 The Livingston Survey was started in 1946 by the columnist Joseph Livingston. It is now run semi-annually by the Federal Reserve Bank of Philadelphia and includes individual inflation forecasts from, e.g., academic institutions, commercial banks, and non-financial firms. Another survey that has been regularly used is the Blue Chip Survey based on professional forecasters at financial firms (see, e.g., Angeletos et al. 2020).
- 11 Cautioning against over-interpreting the results of Coibion and Gorodnichenko (2015)-type regressions, however, Bianchi et al. (2022) show by using machine-learning tools that forecast revisions are not reliable out-of-sample predictors of mean forecast errors in this type of setup.
- 12 Their analysis is mostly based on data from the ifo survey of German firms, which is a well-known and widely used survey that has been conducted since 1949 and whose design has since then been adopted by surveys around the world (Becker and Wohlrabe 2008; Born et al. 2022b).
- 13 The ifo business climate index is an aggregate indicator of the German business cycle compiled on the basis of the ifo survey. This index is widely watched and Bloomberg samples a consensus forecast prior to its release. Macro news is computed as the difference between the current release of the index and the consensus forecast, both available in real time.
- 14 See Born et al. (2022a) for further discussions. They also run a number of additional robustness tests which suggest that measurement error is unlikely to drive the overreaction to micro news.
- 15 Some versions of this framework also feature a possibility of overreacting, which is, however, mostly seen as a “bug.” See Angeletos and Lian (2022) for an overview.
- 16 L’Huillier et al. (2023) incorporate diagnostic expectations into a standard New Keynesian model, representing efforts to introduce new models of expectation formation into mainstream models of the business cycle.

References

- Andre, Peter, Carlo Pizzinelli, Christopher Roth, and Johannes Wohlfart. 2022. “Subjective Models of the Macroeconomy: Evidence from Experts and Representative Samples.” *Review of Economic Studies* 89, no. 6: 2958–2991.
- Angeletos, George-Marios, Fabrice Collard, and Harris Dellas. 2020. “Business-Cycle Anatomy.” *American Economic Review* 110, no. 10: 3030–3070.
- Angeletos, George-Marios, and Zhen Huo. 2021. “Myopia and Anchoring.” *American Economic Review* 111, no. 4: 1166–1200.
- Angeletos, George-Marios, Zhen Huo, and Karthik A. Sastry. 2021. “Imperfect Macroeconomic Expectations: Evidence and Theory.” *NBER Macroeconomics Annual* 2020 35: 1–86.

- Angeletos, George-Marios, and Chen Lian. 2016. "Incomplete Information in Macroeconomics: Accommodating Frictions in Coordination." In *Handbook of Macroeconomics*, edited by John B. Taylor, and Harald Uhlig, 1065–1120. Amsterdam: Elsevier.
- Angeletos, George-Marios, and Chen Lian. 2022. "Dampening General Equilibrium: Incomplete Information and Bounded Rationality." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 613–645. Amsterdam: Elsevier.
- Angeletos, George-Marios, and Karthik A. Sastry. 2021. "Managing Expectations: Instruments versus Targets." *Quarterly Journal of Economics* 136, no. 4: 2467–2532.
- Azeredo da Silveira, Rava, and Michael Woodford. 2019. "Noisy Memory and Over-Reaction to News." *AEA Papers and Proceedings* 109: 557–561.
- Ba, Cuimin, J. Aislinn Bohren, and Alex Imas. 2023. "Over- and Underreaction to Information." Unpublished manuscript, University of Chicago. SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4274617.
- Bachmann, Rüdiger, Giorgio Topa, and Wilbert van der Klaauw, eds. 2022. *Handbook of Economic Expectations*. Amsterdam: Elsevier.
- Becker, Sasha O., and Klaus Wohlrabe. 2008. "Micro Data at the ifo Institute for Economic Research—The 'ifo Business Survey.' Usage and Access." *Schmollers Jahrbuch-Zeitschrift für Wirtschafts- und Sozialwissenschaften* 182, no. 2: 307–319.
- Bianchi, Francesco, Sydney C. Ludvigson, and Sai Ma. 2022. "Belief Distortions and Macroeconomic Fluctuations." *American Economic Review* 112, no. 7: 2269–2315.
- Bondt, Werner F. M. De, and Mary M. Bange. 1992. "Inflation Forecast Errors and Time Variation in Term Premia." *Journal of Financial and Quantitative Analysis* 27, no. 4: 479–496.
- Bordalo, Pedro, Nicola Gennaioli, Rafael La Porta, and Andrei Shleifer. 2019. "Diagnostic Expectations and Stock Returns." *Journal of Finance* 74, no. 6, 2839–2874.
- Bordalo, Pedro, Nicola Gennaioli, Yueran Ma, and Andrei Shleifer. 2020. "Overreaction in Macroeconomic Expectations." *American Economic Review* 110, no. 9: 2748–2782.
- Born, Benjamin, Zeno Enders, Manuel Menkhoff, Gernot J. Müller, and Knut Niemann. 2022a. "Firm Expectations and News: Micro v Macro." CEPR Discussion Paper No. 17768. URL: <https://www.cesifo.org/en/publications/2022/working-paper/firm-expectations-and-news-micro-v-macro>.
- Born, Benjamin, Zeno Enders, Gernot J. Müller, and Knut Niemann. 2022b. "Firm Expectations about Production and Prices: Facts, Determinants, and Effects." In *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorgio Topa, and Wilbert van der Klaauw, 355–383. Amsterdam: Elsevier.
- Bouchaud, Jean-Philippe, Philipp Krüger, Augustin Landier, and David Thesmar. 2019. "Sticky Expectations and the Profitability Anomaly." *Journal of Finance* 74, no. 2: 639–674.
- Broer, Tobias, and Alexandre N. Kohlhas. 2024. "Forecaster (Mis-) Behavior." *The Review of Economics and Statistics* 1–18. DOI: 0.1162/rest_a_01210.
- Carroll, Christopher D., Edmund Crawley, Jiri Slacalek, Kiichi Tokunaka, and Matthew N. White. 2020. "Sticky Expectations and Consumption Dynamics." *American Economic Journal: Macroeconomics* 12, no. 3: 40–76.
- Chahrour, Ryan, Kristoffer Nimark, and Stefan Pitschner. 2021. "Sectoral Media Focus and Aggregate Fluctuations." *American Economic Review* 111, no. 12: 3872–3922.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2015. "Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts." *American Economic Review* 105, no. 8: 2644–2678.
- Conrad, Christian, Zeno Enders, and Alexander Glas. 2022. "The Role of Information and Experience for Households Inflation Expectations." *European Economic Review* 143, no. 104015.
- D'Acunto, Francesco, Ulrike Malmendier, Juan Ospina, and Michael Weber. 2021. "Exposure to Grocery Prices and Inflation Expectations." *Journal of Political Economy* 129, no. 5: 1615–1639.
- Ehrbeck, Tilman, and Robert Waldmann. 1996. "Why Are Professional Forecasters Biased? Agency Versus Behavioral Explanations." *Quarterly Journal of Economics* 111, no. 1: 21–40.
- Elliott, Graham, Ivana Komunjer, and Allan Timmermann. 2008. "Biases in Macroeconomic Forecasts: Irrationality or Asymmetric Loss?" *Journal of the European Economic Association* 6, no. 1: 122–157.
- Enders, Zeno, Franziska Hünnekes, and Gernot Müller. 2022. "Firm Expectations and Economic Activity." *Journal of the European Economic Association* 20, no. 6: 2396–2439.

- Evans, George W., and Seppo Honkapohja. 2005. "An Interview with Thomas J. Sargent." *Macroeconomic Dynamics* 9, no. 4: 561–583.
- Farhi, Emmanuel, and Iván Werning. 2019. "Monetary Policy, Bounded Rationality, and Incomplete Markets." *American Economic Review* 109, no. 11: 887–892.
- Farmer, Leland, Emi Nakamura, and Jon Steinsson. Forthcoming. "Learning about the Long Run." *Journal of Political Economy*. DOI: 10.1086/730207.
- Fuhrer, Jeffrey C. 2018. "Intrinsic Expectations Persistence: Evidence from Professional and Household Survey Expectations." Federal Reserve Bank of Boston Working Paper, no. 18–9. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3296152.
- Fuster, Andreas, Benjamin Hebert, and David Laibson. 2012. "Natural Expectations, Macroeconomic Dynamics, and Asset Pricing." *NBER Macroeconomics Annual* 26: 1–48.
- Fuster, Andreas, David Laibson, and Brock Mendel. 2010. "Natural Expectations and Macroeconomic Fluctuations." *Journal of Economic Perspectives* 24, no. 4: 67–84.
- Fuster, Andreas, Ricardo Perez-Truglia, Mirko Wiederholt, and Basit Zafar. 2022. "Expectations with Endogenous Information Acquisition: An Experimental Investigation." *Review of Economics and Statistics* 104, no. 5: 1059–1078.
- Gabaix, Xavier. 2020. "A Behavioral New Keynesian Model." *American Economic Review* 110, no. 8: 2271–2327.
- García-Schmidt, Mariana, and Michael Woodford. 2019. "Are Low Interest Rates Deflationary? A Paradox of Perfect-Foresight Analysis." *American Economic Review* 109, no. 1: 86–120.
- Gemmi, Luca, and Rosen Valchev. 2023. "Biased Surveys." NBER Working Paper 31607. URL: <https://www.nber.org/papers/w31607>.
- Juodis, Artūras, and Simas Kučinskas. 2023. "Quantifying Noise in Survey Expectations." *Quantitative Economics* 14, no. 2: 609–650.
- Kohlhas, Alexandre, and Donald Robertson. 2022. "Cautious Expectations." Unpublished manuscript, Oxford University. URL: <https://perseus.iies.su.se/~akohl/index.php>.
- Kohlhas, Alexandre, and Ansgar Walther. 2021. "Asymmetric Attention." *American Economic Review* 111, no. 9: 2879–2925.
- Krugman, Paul. 2009. "How Did Economists Get It So Wrong?" *New York Times*, September 2, 2009. URL: <https://www.nytimes.com/2009/09/06/magazine/06Economic-t.html>.
- Kuhn, Thomas S. 2012. *The Structure of Scientific Revolutions*. 50th Anniversary Edition. Chicago, IL: University of Chicago Press.
- Lahiri, Kajal, and Xuguang Sheng. 2008. "Evolution of Forecast Disagreement in a Bayesian Learning Model." *Journal of Econometrics* 144, no. 2: 325–340.
- L'Huillier, Jean-Paul, Sanjay R. Singh, and Donghoon Yoo. Forthcoming. "Incorporating Diagnostic Expectations into the New Keynesian Framework." *Review of Economic Studies*. DOI: 10.1093/restud/rdad101.
- Lorenzoni, Guido. 2009. "A Theory of Demand Shocks." *American Economic Review* 99, no. 5: 2050–2084.
- Lovell, Michael C. 1986. "Tests of the Rational Expectations Hypothesis." *American Economic Review* 76, no. 1: 110–124.
- Lucas, Robert E. 1972. "Expectations and the Neutrality of Money." *Journal of Economic Theory* 4, no. 2: 103–124.
- Lucas, Robert E. 1973. "Some International Evidence on Output-Inflation Tradeoffs." *American Economic Review* 63, no. 3: 326–334.
- Lucas, Robert E. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 1: 19–46.
- Lucas, Robert E. 2003. "Macroeconomic Priorities." *American Economic Review* 93, no. 1: 1–14.
- Mackowiak, Bartosz, and Mirko Wiederholt. 2009. "Optimal Sticky Prices under Rational Inattention." *American Economic Review* 99, no. 3: 769–803.
- Malmendier, Ulrike, and Stefan Nagel. 2016. "Learning from Inflation Experiences." *Quarterly Journal of Economics* 131, no. 1: 53–87.
- Metzler, Lloyd A. 1941. "The Nature and Stability of Inventory Cycles." *Review of Economics and Statistics* 23, no. 3: 113–129.
- Mishkin, Frederic S. 1995. "The Rational Expectations Revolution: A Review Article of: Preston J. Miller, ed.: *The Rational Expectations Revolution, Readings from the Front Line*." NBER Working Paper no. 5043. URL: <https://www.nber.org/papers/w5043>.

- Morris, Stephen, and Hyun Song Shin. 2003. "Global Games: Theory and Applications." In *Advances in Economics and Econometrics: Theory and Applications, Eighth World Congress*, edited by Mathias Dewatripont, Lars Peter Hansen, and Stephen J. Turnovsky, 56–114. Econometric Society Monographs. Cambridge: Cambridge University Press.
- Mullineaux, Donald J. 1978. "On Testing for Rationality: Another Look at the Livingston Price Expectations Data." *Journal of Political Economy* 86, no. 2, part 1: 329–336.
- Muth, John F. 1960. "Optimal Properties of Exponentially Weighted Forecasts." *Journal of the American Statistical Association* 55, no. 290: 299–306.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica* 29, no. 3: 315–335.
- Nordhaus, William D. 1987. "Forecasting Efficiency: Concepts and Applications." *Review of Economics and Statistics* 69, no. 4: 667–674.
- Pesando, James. 1975. "A Note on the Rationality of the Livingston Price Expectations." *Journal of Political Economy* 83, no. 4: 849–858.
- Prescott, Edward C. 1977. "Should Control Theory be used for Economic Stabilization?" *Carnegie-Rochester Conference Series on Public Policy* 7: 13–38.
- Samuelson, Paul A. 1938. "A Note on the Pure Theory of Consumer's Behaviour." *Economica* 5, no. 17: 61–71.
- Sargent, Thomas. 2008. "Rational Expectations." In *The New Palgrave Dictionary of Economics*, edited by Steven N. Durlauf, and Lawrence E. Blume, 1–7. 2nd ed. London: Palgrave Macmillan. DOI: 10.1057/978-1-349-95121-5_1684-2.
- Sheffrin, Steven M. 1996. *Rational Expectations*. 2nd ed. Cambridge Surveys of Economic Literature. Cambridge: Cambridge University Press.
- Shiller, Robert J. 2017. "Narrative Economics." *American Economic Review* 107, no. 4: 967–1004.
- Shintani, Mototsugu, and Kozo Ueda. 2023. "Identifying the Source of Information Rigidities in the Expectations Formation Process." *Journal of Economic Dynamics and Control* 150, no. 104653. DOI: 10.1016/j.jedc.2023.104653.
- Sims, Christopher A. 2003. "Implications of Rational Inattention." *Journal of Monetary Economics* 50, no. 3: 665–690.
- Stiglitz, Joseph E. 2011. "Rethinking Macroeconomics: What Failed, and How to Repair It." *Journal of the European Economic Association* 9, no. 4: 591–645.
- Swidler, Steve, and David Ketcher. 1990. "Economic Forecasts, Rationality, and the Processing of New Information over Time." *Journal of Money, Credit and Banking* 22, no. 1: 65–76.
- Taylor, John. 2001. "How the Rational Expectations Revolution Has Changed Macroeconomic Policy Research." In *Advances in Macroeconomic Theory: International Economic Association*, edited by Jacques Drèze, 79–96. London: Palgrave Macmillan.
- Weber, Michael, Francesco D'Acunto, Yuriy Gorodnichenko, and Olivier Coibion. 2022. "The Subjective Inflation Expectations of Households and Firms: Measurement, Determinants, and Implications." *Journal of Economic Perspectives* 36, no. 3: 157–184.
- Woodford, Michael. 2003. *Interest and Prices: Foundations of a Theory of Monetary Policy*. Princeton: Princeton University Press.

11

ECONOMIC EXPECTATIONS AND AN AI AGENT

Ekaterina Svetlova

At the heart of every economic theory is the question about how economic agents form expectations, what forms those expectations take, and how they change. As the volume at hand demonstrates, many concepts have been developed to answer this question (see also Svetlova 2022a for an overview). However, most of them have been considered insufficient because they picture an economic agent as either too naïve or too smart. For instance, the prevailing rational expectations hypothesis (REH) presupposes that smart economic agents—while operating in a data-rich, high-dimensional, non-linear, and uncertain environment—have already learnt the relevant forecasting model; by doing so, the REH casts the learning problem aside. At the same time, the adaptive expectations approach works with a naïve agent who does not have any understanding of the functioning of the economy. Furthermore, most existing concepts of belief formation respond to the high-dimensionality of economic forecasting problems with over-simplification. For example, in the field of asset pricing, the large (and growing) number of factors influencing the future cash flows and thus stock prices of companies are reduced to only three or four (Nagel 2021, 3).

One important way of searching for the middle ground between too smart and too naïve expectation concepts is to introduce an AI agent which applies advanced techniques such as machine learning (ML) to form beliefs. The ML methods are an attractive alternative for modelling economic beliefs in complex and data-rich settings “without artificially forcing the learning problem to be low-dimensional” (Nagel 2021, 94).

It is important to emphasize that the ML approaches can be used in two ways. First, as instruments of empirical research, they could help to identify and work with a large number of relevant predictors, analyze their joint effects on variables about which the beliefs (in the sense of expectations) are formed, etc. Second, economic agents themselves can be modelled as *machine learners* in complex environments; in this case, AI approaches are used to *enrich economic theory* by offering new—and richer—ways of modelling beliefs. The chapter at hand focusses on the second set of applications, discussing how AI agents can be meaningfully introduced into theoretical models of economic expectations. Note that this discussion is not about “real people” who use ML algorithms but about innovative ways to theoretically represent belief formation processes. For example, an economic forecaster that is

modelled as a perfect econometrician in the case of the REH can be replaced by a machine learner in new approaches.

To develop this discussion, the chapter, firstly, situates the AI-based expectation concepts within the long-standing debate about expectation formation in economics. It presents how those concepts explore the middle ground between naïve and rational expectations and offer a new approach to boundedly rational expectations. Their advantages and disadvantages with respect to existing expectation concepts are discussed. Second, two ways to formalize AI-based expectations are presented in detail, one based on Deep Reinforcement Learning and the other on Recurrent Neural Networks. Finally, the theoretical and practical implications of AI-based expectation concepts are deliberated. Which form do the expectations of AI agents take? How do AI agents process information? What kind of information do they use? Do we arrive at a new understanding of bounded rationality? What are the implications for policymakers? In a nutshell, the chapter discusses whether artificial intelligence co-determines and profoundly changes the theoretical understanding of expectation formation in modern economics.

Between Naïve and Smart Expectations: The Search for the Middle Ground

The emergence of an AI agent is a logical continuation of preceding efforts to model expectations in economics. Thus, in order to better understand this emerging concept, we have to discuss it in relation to the strengths and weaknesses of its predecessors. Such a juxtaposition will help to figure out which issues in the literature on expectations are addressed and resolved through the introduction of an AI agent.

Generally, economics assumes that agents form expectations while they observe an *information set* (e.g. news, central banks' and companies' announcements, past and current economic data, etc.) and *process those signals* to arrive at expectations about particular variables such as inflation, interest rates, asset prices etc. They can also compare their expectations to the actual realization of the variables, identify errors, and learn from this experience. This learning would lead to *updates of agents' beliefs*. The existing concepts of expectation formation differ according to how they conceptualize the rules governing the information set, information processing, and learning.

As preceding chapters in this volume demonstrate, the search for an adequate approach to economic expectations has oscillated between two poles: naïve expectations and fully rational expectations. The concept of an AI agent tunes into the exploration of the approaches in between.

Naïve expectations approaches are based on very simple information processing rules. The most prominent example is the *adaptive expectations approach* (Fisher 1930; Cagan 1956; Nerlove 1958). This assumes that expectations are revised up or down in accordance with the last forecasting error, calculated as the difference between the actual realization of the variable and its expected value. Thus, adaptive expectations imply a *simple learning procedure* but are at the same time backward-looking, blindly self-feeding, and do not incorporate the fact that economic agents have (at least some) understanding of the underlying causal mechanisms of the economy.

The critique of naïve concepts was the point of departure for the Rational Expectation Hypothesis (REH) (Muth 1961; Lucas 1972; see also Duarte, Chapter 2 in this volume). The REH radically opposes naïve expectations by assigning to the agents the complete causal description of the economic world. Within the REH framework, rational individuals

know the true theoretical (econometric) model of the economy, its parameters (factors that influence future values of relevant economic variables), and the nature of the stochastic processes that generate those variables. Agents' expectations of, say, inflation, are equal to the prediction of inflation generated by an economic model in the previous period. The REH agents rely on one fully predetermined model to form their forecasts. This model is assumed to be generated by the learning process that has already been *completed* (Shaw 1987, 189); thus, learning—and the expectation formation *process* as such—are not an issue in the REH world. Importantly, expectations are assumed to be common knowledge and correct on average. The “communism of models” (Evans and Honkapohja 2005, 567) and homogeneity of beliefs are the result.

The REH concept has been extensively criticized. The major objections relate to (i) the REH difficulties in accounting for heterogeneity of beliefs (see Conrad and Lahiri, Chapter 6 in this volume), (ii) the REH assumption of agents who are unrealistically smart, i.e. possess the full information set and are able to form model-conform beliefs, (iii) the REH-inappropriateness for a situation of radical uncertainty, innovation, and surprising change (due to the agents' perfect knowledge) and finally (iv) the REH's failure to explicitly acknowledge the fact that agents' expectations and actions have an impact on their environment, on each other, and on future expectations and actions (e.g. Akerlof and Shiller 2009; Colander 2013; Frydman and Goldberg 2013; Beckert 2016; King and Kay 2020; see Duarte, Chapter 2 in this volume for details).

The majority of concepts within economic science that challenge the REH refer to the idea of “bounded rationality” (Simon 1955). They assume various frictions and imperfections related to the agents' cognitive ability either to access the full information set or process the observed data efficiently and quickly. The concept of an AI agent fits in with this research while offering additional advantages in comparison to the existing approaches. The most important advantage is that working with AI concepts allows us to make less restrictive assumptions about agents' cognitive abilities and understandings of the external environment.

In particular, similar to concepts of *rational inattention* (Mankiw and Reis 2002; Sims 2003; Matějka et al. 2017; Ellison and Macaulay 2019) and *sticky expectations* (Hong and Stein 1999; Mankiw and Reis 2002; Coibion and Gorodnichenko 2012, 2015; Bouchaud et al. 2019; Carroll et al. 2020; Coibion et al. 2020), AI agents also face information rigidities. However, the AI agent-based concepts go further: they do not make explicit assumptions about the nature of information (e.g., sticky or not), about limited attention etc. Rather, the concepts assume that AI agents do not even know what information is needed to inform their decisions. While concepts of restricted perception and rational inattention still focus on getting the underlying model right, the AI agent's objective is learning that enables decision-making, without specifying a model and the related information and signal structure.

Furthermore, the AI-based concepts demonstrate affinity with the other strand of research on expectation formation by a boundedly rational agent, namely *adaptive learning approaches* (Evans and Honkapohja 2001; Eusepi and Preston 2018, for a recent review). These approaches presuppose decision-makers who use past observations to update beliefs in light of incoming news and the behavior of others. They operate *without knowing the true model* of the economy; that is to say, they do not possess rational expectations at the outset, but rather learn to form them based on particular forecasting rules such as standard econometric techniques (e.g., the least-square regression) or Bayesian updating. They

estimate the unknown parameters of their initially misspecified model as econometricians would do. Note that the adaptive learning approach might require quite strong assumptions regarding the model used by an agent to form expectations (e.g., linearity) and thus still presupposes extraordinary a priori knowledge. The AI-based concepts allow us to flex these assumptions and equip an agent with the model that “is flexible enough to represent various kinds of possible relationships between the relevant variables” (Heinemann 2000, 1009).

Thus, AI agents can replace perfect econometricians in the economic theory of beliefs updating. The former are modelled to learn in complex environments in accordance with non-parametric and non-linear machine-learning rules. The innovative AI concepts relax restrictive assumptions about the relationship between the signals agents receive and their expectations and do not assume learning structures in advance. As a result, the AI-based adaptive, forward-looking, and (at times) model-free learning approaches generate a richer set of results while making it possible to model agents’ heterogeneity, expectation changes, and attention shifts. In the next sub-section, I will use two examples from the current literature to illustrate these claims.

Advantages of the AI-Based Concepts of Expectations: Two Examples

Alternative learning models which originate in the field of computational intelligence have found application in modelling expectations for quite a while (Arifovic 1995; Evans and Honkapohja 2001; Marwala and Hurwitz 2017). These models employ various types of concepts from computational science, such as genetic and evolutionary algorithms, classifier systems, reinforcement learning, neural networks, and others. In what follows, I present two examples of how AI-based modelling can be applied in order to formalize expectation formation by boundedly rational agents. One adapts deep reinforcement learning (DRL) while the other uses recurrent neural networks (RNNs).

Expectations and Deep Reinforcement Learning

Some recent research (Charpentier et al. 2020; Hinterlang and Tänzer 2021; Shi 2022a, 2022b; Chen et al. 2023) has introduced a Deep Reinforcement Learning (DRL) agent into macroeconomic modelling as a way of conceptualizing bounded rationality. DRL—a combination of the Reinforcement Learning (RL) approach and deep Artificial Neural Networks (ANN) (Mnih et al. 2013)—makes it possible to model agents’ forward-looking behavior based on the revision of past expectations. In this sense, it is a subcategory of an adaptive learning approach. However, DRL agents have no a priori knowledge about the structure of the economy and related fundamentals; they do not aim to form model-conform beliefs (as in the REH) or infer the actual values of economic parameters (as in least-square adaptive learning approaches). Rather, they learn flexibly from interactions with the unknown and complex environment by choosing actions, adjusting their beliefs, and observing and maximizing rewards (or minimizing punishments). That is, they learn from repeated experience. Importantly, agents’ expectations and actions influence not only rewards but also future states of their environment. In other words, agents take the rewards and punishments they have received into consideration about the future while moving from one state to the next.

Shi (2022a, 2022b) models this process with a DRL algorithm that employs two ANNs. The agents learn according to the so called actor-critic reinforcement learning, i.e. they

simultaneously (i) learn how to make decisions (the *policy function*) and (ii) evaluate and improve decisions (the *value function*). Two ANNs are used to approximate the agents' policy and value functions. One is an *actor network* that describes how agents choose their actions given a particular state of the world; the other is a *critic network* that represents agents' beliefs about rewards given the chosen action (see also Haarnoja et al. 2018):

The goal of RL agents is to continuously update their subjective beliefs about the world based on experience, and to form a decision-making strategy (approximated by the actor network) that produces the highest discounted future returns (approximated by the critic network). The actor network is updated with the goal of maximising the corresponding critic network. In other words, the actor network is updated based on what the agent believes, at that time, to be a strategy that produces high “expected” returns.

(Shi 2022b, 9)

This formalization allows us to observe agents' behavior in response to an *unforeseen change* in the environment, for example, an inflation target change. It has been shown that agents who have been more active in exploring their environment notice the policy regime change earlier and adjust quicker. The same applies to AI agents who have experienced a severe structural change during their lifetime; because beliefs updating is done by drawing samples from the memory (i.e., is based on lifetime experience), the agent who has never experienced a regime shift adjusts more slowly. In other words, the DRL framework analyzes agents' expectations of and reactions to policy changes; those reactions depend on whether and how much the agents have learned about similar changes in the past.

Thus, the expectation formation model based on a DRL agent can address some characteristic deficiencies of the REH and traditional adaptive learning approaches. The DRL-based concept models an agent who starts without any knowledge about his or her environment (thus, is not too smart), faces unexpected policy changes (the model takes uncertainty into account), and influences future states of the world with his or her expectations and actions (the model is dynamic). Furthermore, the model allows for *heterogeneity of expectations*; this heterogeneity stems from agents' lifetime experiences and the intensity levels of interactions with the environment. However, note that the discussed model is not a heterogeneous agent model already; it is specified as a general equilibrium model with a *representative* AI agent and offers room for future studies that explore agents with heterogeneous expectations within the same economic environment.

Finally, Chen et al. (2023, 24) highlight another, rather technical advantage of the proposed DRL framework over previous learning approaches in macroeconomics. They observe that, at any stage of learning, agents are “more or less rational” and suggest that this “more or less” can be quantified and “brought to the data” by means of the DRL approach. In other words, the model introduces the *quantifiable* levels of agents' rationality. The choice of the desired, or right level, is an empirical question.

Expectations and Recurrent Neural Networks

Another example of applying ANNs to formalize beliefs of economic agents has been provided by Hou (2020, 2021). He applied Recurrent Neural Networks (RNNs) to estimate a generalized model of expectation formation. RNNs make it possible to generate outputs

based on sequential input data patterns (when one data point depends on the previous data point). RNNs store the information about previous states (“memory”) and use feedback loops to generate the next element of the sequence (see Salem (2022) for an overview). In Hou’s (2020, 2021) framework, agents (for example, households) observe a constant flow of *public signals* (e.g., official statistics such as CPI inflation or professional forecasts on CPI inflation) and *private signals* (e.g., price changes to particular products in local supermarkets or news stories about inflation published in local newspapers) to form their subjective expectations about inflation. Importantly, there is also a set of *unobserved* individual-level information that is not captured by public and private signals; thus, the agents’ information set is incomplete and agents are selective about the information sources they use.

Note that no a priori parametric (restrictive) assumptions about the relationship between macroeconomic signals and expectational variables are made in this framework, allowing for more flexibility in comparison to the REH and standard learning models. The advantage of RNN is that it can capture the relationships which are missed by models that are linear or rely on a pre-assumed structure (Hou 2020, 2). Also, the set of used signals is richer than in the preceding approaches. Furthermore, the RNN framework can account for cross-correlation of different macroeconomic variables about which expectations are formed as well as for the fact that the agents form their expectations on variables jointly rather than independently (in contrast to the REH).

The proposed framework allows us to estimate the impact of information on expectations changes *over time* and whether macroeconomic signals can asymmetrically affect households’ expectations. Hou shows that agents’ expectations respond to signals in an asymmetrical and non-linear manner and vary depending on the state of the economy. Households behave as “adaptive learners” (pay attention to past signals) when economic conditions are stable, and become more “forward-looking” (weight signals about the future more heavily) when the situation worsens. Furthermore, Hou demonstrates that the *content* of signals related to economic conditions, rather than the *amount* of news coverage, plays a crucial role in triggering the attention shift. The flexibility of the RNN framework provides a means of integrating these stylized facts about agents’ beliefs into the models.

Implications for the Economic Theory of Expectations

Now, after discussing advantages which the concept of an AI agent offers in comparison to the REH and traditional adaptive learning approaches, it is crucial to flesh out the implications of this approach for the theory of economic expectations. This has not been done sufficiently so far (Marwala and Hurwitz 2017; Camerer 2019; Wagner 2020). Following the axis *information set* → *information processing* → *expectations*, let us ask: If we use AI agents to model beliefs, what can we say about completeness of their information sources? About the (im) perfection of their data processing? What type of expectations do AI agents form? Rona-Tas (2020) questions whether algorithmic predictions—which can be conceived merely as pattern recognitions and not predictions of change—can qualify as expectations at all. Is *expectation* a valid category in the case of an algorithmic agent?

Information Set

The expectations of an AI agent are based on *data* (not on a model, a theory, or an explanation). This is a crucial aspect which the AI-based theory of expectations should take

into account. The type of data, their origin and preparation, their cost and quality become central and require a radical re-thinking of economic expectations. Let us discuss some aspects.

We discussed that an AI agent was introduced as a version of a boundedly rational agent. One of the central aspects of the bounded rationality concept is the assumption that agents possess an incomplete information set (due to humans' cognitive restrictions, costs of information procurement etc.). As we could see in the examples above, this applies to an AI agent as well. At the same time, one strength of an AI agent is that it is designed to process *far more data* (than could be done by any human) and utilize information from *various sources* (textual, visual etc.) more fully. Thus, an AI agent is able to form expectations in a high-dimensional environment. Furthermore, the incompleteness of an information set might become less of an issue, as AI can fill in the information gaps using techniques for estimating missing data (Marwala and Hurwitz 2017). Thus, according to Marwala and Hurwitz (2017), AI extends the limits of bounded rationality and necessitates the concept of *flexibly-bounded rationality*: technology pushes human cognition beyond its behavioral limits toward more rationality (and rational expectations).

At the same time, the issue of the *costs of information procurement* becomes crucial (but has not been properly addressed in the existing AI-based concepts of expectations). Are data becoming cheaper (due to their better accessibility on the web, on social media etc.) or more expensive (due to costs of data cleaning, preparation etc.)? The answer to this question would contribute to the debate whether the rationality of an AI agent is more or less bounded.

Furthermore, the ability to deal with an incomplete information set makes an AI agent more realistic in comparison to the REH and remedies an important disadvantage of the latter: the AI approach to expectations incorporates *uncertainties* about the true state of the system. For example, in the field of reinforcement learning, the application of the so-called partially observable Markov decision process (POMDP) allows algorithms to search for optimal decisions in environments which are not fully observable to them (although—to my knowledge—this approach has not been applied to formalize economic expectations so far).

Finally, note that AI-based concepts of expectations once more highlight the difference between *states of the world* and *observations*. This difference is not relevant for the REH, for example, which is concerned with model-based knowledge only. The introduction of an AI agent draws attention to the fact that expectations are conditioned on observations because agents do not have a direct access to the full set of states. Knowledge of the world is based not just on models but relates to how the world is observed. Limitations of the agent's ability to observe become crucial. Such limitations may differ among, for example, embodied AI agents that rely on their on-board sensors, and humans. These differences might become increasingly relevant for the economic theory of expectations: an economic AI agent and a human might observe (or consider relevant) different economic issues on which their expectations are then built.

Finally, concepts of an AI agent require that we pay attention to the fact that data are not passively given but dependent on the actors. In other words, data are *incomplete* not just due to their limited observability and accessibility but also because they are generated in the process of agents' interactions with the environment (as we could see in the RL example above). Different trajectories of interactions lead to different experiences, which in turn leads to different expectations and future actions.

Information Processing

The increasing importance of data implies the diminishing relevance of information processing in case of AI-based expectations. Expectations emerge from the data (as they are based solely on the latter in this case) and are not necessarily based on a model, a theory, or a causal explanation of the economy. In other words, expectations become possible without understanding the economic process.

For economists, it means that they are working with “black boxes.” They see what AI agents expect and which decisions they make but do not know how and why exactly they do so. Expectations might become a non-linear and non-parametric function, which is a black box without any obvious economic interpretation (Joseph 2019). As Hou’s (2020) paper discussed above, for example, shows, the RNN-based approach produces some interesting, stylized facts about households’ expectations, without explaining how they come about; neural networks function rather as opaque placeholders for the belief formation process. The limited understanding of how exactly economic decision-makers form their beliefs has been a point of critique of all existing expectation theories in economics; this critique seems to be even more relevant in the case of AI.

At the same time, as discussed above, the restricted transparency of information processing in case of AI agents has a positive side. It makes it possible to avoid restrictive assumptions and renders expectations modeling more flexible (in comparison to earlier approaches). However, the limited attention paid to the procedure of expectation formation is of a different origin here. Whereas belief formation is not of concern in case of the REH because such belief formation is already somehow perfect and fully transparent, for AI-based concepts this process is irrelevant (using data trumps explanations).

Notably, there have been efforts to develop “explainable AI” (known as XAI) (Escalante et al. 2018; Samek et al. 2019). XAI is supposed to be intelligible to its users so that the latter understand how the applied algorithms work and *why* they work in this way. Against the backdrop of the discussion above, the ongoing work on XAI might become crucial for the economic theory of expectations, although—to my knowledge—this importance has not been recognized or discussed so far.

Finally, there is a wide variety of algorithms that might be applied to model belief formation in economics. Some of them are more easily interpretable than others, some are model-based and some are not. What is important for AI-based modelling of expectations is to recognize and analyze the relevance and implications of these differences.

What Is an Expectation (in the AI World)?

Now, let us briefly discuss what exactly comes out after information has been gathered and processed by AI agents. In other words, what is an AI expectation? The research on AI-based expectations cited above has not engaged with this important question so far.

Typically, AI algorithms form *predictions*. Predictions are point estimates or probability estimates for a range of future values of economic variables based on a given set of data. To some extent, this understanding of expectations is traditional for economic theory and is shared by naïve beliefs concepts, the REH, adaptive learning—and AI agents.

It has been observed, however, that an AI prediction (and this applies to all other data-driven types of expectation) “is not ‘prediction’ in the strict sense of the word. We are not forecasting something yet to happen. We are looking for patterns in the (near) past”

(Rona-Tas 2020, 896). AI algorithms are usually trained on a historical data set and then applied to the other, off-sample, set. Note that the off-sample set also contains historical data; the only difference to the training set is that an algorithm has not seen them before. But still, the off-set data do not have anything to do with the future. Based on the patterns discovered in the historical data, an AI algorithm would predict an outcome for the other set of data, basically assuming that the patterns will continue: “We predict past variation not change” (Rona-Tas 2020, 896). Whereas perfectly rational agents (perfect econometricians) or adapted learning econometricians would engage with those variations based on a theoretical model, an AI agent can do it model-free. Importantly, AI-based approaches continue the tradition of dealing with expectations as data-centric predictions that are not based on any considerations about the future, i.e. do not take into account *what might happen* and *why*.

This specific nature of economic expectations (including AI agents) gave rise to the critiques in form of *fictional* (Beckert 2016) and *narrative* (Tuckett 2018; Johnson and Tuckett 2022; Chapter 5 in the volume at hand) expectations. These concepts depict expectations as imaginaries—often in form of narratives—of *how the future could unfold*; they are about taking into account events that have not yet happened (i.e., the events are nonexistent). In this case, economic agents confront a complex, high-dimensional reality with narrative, not econometric, tools.

The narrative fictions about the future “set out credible *causal relationships* between the known present and imagined futures” (Beckert and Bronk 2018, 10, my emphasis). They create a plausible, counterfactual world that is not a part of statistics- and algorithms-based expectations. Yet, narrative imaginaries are crucial for economic agents because they allow the latter to cope with radical uncertainties (Knight 1921). Counterfactual reasoning enables agents to imagine disruptive changes, shocks, innovations; in other words, it allows them to “expect surprises” (Shackle 1961) such as sudden swings in the economy or technological disruptions and react to them. At the same time, “[m]ost ML methods are not designed for settings undergoing such continuous structural change” (Nagel 2021, 123). This seems to be a serious disadvantage of the AI-based expectation concepts.

Similarly, Pearl (2018, 6) criticizes “data-centric intelligence” as struggling to recognize causes and effects and, thus, to develop alternative realities (which are based on causal reasoning). Algorithms cannot generate fictitious counterfactual scenarios of the future because such scenarios (as well as related causal explanations) are absent from the data: “data are, by definition, facts” (Pearl 2018, 33). AI algorithms make predictions based on passive observations and associations between variables. Consequentially, Pearl situates AI on the lowest step of his “ladder of causation”—beneath techniques that explore effects of interventions (what could happen if we take a particular measure) and counterfactuals (what could have been).

Hence, it seems that economic theories of expectations are currently facing a fork in the road: either to continue perfecting the data-centric methods (including AI) or to accept the importance of causal inference, counterfactuals, and narratives, for expectation formation. However, the newest developments in AI modelling might make this dilemma obsolete. For example, Gershman (2017) shows how the reinforcement learning (RL) approach (discussed above) can accommodate causality by combining the *model-free, purely experience-based learning* (as the repetition of actions that lead to reward) with *model-based RL* that involves building a causal model of the environment as a framework for predictions. Moreover, “both model-based and model-free RL rely upon inferences

about latent causes in partially observable domains” (2017, 14). Thus, causality plays a role in both modes of RL. Dasgupta et al. (2019) also demonstrate that an RL agent can perform causal reasoning in novel situations and even make counterfactual predictions. More generally, the reinforcement learning (RL) approach exhibits strong relation to causality modelling and exploration of intervention effects: “Reinforcement learning allows to infer consequences of interventions (or actions) used in the past” (Charpentier et al. 2020 5). It is about experimentation on the part of artificial agents who actively engage with the environment and draw conclusions about its structure in order to make informed decisions in a complex, uncertain world (see also Gasse et al. 2021 for more details on causal reinforcement learning). Thus, more generally, it cannot be said that AI excludes causal modelling per se.

Closely related to causality are counterfactual explanations that involve envisioning an alternate reality. As mentioned above, human economic actors’ ability to engage in this type of thinking suggests the superiority of fictional and narrative expectations over AI agents. However, this advantage might disappear because some recent AI techniques can be used to develop counterfactuals (Marwala and Hurwitz 2017). Counterfactual explanations are particularly crucial for explainable AI (Chou et al. 2021; Baron 2023) and might, as discussed above, enrich the theory of economic expectations through increasing transparency and understandability of AI agents.

Importantly, an RL-based agent does not need to form beliefs about economic variables: it rather forms expectations about future rewards and punishments (returns) which are parameters within the value function of neural networks. Thus, RL approaches are based on a general form of beliefs which circumvent the juxtaposition discussed in this section (probabilistic/statistic predictions versus fictional/narrative expectations).

Finally, we observe a quite fast development of *computational narrative intelligence* that aims to develop artificial intelligence and machine learning technologies which can create and understand stories. Despite some progress in the field (Li et al. 2013; Riedl 2016, 2017), there is still a long way to go until artificial intelligence becomes fully able to generate and comprehend fictions or provide natural language explanations. Still, we should not ignore the importance of these developments for the modelling of AI-based expectations.

More generally, if AI is used to conceptualize beliefs, such concepts should clarify their relation to causality and narrative expectations.

Conclusion

The chapter has provided an introduction to the contemporary concepts of AI-based economic expectations and discussed how they address major points of criticism raised with respect to the preceding expectation concepts (such as the REH, adaptive expectations, and adaptive learning). The provided overview pointed to some fields of future research and practical applications, which are summarized and elucidated below.

First of all, the *theoretical consequences* of the introduction of an AI agent into expectation formation hypotheses require further work. Can we still use the term “expectation” in the case of an algorithmic agent? Is temporality (the difference between past and future) still meaningful for algorithms? How do expectations relate to the past and the future? Are expectations about stating the future or anticipating and shaping it? The other issue is the *rationality of expectations* which has been addressed in this chapter several times. Will the REH become more valid when economists increasingly work with AI agents? As

discussed above, it might be the case because advanced technology might move closer to perfect information processing and discover the “right” model of the economy (even without searching for it). Also, the limited attention to the expectation formation process within the REH framework would start making sense due to the non-transparent nature of algorithms’ workings (i.e., AI agents might know or discover the right model, but we do not know how). Finally, advances in AI techniques which allow to develop *counterfactuals* and grasp *causality* might further push AI expectations toward the REH as an expectation regime under which agents are in possession of a causal model of an economy. Also, the “crossbreeding” of contemporary research on *explainable AI* with the economic theory of expectations might drive progress in modelling agents’ beliefs. This research would allow to understand the limitations of algorithmic opaqueness and thus demarcate what agents can know and observe and how they do it.

At the same time, if the REH remains an unattainable ideal, the concept of *flexibly-bounded rationality* might deserve some more detailed considerations. Finally, further research on *heterogeneity* of AI agents and its causes should be conducted.

Meanwhile, the prospects for the *practical* implications of modelling an AI agent should not be underestimated. An AI agent could become a flexible tool of choice for policymakers to solve macroeconomic models (e.g., general equilibrium models) in order to determine optimal monetary and fiscal policies or understand agents’ response to policy changes. So, Hinterlang and Tänzer (2022) show how central banks can use machine learning to revise their monetary policy while accounting for non-linearities in the data; they show that ML-based models clearly outperform linear models. Also, as discussed above, Shi (2022a) and Shi (2022b)—while using deep reinforcement learning—analyze agents’ behavior changes and adaptations when faced with policy changes and shocks in the economy (e.g., acceleration of money supply). Chen et al. (2023) use a DRL agent to solve dynamic stochastic general equilibrium models (e.g. the DSGE model) with interaction between fiscal and monetary policy. They demonstrate that

when both monetary and fiscal policy are active (or passive), the corresponding rational expectations equilibria are explosive (or indeterminate), and contrary to the Adaptively Learning Agent, [the] Artificially Intelligent Agent remains capable of learning these equilibria. [The] results also echo some early results in the literature comparing adaptive learning with artificial agents, e.g. learning via genetic algorithms (Arifovic 1995)

(Chen et al. 2023, 3)

This result is important because DSGE models are tools of choice for many policymakers around the world; thus, the modelling advancement is crucial for the efficiency improvement of fiscal and monetary policy and the successful management of expectations (successful, in this context, meaning they are managed in such a way as to keep the economic and financial system stable).

An AI agent could also become a useful instrument for practitioners to conduct controlled experiments to assess the impact and effectiveness of policy changes. For example, using an RL algorithm, one can model various scenarios involving fiscal policy changes and assess the resulting macroeconomic outcomes, without having data on the hypothetical macroeconomic scenarios (Dasgupta et al. 2019). With respect to heterogeneity of agents, an interesting question might be whether different types of AI agents (i.e. based on different

types of neural networks, supervised and unsupervised learning etc.) react in a different manner to central banks' signals or corporate announcements.

Finally, research on the technology-driven *interconnectedness* of economic expectations would be of utmost importance for theoretical economists as well as for policymakers. Expectations influence the process of their own formation and should be modelled as endogenous elements of this process (on this point see also Lenel and Reichmann, Chapter 16 in this volume). It is important to be able to simulate economies with many economic agents who can interact with each other. This could be done, for example, by means of agent-based models (ABMs) with AI agents. Castro et al. (2021), and Song (2021) have already approached the problem of joint learning in their multi-agent ABM studies with RL. ABMs in combination with machine learning could provide an artificial environment for policymakers to observe how agents behave, interact, learn, and react to policies. In particular, Castro et al. (2021) show how banks can use advanced ML to solve a highly complex problem of daily liquidity provision and highlight clear practical implication of their research program:

First, looking down the road to a time when [payment] system participants may be using these algorithms, knowledge of [policy] functions could help regulators achieve their mandates of ensuring safety and efficiency of these systems. For example, regulators could assess the liquidity and risk implications to the system should banks themselves attempt to use these machine learning algorithms for their liquidity management. Second, understanding equilibrium behavior of participants through these functions can be helpful to design new payments systems. This is particularly relevant given the worldwide trend to modernize core national payments systems.

(Castro et al. 2021, 3)

Certainly, more research will be conducted in this direction.

Moreover, as AI agents in multi-agent models are involved in complex interactions with each other, there is a need for a valid account that explains how algorithmic expectations retain independence and heterogeneity in some contexts and then gravitate in one direction in other contexts. Algorithmic herding might happen due to “locked-in” patterns in data or influential narratives spread among AI agents (interactive narratives). The other example of algorithmic interconnectedness could be a case of “algorithmic collusion,” the situation in which AI agents learn to engage in joint behavior, which could mutually benefit them but, at the same time, cause severe market swings and jeopardize other market participants. Research on such issues could further advance contemporary debates on expectations and their importance for economic crises, business cycles, and systemic risks (Svetlova 2022b).

References

- Akerlof, George A., and Robert J. Shiller. 2009. *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton, NJ: Princeton University Press.
- Arifovic, Jasmina. 1995. “Genetic Algorithms and Inflationary Economies.” *Journal of Monetary Economics* 36, no. 1: 219–243. DOI: 10.1016/0304-3932(95)01203-7.
- Baron, Sam. 2023. “Explainable AI and Causal Understanding: Counterfactual Approaches Considered.” *Minds and Machines* 33: 347–377. DOI: 10.1007/s11023-023-09637-x.
- Beckert, Jens. 2016. *Imagined Futures: Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.

- Beckert, Jens, and Richard Bronk. 2018. "An Introduction to Uncertain Futures." In *Uncertain Futures: Imaginaries, Narratives, and Calculation in the Economy*, edited by Jens Beckert, and Richard Bronk, 1–36. Oxford: Oxford University Press.
- Bouchaud, Jean-Philippe, Philipp Krueger, Augustin Landier, and David Thesmar. 2019. "Sticky Expectations and the Profitability Anomaly." *Journal of Finance* 74, no. 2: 639–674. DOI: 10.1111/jofi.12734.
- Cagan, Phillip. 1956. "The Monetary Dynamics of Hyper-Inflation." In *Studies in the Quantity Theory of Money*, edited by Milton Friedman, 25–117. Chicago, IL: Chicago University Press.
- Camerer, Colin. 2019. "Artificial Intelligence and Behavioral Economics." In *The Economics of Artificial Intelligence: An Agenda*, edited by Ajay Agrawal, Joshua Gans, and Avi Goldfarb, 587–607. National Bureau of Economic Research Conference Report. URL: <https://www.nber.org/books-and-chapters/economics-artificial-intelligence-agenda>.
- Carroll, Christopher D., Edmund Crowley, Jiri Slacalek, Kiichi Tokunaka, and Matthew N. White. 2020. "Sticky Expectations and Consumption Dynamics." *American Economic Journal: Macroeconomics* 12, no. 3: 40–76. DOI: 10.1257/mac.20180286.
- Castro, Pablo S., Ajit Desai, Han Du, Rodney J. Garratt, and Francisco Rivasdeneyra. 2021. "Estimating Policy Functions in Payments Systems Using Reinforcement Learning." Bank of Canada, Staff Working Paper 2021–7. URL: <https://www.bankofcanada.ca/2021/02/staff-working-paper-2021-7/>.
- Charpentier, Arthur, Romuald Élie, and Carl Remlinger. 2020. "Reinforcement Learning in Economics and Finance." ArXiv. March 22, 2020. DOI: 10.48550/arXiv.2003.10014.
- Chen, Mingli, Andreas Joseph, Michael Kumhof, Xinlei Pan, and Xuan Zhou. 2023. "Deep Reinforcement Learning in a Monetary Model." ArXiv. January 5, 2023. DOI: 10.48550/arXiv.2104.09368.
- Chou, Yu-Liang, Catarina Moreira, Peter Bruza, Chun Ouyang, and Joaquim Jorge. 2021. "Counterfactuals and Causability in Explainable Artificial Intelligence: Theory, Algorithms, and Applications." ArXiv. June 8, 2021. DOI: 10.48550/arXiv.2103.04244.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2012. "What Can Survey Forecasts Tell Us About Information Rigidities?" *Journal of Political Economy* 120, no. 1: 116–159. DOI: 10.1086/665662.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2015. "Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts." *American Economic Review* 105, no. 8: 2644–2678. DOI: 10.1257/aer.20110306.
- Coibion, Olivier, Yuriy Gorodnichenko, Saten Kumar, and Mathieu Pedemonte. 2020. "Inflation Expectations as a Policy Tool?" *Journal of International Economics* 124, (C): 1–24. DOI: 10.1016/j.jinteco.2020.103297.
- Colander, David. 2013. "The Systemic Failure of Economic Methodologists." *Journal of Economic Methodology* 20, no. 1: 56–68. DOI: 10.1080/1350178X.2013.774848.
- Dasgupta, Ishita, Jane Wang, Silvia Chiappa, Jovana Mitrovic, Pedro Ortega, David Raposo, Edward Hughes, Peter Battaglia, Matthew Botvinick, and Zeb Kurth-Nelson. 2019. "Causal Reasoning from Meta-reinforcement Learning." ArXiv. January 23, 2019. DOI: 10.48550/arXiv.1901.08162.
- Ellison, Martin, and Alistair Macaulay. 2019. "A Rational Inattention Unemployment Trap: Formation of Expectations and Heterogeneity of Expectations." CEPR Discussion Paper No.13761. CEPR Press, Paris and London. <https://cepr.org/publications/dp13761>.
- Escalante, Héctor J., Sergio Escalera, Isabelle Guyon, Xavier Baró, Yağmur Güçlütürk, Umut Güçlü, and Marcel van Gerven, ed. 2018. *Explainable and Interpretable Models in Computer Vision and Machine Learning*. Cham: Springer.
- Eusepi, Stefano, and Bruce Preston. 2018. "The Science of Monetary Policy: An Imperfect Knowledge Perspective." *Journal of Economic Literature* 56, no. 1: 3–59. DOI: 10.1257/jel.20160889.
- Evans, George Willams, and Seppo Honkapohja. 2001. *Learning and Expectations in Macroeconomics*. Princeton: Princeton University Press.
- Evans George Willams, and Seppo Honkapohja. 2005. "An Interview with Thomas Sargent." *Macroeconomic Dynamics* 9, no. 4: 561–583. DOI: 10.1017/S1365100505050042.
- Fisher, Irving. 1930. *Theory of Interest*. New York: Macmillan.
- Frydman, Roman, and Michael D. Goldberg. 2013. "Change and Expectations in Macroeconomic Models: Recognizing the Limits to Knowability." *Journal of Economic Methodology* 20, no. 2: 118–138. DOI: 10.1080/1350178X.2013.804677.

- Gasse, Maxime, Damien Grasset, Guillaume Gaudron, and Pierre-Yves Oudeyer. 2021. "Causal Reinforcement Learning Using Observational and Interventional Data." *ArXiv*. June 28, 2021. DOI: 10.48550/arXiv.2106.14421.
- Gershman, Samuel J. 2017. "Reinforcement Learning and Causal Models." In *The Oxford Handbook of Causal Reasoning*, edited by Michael R. Waldmann, 295–306. Oxford: Oxford University Press.
- Haarnoja, Tuomas, Aurick Zhou, Pieter Abbeel, and Sergey Levine. 2018. "Soft Actor-Critic: Off-Policy Maximum Entropy Deep Reinforcement Learning with a Stochastic Actor." *Proceedings of the 35th International Conference on Machine Learning (ICML 2018)*, PMLR 80: 1861–1870.
- Heinemann, Maik. 2000. "Adaptive Learning of Rational Expectations Using Neural Networks." *Journal of Economic Dynamics & Control* 24, nos. 5–7: 1007–1026. DOI: 10.1016/S0165-1889(99)00034-2.
- Hinterlang, Natascha, and Alina Tänzer. 2021. "Optimal Monetary Policy Using Reinforcement Learning." Deutsche Bank Discussion Paper 51/2021. URL: <https://www.bundesbank.de/resource/blob/882216/2472b530db61820e3912cda558726023/mL/2021-12-22-dkp-51-data.pdf>.
- Hong, Harrison, and Jeremy C. Stein. 1999. "A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets." *The Journal of Finance* 54, no. 6: 2143–2184. DOI: 10.1111/0022-1082.00184.
- Hou, Chenyu. 2020. "Learning and Subjective Expectation Formation: A Recurrent Neural Network Approach." Bank of England. <https://www.bankofengland.co.uk/-/media/boe/files/events/2020/november/modelling-with-big-data-event-chenyu-hou-paper.pdf>.
- Hou, Chenyu. 2021. "Essays in Macroeconomics and Expectation Formation." PhD thesis., University of British Columbia. URL: <https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/24/items/1.0400484>.
- Johnson, Samuel G. B., and David Tuckett. 2021. "Narrative Expectations in Financial Forecasting." *Journal of Behavioral Decision Making* 35, no. 1. Article e2245. DOI: 10.1002/bdm.2245.
- Joseph, Andreas. 2019. "Shapley Regressions: A Framework for Statistical Inference on Machine Learning Models." Bank of England Staff Working Paper No. 784. URL: <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2019/shapley-regressions-a-framework-for-statistical-inference-on-machine-learning-models.pdf>.
- King, Mervyn, and John Kay. 2020. *Radical Uncertainty: Decision-Making for an Unknowable Future*. London: The Bridge Street Press.
- Knight, Frank H. 1921. *Risk, Uncertainty and Profit*. Mineola, NY: Dover Publishing.
- Li, Boyang, Stephen Lee-Urban, George Johnston, and Mark Riedl. 2013. "Story Generation with Crowdsourced Plot Graphs." *Proceedings of the AAAI Conference on Artificial Intelligence* 27, no. 1: 598–604. DOI: 10.1609/aaai.v27i1.8649.
- Lucas, Robert E. 1972. "Expectations and Neutrality of Money." *Journal of Economic Theory* 4, no. 2: 101–124. DOI: 10.1016/0022-0531(72)90142-1.
- Mankiw, Gregory, and Ricardo Reis. 2002. "Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve." *The Quarterly Journal of Economics* 117, no. 4: 1295–1328. DOI: 10.1162/003355302320935034.
- Marwala, Tshilidzi, and Evan Hurwitz. 2017. *Artificial Intelligence and Economic Theory: Skynet in the Market*. New York: Springer.
- Matějka, Filip, Steiner, Jakub, and Cory Stewart 2017. "Rational Inattention Dynamics: Inertia and Delay in Decision Making." *Econometrica* 85: 521–553.
- Mnih, Volodymyr, Koray Kavukcuoglu, David Silver, Alex Graves, Ioannis Antonoglou, Daan Wierstra, and Martin Riedmiller. 2013. "Playing Atari with Deep Reinforcement Learning." *ArXiv*. December 19, 2013. DOI: 10.48550/arXiv.1312.5602.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica* 29, no. 3: 315–335. DOI: 10.2307/1909635.
- Nagel, Stefan. 2021. *Machine Learning in Asset Pricing*. Princeton, NJ: Princeton University Press.
- Nerlove, Marc. 1958. *The Dynamics of Supply: Estimation of Farmers' Response to Price*. Baltimore, MD: Johns Hopkins University Press.
- Pearl, Judea. 2018. *The Book of Why: The New Science of Cause and Effect*. London: Penguin Random House.

- Riedl, Mark. 2016. "Computational Narrative Intelligence: A Human-Centered Goal for Artificial Intelligence." ArXiv. February 21, 2016. DOI: 10.48550/arXiv.1602.06484.
- Riedl, Mark. 2017. "Computational Narrative Intelligence: Past, Present, and Future." Medium. Last modified October 25, 2017. URL: <https://mark-riedl.medium.com/computational-narrative-intelligence-past-present-and-future-99e58cf25ffa>.
- Rona-Tas, Akos. 2020. "Predicting the Future: Art and Algorithms." *Socio-Economic Review* 18, no. 3: 893–911. DOI: 10.1093/ser/mwaa040.
- Salem, Fadi M. 2022. *Recurrent Neural Networks: From Simple to Gated Architectures*. Cham: Springer.
- Samek, Wojciech, Grégoire Montavon, Andrea Vedaldi, Lars Kai Hansen, and Klaus-Robert Müller, eds. 2019. *Explainable AI: Interpreting, Explaining and Visualizing Deep Learning*. Cham: Springer.
- Shackle George Lennox Sharman 1961. *Decision, Order and Time in Human Affairs*. 2nd ed. Cambridge: Cambridge University Press.
- Shaw, George Kearsley. 1987. "Rational Expectations." *Bulletin of Economic Research* 39, no. 3: 187–209. DOI: 10.1111/j.1467–8586.1987.tb00241.x.
- Shi, Rui (Aruhan). 2022a. "Learning from Zero: How to Make Consumption-Saving Decisions in a Stochastic Environment with an AI Algorithm." ArXiv. February 18, 2022. DOI: 10.48550/arXiv.2105.10099.
- Shi, Rui (Aruhan). 2022b. "Can an AI Agent Hit a Moving Target?" ArXiv. October 24, 2022. DOI: 10.48550/arXiv.2110.02474.
- Simon, Herbert. 1955. "A Behavioral Model of Rational Choice." *The Quarterly Journal of Economics* 69, no. 1: 99–118. DOI: 10.2307/1884852.
- Sims, Christopher A. 2003. "Implications of Rational Inattention." *Journal of Monetary Economics* 50, no. 3: 665–690. DOI: 10.1016/S0304–3932(03)00029-1.
- Song, Bing, Gang Xiong, Songming Yu, Peijun Ye, Xisong Dong, and Yisheng Lv. "Calibration of Agent-Based Model Using Reinforcement Learning." 2021 IEEE 1st International Conference on Digital Twins and Parallel Intelligence (DTPI) (2021): 278–281. <https://ieeexplore.ieee.org/document/9540180>. DOI: 10.1109/DTPI52967.2021.9540180.
- Svetlova, Ekaterina. 2022a. "AI Meets Narratives: The State and Future of Research on Expectation Formation in Economics and Sociology." *Socio-Economic Review* 20, no. 2: 841–861. DOI: 10.1093/ser/mwab033.
- Svetlova, Ekaterina. 2022b. "AI Ethics and Systemic Risks in Finance." *AI and Ethics* 2: 713–725. DOI: 10.1007/s43681-021-00129-1.
- Tuckett, David. 2018. "Conviction Narrative Theory and Understanding Decision-Making in Economics and Finance." In *Uncertain Futures: Imaginaries, Narratives, and Calculations in the Economy*, edited by Jens Beckert, and Richard Bronk, 62–82. Oxford: Oxford University Press.
- Wagner, Dirk N. 2020. "Economic Patterns in a World with Artificial Intelligence." *Evolutionary and Institutional Economics Review* 17, no. 1: 111–131. DOI: 10.1007/s40844-019-00157-x.



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PART 2

Practices and Determinants of Expectation Management and Coordination



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12

CENTRAL BANK COMMUNICATION WITH THE GENERAL PUBLIC

Lena Dräger

Central banks face a difficult task. Their mandate is to maintain price stability and, in some countries, to stabilize the economy over the business cycle. Since the global financial crisis of 2008, many central banks have been entrusted with additional tasks, such as the micro- and macroprudential supervision of banks (Gardt et al. 2021). Moreover, in recent years central banks across the world have had to address multiple crises, from the global financial crisis to the recent surge in inflation. In order to fulfil their mandate while faced with a limited set of monetary policy instruments, central banks use communication to guide and manage the economic expectations of the relevant agents in the economy.

The potential use of communication as a way of influencing economic expectations first emerged as a vital part of monetary policy-making in the 1990s, initially in academia, and shortly thereafter in the form of monetary policy practice (Blinder et al. 2008; Binder 2017; on the history, see also Lenel and Reichmann, Chapter 16 in this volume). This approach can be regarded as orthogonal to the previous view that central banks should be obscure and opaque in their communication. Thus, the change in central banks' approach to communication has been termed a "revolution in thinking" (Blinder et al. 2008, 1) or a "communication revolution" (Haldane et al. 2021, 1).

Who are the relevant economic agents targeted by the communication efforts of central banks? Before the financial crisis of 2008, central banks mostly focused their communication on financial market participants (Blinder et al. 2008). These professionals follow central bank communication attentively, with asset prices reacting instantaneously to central bank statements. Since the financial crisis of 2008, many central banks have increased their efforts to communicate with the general public, that is, with households and firms (Blinder et al. 2024).¹ These agents act as price-setters, wage negotiators, and consumers or savers, and thereby shape both aggregate demand and inflation. However, and in contrast to financial market participants, members of the public tend to be less informed about macroeconomic relationships in general and about monetary policy in particular.² Thus, their expectations on future macroeconomic variables, such as inflation, are typically not formed in line with the rational expectations paradigm, instead being more heterogeneous and persistent.

So, can central bank communication achieve the goal of guiding and managing expectations in the face of an uninformed, and potentially uninterested, public? And should central banks aim for fine-tuning expectations or focus on communicating their targets more generally? This chapter evaluates the challenges faced by central banks in this regard, pointing out the potential links between the effects of central bank communication and the formation of macroeconomic expectations in the general public. In the second section, I discuss the theoretical interdependence of central bank communication and the formation of macroeconomic expectations by agents in the economy. In Section 3, I give a brief overview of the historical evolution of central bank communication since the 1980s. Section 4 surveys the empirical literature on consumers' and firms' managers' knowledge about inflation and monetary policy. Section 5 discusses the challenges faced by central banks in getting the attention of the public, and the evidence for the potential effects of direct central bank communication with the public. Section 6 reviews the role of the media as transmitter of information between the central bank and the public, followed by the conclusion.

The Theoretical Interdependence of Central Bank Communication and the Formation of Macroeconomic Expectations

The argument that central bank communication with the general public plays a role in the transmission of policy impulses to the economy rests on at least two assumptions. First, we have to assume imperfect competition in goods and labor markets, such that firms gain price-setting power and wages are negotiated by employers and employees, rather than set by the market. Second, we have to assume price rigidity, such that firms setting prices have to form expectations about future macroeconomic outcomes. Both assumptions are confirmed in the data and included in New Keynesian macroeconomic models, which have become the workhorse model in both academia and central banks since the late 1990s (Clarida et al. 1999).

Under imperfect competition and price rigidity, macroeconomic expectations take on a crucial role for both current and future macroeconomic outcomes. A central question, also for the effectiveness of economic policy changes, then concerns the formation of macroeconomic expectations. Most macroeconomic models, including the New Keynesian baseline model, assume that economic agents form expectations rationally, that is, under full information, agreeing on one correct macroeconomic model—including full knowledge about the central bank's policy rule—and with the ability to use both for their macroeconomic forecasts. As discussed in Braun (2015) and Lenel (2023), communication by central banks about their objectives and their instruments, such as the policy rate, provides the informational basis necessary for the formation of rational expectations in the first place.

However, as pointed out by Blinder et al. (2008) as well as Braun (2015), in a stationary economy with only stochastic shocks and a central bank credibly committed to an unchanging and publicly known policy rule, any further central bank communication would be superfluous if agents had rational expectations, because any central bank reaction would already be fully anticipated. The discussion about the potential merits of central bank communication is thus contingent on the formation of macroeconomic expectations by the agents in the economy, thus, by the general public.

The empirical evidence in this area consistently rejects the rationality of macroeconomic forecasts by consumers or firms even with detailed information about monetary policy widely available (see, amongst many others, Souleles 2004; Coibion and Gorodnichenko

2012; Coibion et al. 2018). Consumers as well as firms display large heterogeneity in their inflation expectations and are often uninformed about monetary policy (Coibion and Gorodnichenko 2012; Kumar et al. 2015). Even professional forecasters are prone to behavioral biases, such as herding, which cause deviations from full rationality in their expectations (Pons-Novell 2003).

Instead, there seems to be evidence in favor of macroeconomic expectation formation under imperfect information (Coibion and Gorodnichenko 2012; Dräger and Lamla 2012, 2017), in line with theories of rational inattention (Sims 2003; Maćkowiak and Wiederholt 2009; Maćkowiak et al. 2023). Under rational inattention, economic agents do not have full information, but must choose where to allocate their attention due to a limited capacity for processing information. Particularly in times of low and stable inflation, there is little benefit from devoting precious attention to aggregate inflation (see also Müller, Chapter 13 in this volume). But this may change when inflation is high or when information can be more easily obtained. Evidence from survey experiments supports this theory, since both consumers and firms tend to adjust their inflation expectations toward the information provided when they are presented with information treatments on current or projected inflation or the inflation target (Kumar et al. 2015; Binder and Rodrigue 2018; Coibion et al. 2022; Dräger et al. 2024).

With macroeconomic expectations formed under rational inattention, central banks can influence the macroeconomic expectations of economic agents by explaining the central bank's objectives and its views on the current macroeconomic stance, and by providing information on the monetary policy path. In that sense, successful communication could remove (part of) the attention friction and, thereby, move macroeconomic expectations closer to the rational expectations benchmark. This may help to increase the speed of an otherwise notoriously slow transmission process from monetary policy impulses to the real economy; if central banks communicate the path of monetary policy rates in advance, interest rates on financial markets will adjust faster, leading to a faster adjustment in aggregate demand and, ultimately, inflation. However, this channel hinges crucially on the communication reaching the intended audience and on the audience's understanding of the message. Moreover, as pointed out by Blinder et al. (2024), attempting to guide the macroeconomic expectations of the public using forward guidance carries the danger of having to revert on the previously announced policy path if the central bank's projections are not realized. This could harm the public's trust in the central bank and its credibility.

Another important aspect of central bank communication focuses on explaining the general objectives of monetary policy and aims at anchoring inflation expectations close to the inflation target by informing about and credibly committing to the target. If the central bank's inflation target is credible, economic agents' medium-term inflation expectations remain anchored at the target even if the economy is hit by transitory supply shocks, such as energy or food price hikes. Trust in the institution may be an important aspect in this regard. Finally, as pointed out by Gardt et al. (2021), central bank independence without direct democratic control calls for more central bank transparency and communication as a means of remaining accountable to the general public.

The Historical Evolution of Central Bank Communication

Historically, central banks communicated only in opaque ways. This had the aim of maintaining a degree of freedom by remaining obscure about the monetary policy targets as

well as the instruments used. For instance, the Federal Reserve (“the Fed”) only started to publish its target for the federal funds rate, its main refinancing rate, in February 1994. This approach to central bank communication is demonstrated by the famous quote from Alan Greenspan, chairman of the Fed from 1987 to 2006: “If I seem unduly clear to you, you probably misunderstood what I said” (quoted in the *Guardian* newspaper on November 4, 2005).

The move toward a more transparent communication started in many central banks in the 1990s (Binder 2017). As described by Blinder et al. (2008), the change in central bank communication was motivated by the emerging new consensus that more transparent communication would enhance the efficiency of monetary policy. At the same time, this increased the accountability of the institution, an important aspect of independent central banks (Blinder et al. 2024). Major central banks across the world introduced communication instruments such as the publication of central bank forecasts, votes in monetary policy meetings, statements explaining the monetary policy decision, and numerical inflation targets, and providing forward guidance on future policy rates and press conferences after policy meetings. However, central bank communication was targeted solely at expert audiences, such as financial market participants or professional forecasters (Blinder et al. 2008). These experts follow every monetary policy decision or statement attentively, leading to instantaneous effects on asset prices when policy decisions are announced.

After the large economic disruptions caused by the global financial crisis in 2008–2009, another major change in central bank communication emerged: central banks increasingly aimed their communication efforts at the general public, that is, laypersons as opposed to experts. As pointed out by Binder (2017) and Blinder et al. (2024), there were several reasons for this. First, the economic crises meant that central banks entered into the public debate, making it necessary to explain policy actions to a non-expert public. Second, unconventional instruments used by central banks when nominal interest rates were close to zero (the so-called effective lower bound for interest rates) made monetary policy more complex and more controversial, thus calling for more communication to convince the public that central banks were acting within their mandate. Third, at the effective lower bound and with inflation below target in many countries after the financial crisis,³ using communication to steer the inflation expectations of consumers and firms in theory became a potential way to increase aggregate demand, and thereby actual inflation, at least theoretically (Clarida et al. 1999). The theoretical mechanism would be as follows: With nominal interest rates at zero and inflation below target, convincing the public that monetary policy will bring inflation back to target in the future increases inflation expectations, leading to a fall in the real interest rate. This raises aggregate demand, which in turn will fuel inflation.

Communicating with the general public necessarily needs to address the different aspects of monetary policy as an economic and a policy institution and, consequently, the different roles of members of the public as both economic actors and citizen. The following quotes from central bankers demonstrate their willingness to communicate with the public and address these different roles:

The effects of monetary policy depend critically on the public getting the message about what policy will do months or years in the future. (Janet Yellen as Chairwoman of the Fed, 2013, in a speech at the Society of American Business Editors and Writers’ 50th Anniversary Conference)

The ECB needs to be understood by the markets that transmit its policy, but it also needs to be understood by the people whom it ultimately serves. People need to know that it is their central bank, and making its policy with their interests at heart. (Christine Lagarde as president of the European Central Bank (ECB), 2019, in her Opening Statement to the Economic and Monetary Affairs Committee of the European Parliament)

Communicating with the general public, however, poses several new challenges. First, in contrast to experts, households and firms usually do not listen attentively when the central bank talks. Monetary policy and inflation are typically not top priorities in people's daily life decisions, even though they affect important economic outcomes, such as the real returns of private retirement provisions or real interest rates on mortgages. For instance, on average between January 1980 and January 2023, in the University of Michigan's Survey of Consumers only 5 percent of the economic and business news that US consumers remembered from the last three months was related to prices and inflation. If news about other monetary variables, such as credit, interest rates, or the dollar value, was included, this share increased to 15 percent on average (see Figure 12.1). However, the degree of (in) attention changes dramatically when inflation increases strongly. When inflation accelerated in most industrial economies at the end of 2021, indexed Google searches for "inflation" spiked in Germany, the US, and Canada (Blinder et al. 2024). Similarly, the share of consumers in the University of Michigan's Survey of Consumers who said that they had heard news about prices or inflation reached a local maximum of 29 percent when recent US inflation peaked in June 2022.

Second, even if a message by the central bank is received by the public, laypersons often have difficulties understanding it. The workings of monetary policy and the transmission of

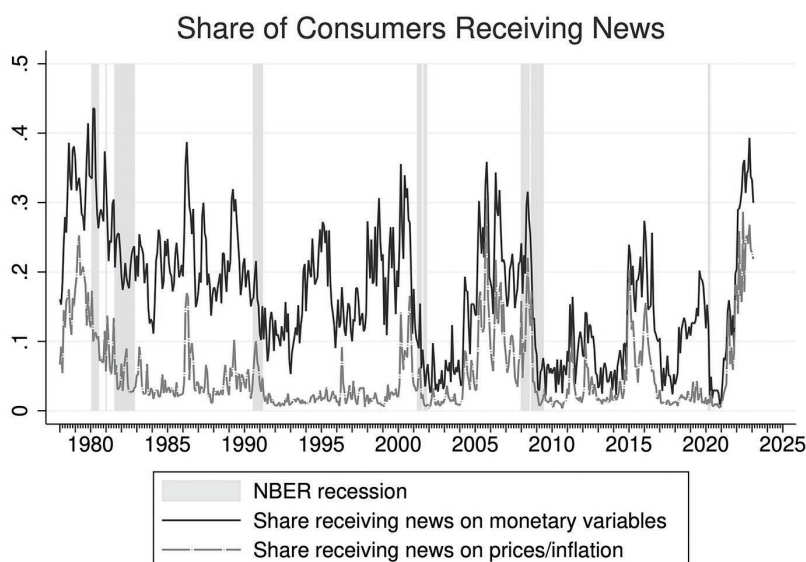


Figure 12.1 Share of respondents in the University of Michigan Survey of Consumers reporting having heard news on monetary variables or on prices and inflation.

Source: Data: University of Michigan Survey of Consumers and National Bureau of Economic Research. Graph: author's creation.

its impulses to the macroeconomy are complex. Average knowledge about both the concept of inflation and about the targets and instruments of monetary policy in the population tends to be low (Blanchflower and Kelly 2008; Candia et al. 2020; Dräger and Nghiem 2025). On top of this, typical central bank publications like inflation reports require very advanced reading abilities. For instance, the readability of ECB speeches, as measured by the Flesch-Kincaid Grade Level score indicating how many years of formal schooling are required to understand the text, has fallen only slightly over time and remains high at a score of about 11 years (Gardt et al. 2021; Ferrara and Angino 2022). Similar evidence exists for Fed and Bank of England publications (Binder 2017; Haldane and McMahon 2018; Haldane et al. 2021). As Andrew Haldane, then Chief Economist at the Bank of England, said in a speech in 2018, “around 95% of all the words central banks utter are inaccessible to around 95% of the population” (Haldane 2018). Central bankers thus have to find new ways of communicating with laypeople that differ from the established communication with experts.

In order to intensify their communication efforts with the general public, central banks across the world introduced new forms of communication (Blinder et al. 2024). Almost all central banks now have a website including information targeted at lay audiences, and often publish educational material on monetary policy and inflation for use in schools. Some central banks, such as the Bank of England and the ECB, have started to publish so-called “layered communication,” where monetary policy changes are explained in simple terms using visual illustrations for the public, with more detailed information available for experts. Central bankers give more speeches and interviews at diverse institutions and for diverse media outlets, including online media and podcasts, and publish them on their websites (Gardt et al. 2021). In addition, many central banks are active on social media, mainly on X (formerly Twitter) and YouTube.

Moreover, the ECB, the Bank of England, and the Fed introduced so-called “listening events,” such as the Bank of England’s “Citizens’ Panels.” At these events, members of the public meet with central bankers to discuss their views on monetary policy or how they are affected by certain shocks, such as the Covid-19 pandemic. The ECB and the Fed have subsequently incorporated this feedback into their recent strategy review processes. Haldane et al. (2021) discuss tentative evidence that this form of direct engagement with the public may boost trust in the central bank in addition to fostering an understanding of monetary policy and the central bank as an institution. At the same time, the authors stress the potential danger that this type of event could generate exaggerated expectations that the central bank may take the public’s feedback into account in their policy decisions, and therefore subsequent disappointment and loss in trust when this is not the case.

What Does the General Public Know about Inflation and Monetary Policy?

This section surveys the empirical evidence about households’ and firms’ knowledge about inflation, central banks, and monetary policy. Overall, the verdict is clear and seems discouraging for any central bank that aims to communicate with the general public. On average, both consumers and firms display low knowledge about the concept of inflation or recent inflation rates, the current central bank’s monetary policy committee and its leaders, the inflation target, or the way that interest rates affect inflation (Blanchflower and Kelly 2008; Kumar et al. 2015; van der Cruysen et al. 2015; Binder and Rodrigue 2018; Coibion et al. 2018; Hayo and Neumeier 2020; Candia et al. 2021; Haldane et al. 2021; Coibion et al. 2022; Dräger and Nghiem 2025).

For instance, in a Dutch consumer survey, on average only 45 percent of a set of knowledge questions about monetary policy were answered correctly (van der Cruijssen et al. 2015). Moreover, consumers often think they know more about inflation and monetary policy than they actually do (van der Cruijssen et al. 2015; Binder and Rodrigue 2018; Mellina and Schmidt 2018). Similarly, consumers are uninformed about monetary policy objectives and frequently think inflation-targeting central banks are in fact targeting the exchange rate or financing the government (Mellina and Schmidt 2018; Coibion et al. 2023b). Surveying US firms, Candia et al. (2021) report that only one third of managers answered the question about the Fed's inflation target, and of these only 50 percent correctly identified the target as being in the range between 1.5 and 2.5 percent. Company managers in New Zealand seem similarly uninformed about their country's inflation target, despite New Zealand being the first country to adopt a strategy of inflation targeting including an official inflation target (Kumar et al. 2015; Coibion et al. 2018). Dräger et al. (2016) show that about 52 percent of US consumers correctly distinguish between real and nominal income expectations, but only 30–40 percent form macroeconomic expectations in line with a Phillips curve or a Taylor rule (the latter being in line with evidence in Carvalho and Nechio 2014). Moreover, Dräger et al. (2022) present evidence that consumers with the same level of inflation or interest rate expectations disagree strongly on whether the expected rate is appropriate for the economy or whether higher or lower rates would be preferable.

In line with the persistent heterogeneity in consumers' inflation expectations across socio-demographic groups discussed in many studies,⁴ knowledge about inflation and monetary policy also varies across socio-demographic characteristics (Blanchflower and Kelly 2008; Burke and Manz 2014; van der Cruijssen et al. 2015). Not surprisingly, the groups that typically perform worse in predicting inflation, such as females, those with lower income or education, and those with lower social status, also display lower knowledge about inflation and monetary policy in general.

While knowledge is generally very limited, the majority of respondents in consumer surveys also expresses a low level of desire to be informed about monetary policy and states that they inform themselves rarely or never (Hayo and Neuenkirch 2014; van der Cruijssen et al. 2015). Low attentiveness toward inflation or monetary policy seems to be a stable result, at least during times of low and stable inflation rates. For instance, Binder (2017) reports that the share of “don't know” answers to the question about quantitative long-run inflation expectations in University of Michigan Survey of Consumers in the US stayed roughly constant at around 12–15 percent between 1985 and 2016.

So, why should central banks bother to communicate with a public that clearly has little interest in being informed? In other words, should central banks aim to overcome the inattention of the public, even if it may be “rational” in the sense that the majority shows little desire to become better informed? First, as pointed out by Haldane et al. (2021), informing the public about its monetary policy decisions is an important aspect of the accountability of an independent central bank that is not directly subject to democratic votes. Indeed, there is evidence from several studies that better knowledge about the central bank or monetary policy coincides with a stronger trust in the central bank. Hayo and Neuenkirch (2014) report a positive correlation between German consumers' trust in the ECB and their knowledge about monetary policy as well as their desire to be informed about it. Hayo and Neumeier (2020) find that consumers in New Zealand who are better informed about the institutional set-up of monetary policy are more likely to support central bank independence. Similarly, Jost (2017), Haldane and McMahon

(2018), and Haldane et al. (2021), report that better knowledge about monetary policy in the Bank of England's Inflation Attitude Survey coincides with higher satisfaction with the Bank's policies. In a survey experiment, Dräger and Nghiem (2025) show that randomly providing German survey participants with general information about inflation and monetary policy leads to a significant increase in trust in both the ECB and the German Bundesbank. However, as pointed out by van der Cruysen et al. (2023), maintaining trust in the central bank has become more difficult with the recent high inflation rates hurting consumers' purchasing power.

Second, the correlation between financial literacy and trust in the central bank is important not just because of accountability or credibility reasons, but also because both literacy and trust in turn correlate with inflation expectations. Better informed consumers or company managers on average give more accurate inflation predictions (Blanchflower and Kelly 2008; van der Cruysen et al. 2015; Kumar et al. 2015;; Haldane and McMahon 2018; Mellina and Schmidt 2018) and are better able to incorporate information provided in an incentivized lab experiments into their forecasts (Burke and Manz 2014). Some caution regarding this result is indicated from the survey experiment conducted by Dräger and Nghiem (2025). Treating a random sub-sample with general information about inflation and monetary policy significantly raises those respondents' knowledge as well as their trust in the central bank, and it increases the likelihood of providing inflation forecasts, but it does not affect the level of forecasts relative to the control group. At the same time, learning that current inflation is high has the effect of lowering trust in the central bank more for those who received the general information.

In a recent survey covering several large euro area economies, Stanisławska and Palovita (2021) find that medium-term (three-year) inflation expectations are less responsive to changes in short-term (one-year) inflation expectations, and are thus more "anchored," if respondents display high levels of trust in the ECB. Analyzing data from a survey among consumers in all euro area countries, Farvague et al. (2017) report higher individual inflation expectations correlate with trust in the ECB. Similarly, Rumler and Valderrama (2020) show that inflation expectations on the part of Austrian consumers correlate both with knowledge about inflation and with trust in the central bank. Haldane and McMahon (2018) as well as Haldane et al. (2021) point out that the relationship between trust and inflation expectations is non-linear, implying that the highest gains in terms of inflation forecast accuracy could be realized by targeting those with the lowest initial levels of trust.

Third, both consumers and firm managers adjust their inflation forecasts toward quantitative information provided in survey experiments, such as information about current or projected inflation or on the inflation target (Kumar et al. 2015; Binder and Rodrigue 2018; Coibion et al. 2022; Dräger et al. 2024). This suggests that if central banks managed to gain the public's attention, guiding their inflation expectations would be possible.

Finally, even uninformed consumers or company managers may react to their inflation expectations when forming decisions on consumption and saving (Dräger and Nghiem 2021; Duca-Radu et al. 2021; Crump et al. 2022; Coibion et al. 2023a) at the household level or on employment and investment at the firm level (Coibion et al. 2018, 2020).

Overall, thus, the evidence suggests that potentially much could be gained from central bank communication with the general public, but also that many challenges exist to overcome existing financial illiteracy and inattention.

The Channels of Central Bank Communication with the General Public

The high levels of financial illiteracy and inattention discussed in the previous section cause severe problems for central banks aiming to communicate with the general public, the so-called “receiving end” of central bank communication (Gardt et al. 2021; Blinder et al. 2024). Nevertheless, reaching the public is crucial for central banks in order to address the observed “twin deficit” of trust and understanding, as argued by Haldane and McMahon (2018).

In this section, I thus review the empirical literature on direct central bank communication with the public, distinguishing between the evidence on how to raise attention in the public, and the evidence on the effect of information communicated once attention is generated.

The “Attention” Channel of Central Bank Communication

With the recent intensification of central banks’ attempts to communicate with the general public, can we observe that monetary policy institutions are able to reach the public? Lamla and Vinogradov (2019, 2021) survey representative samples of US and British consumers in the two days before and after each country’s central bank’s press conference following a policy meeting. The authors report that, on average, respondents surveyed after the press conference do not give significantly different predictions of current and future inflation or interest rates. In that sense, central bank communication does not seem to be able to generate sufficient attention in the general public, or present sufficiently new information, to affect inflation expectations. This result is confirmed by De Fiore et al. (2021) in a similar analysis using the New York Fed’s Survey of Consumers’ Expectations. The authors do report, however, that consumers’ interest rate expectations adjust significantly after monetary policy announcements. A potential problem might be the large observation window of 21 days before and after announcements in their analysis, which makes it more difficult to claim causal effects from policy announcements. Enders et al. (2019) conducted a related study on German manufacturing firms, which were surveyed in the four-working-day-window around the monetary policy announcement. Their study focuses on monetary policy surprises and shows that firms significantly adjust expectations regarding their own production and prices after small monetary policy shocks, but not after large shocks. One potential explanation for this non-linearity might be that large shocks cause market participants to update information about the state of the economy in general, and this may offset the intended impact of the monetary policy impulse on expectations.

While Lamla and Vinogradov (2019, 2021) find no effect from monetary policy announcements on average inflation expectations, the authors report for both the US and the UK surveys that consumers are significantly more likely to report having heard news about the central bank after the policy meeting. Those that did receive the news communicated by the central bank subsequently gave more accurate inflation predictions and were more confident in their forecast. In that sense, central banks were able to have an effect on consumers’ macroeconomic expectations, provided that the hurdle of getting their attention was overcome. Moreover, Lewis et al. (2020) report in a different daily survey that surprises in relation to the Federal Funds target rate between 2008 and 2017 have instantaneous and persistent effects on consumers’ beliefs about the current and future state of the economy, thus suggesting that a sufficiently large fraction of households is attentive to changes in

monetary policy instruments. It should be noted, however, that the authors' measure of consumer confidence relates to very broad and qualitative beliefs, rather than quantitative forecasts.

Coibion et al. (2023b) evaluate the impact of the announcement of the Fed's change to the new monetary policy strategy of "average inflation targeting" (AIT) on August 27, 2020, on US consumers, using a daily survey administered by the Federal Reserve Bank of Cleveland.⁵ The evidence presented by the authors seems discouraging. Even though the new monetary policy strategy was widely reported in the media, the share of consumers who reported having heard news about the Federal Reserve rose only slightly on the day of the announcement. Importantly, those that did report hearing news were not more likely to correctly identify the new strategy and did not form different macroeconomic expectations. Even after one year, the share correctly identifying the strategy as AIT rose to only 30 percent, from 23 percent immediately after the announcement. By contrast, Hoffmann et al. (2022) conducted a similar, but hypothetical, experiment about AIT with German consumers and report significant differences in posterior inflation forecasts when consumers were asked to assume different monetary policy strategies, where the indicator of the differences suggests that participants understand the dynamics of inflation under AIT.

A potential means of direct communication between central banks and the general public is the use of social media. Indeed, most central banks are nowadays active on social media channels such as X (formerly Twitter) or YouTube. Ehrmann and Wabitsch (2022) evaluate both English-language and German ECB-related traffic on Twitter, as it then was. The authors identify experts and non-experts active on Twitter and show that different types of ECB communication are able to generate some attention in social media, also with respect to the non-expert audience. Importantly, those non-experts that do react to ECB communication, subsequently write more factual tweets about the topic. However, attention is generally relatively low and short-lived, with the exception of press conferences after policy meetings and especially the famous "whatever it takes" speech by former ECB president Mario Draghi, delivered at the height of the European sovereign debt crisis, which generated a pronounced and longer-lived discussion on Twitter.⁶ Haldane et al. (2021) show that in the Bank of England's new "layered communication" strategy reporting on its inflation report, the introduction of the simpler "visual summary" increased traffic on the bank's website by 100 percent. At the same time, tweets about the bank's inflation report increased and the Twitter network of the Bank of England became more dispersed. These optimistic results are somewhat dampened by the findings in Lamla and Vinogradov (2021), who reported that only a small fraction of British consumers in their survey states that they follow the Bank of England on Twitter. Further, even though these consumers express a higher confidence in their forecasts, they actually provide less accurate expectations, suggesting overconfidence in this sub-group.

Complementary to these results, Ferrara and Angino (2022) present evidence that clearer ECB communication in terms of readability is reflected in more media coverage and a higher Twitter engagement rate. In line with the evidence presented by Tillmann and Walter (2019), there is some difference in tone in English-language and German Twitter traffic after the "whatever it takes" speech. Analyzing the tone of speeches by the ECB and the Bundesbank presidents, Tillmann and Walter (2019) show that divergences in tone between negatively vs. positively connoted speeches can persist within the Eurosystem. This "cacophony problem" may endanger the clarity of central bank communication and is found to affect policy uncertainty and macroeconomic dynamics.

Overall, the empirical studies discussed reiterate the problems central banks face in reaching the general public. On a more hopeful note, there is evidence that central banks are successful in raising a certain degree of attention.

The “Information” Channel of Central Bank Communication

Once attention is generated, which type of communication or information is best able to guide macroeconomic expectations in the general public? This is the research question evaluated by a large body of literature, often using survey experiments with randomly provided information treatments (randomized control trial, RCT) to generate causal evidence. Due to the inherent endogeneity of all macroeconomic relationships, causal effects of monetary policy communication on macroeconomic outcomes can only be identified under theoretical assumptions. By contrast, survey experiments provide a way of measuring the causal effect of central bank communication pieces randomly provided to a treatment group within a representative sample of the public, on respondents’ beliefs and their stated economic choices regarding consumption and saving. These RCT studies thus identify the immediate effect of communication. By following up with respondents some months after the experiment, the persistence of communication effects can be measured.

An early contribution by Armantier et al. (2015) shows in an incentivized experiment that the survey-based inflation expectations of participants are largely consistent with their choices between a fixed-payment investment and an inflation-indexed investment, and that inconsistent choices are more likely for participants with low education.

Survey experiments with randomized information treatments test the effect of different types of information on respondents’ updates of their posterior macroeconomic expectations relative to their prior expectations measured before the treatment. Throughout the literature, studies find that participating consumers adjust their inflation expectations toward the information provided, often with economically significant adjustments around 1–2 percentage points (Binder and Rodrigue 2018; Coibion et al. 2022, 2023a; Dräger et al. 2024). Together with the observed large heterogeneity in expectations prior to the information treatments, and in line with the evidence in Armantier et al. (2015), this gives further support to theories of expectation formation where there is limited capacity to absorb and process information. In this sense, providing members of the public with relevant information affects their macroeconomic expectations, even if they did not actively search for the information. However, many studies find that communication effects on beliefs are rather short-lived (with the exception of the study by Dräger et al. 2024).

The adjustments are particularly large when respondents are provided with simple, numerical information over relatively short horizons: Coibion et al. (2022) report strong adjustments by up to several percentage points in US consumers’ inflation expectations after being treated with information about current inflation, inflation projections or the Fed’s inflation target. Providing households with the full Federal Open Market Committee’s (FOMC) monetary policy statement, published after each policy meeting, has about the same effect on expectations. Surprisingly, a shorter, and easier to read summary of the FOMC statement as published in the newspaper *USA Today* leads to adjustments in expectations of only half the size of the effect from the full statement. This leads the authors to suggest that central bank communication via the media might significantly reduce the effects of that information, at least if the media is viewed as less trustworthy by the public. Coibion et al. (2023a) present results testing different ways of providing forward guidance

and find that information about interest rates and/or inflation affects expectations of both variables, particularly if the information is about short horizons, i.e. current rates or rates in the near future. This is in contrast to studies evaluating financial market participants, who pay more attention to information about interest rates farther in the future.

The former studies were conducted during a period with low and stable inflation rates. Dräger et al. (2024) test which type of information may prevent rising inflation spilling over into inflation expectations. In line with the previous evidence, the authors find that participants adjust their expectations toward the information provided, in this case meaning an *upward* shift in inflation expectations once participants are made aware of rising current inflation. This shift can be mitigated by different types of additional, forward-looking information, where the strongest effects are found for numerical inflation projections that predict inflation to fall again in the near future. The authors find that inflation expectations across all horizons are affected by the information treatments. Interestingly, this study finds a “reversal” effect of the information treatments in the six months after the treatments: as inflation continued to rise strongly in the months after the experiment, participants, who received numerical forecasts predicting a fall in inflation in the near future, started to again rely more on their initial prior expectations and to extrapolate their forecasts from observed inflation in the previous month, as it became clear that the forecasts in the treatment were misguided. This result could be regarded as a warning against using forecasts to mitigate a spillover from rising inflation to inflation expectations, as such forecasts may turn out to be biased in the future.

A counter-example to the larger impact of numerical information is provided by D’Acunto et al. (2020). In their RCT study on Finnish consumers’ income expectations, the authors compare the effect of Twitter communication by the Governor of the Bank of Finland stressing that the ECB is doing whatever is necessary to minimize the impact of the Covid-19 crisis on households (termed “target communication” by the authors), to a tweet about the launch of the €750 billion Euro Pandemic Emergency Purchase Programme by the ECB (“instrument communication”). The authors show that the non-numerical target-based communication significantly increases respondents’ expectation of household income, while there is no significant effect from the instrument-based communication. Arguably, this result does not carry over to all target vs. instrument-based communications, since in this example the instrument-based communication was significantly more technical and its implications for household income much harder to understand than the non-numerical target-based communication.

In addition to the question of which type of information has the strongest impact on macroeconomic expectations in the general public, researchers and central banks alike discuss the question how diverse audiences might be best addressed (Haldane and McMahon 2018; Bholat et al. 2019; D’Acunto et al. 2021; Gardt et al. 2021). D’Acunto et al. (2021) study how diversity within monetary policy committees may affect consumers’ macroeconomic expectations. In an RCT study, the authors present the same Fed projection on unemployment or inflation accompanied by a picture of either a white male, a white female, or a Black male FOMC member. The authors find improvements in the accuracy of unemployment expectations and trust in the Fed for female or Black respondents who were shown the image of either the female or the Black FOMC member. Importantly, there are no negative effects on white male respondents in these treatments. Haldane and McMahon (2018) as well as Bholat et al. (2019) evaluate the impact of the layered communication design recently adopted by the Bank of England on consumers’

comprehension of monetary policy, their inflation expectations, and their trust in the central bank. These papers thus focus on how central bank communication may address diversity with respect to education and ability. Both studies experimentally test the impact of the simplified version of the monetary policy statement within the “layered” communication, the “visual summary” mentioned above. This is a text similar in length to the original policy statement, but using simpler language and accompanied by charts and images. Both studies find that the simpler content leads to an improvement in comprehension of monetary policy and in trust in the central bank. As pointed out by Haldane and McMahon (2018), this improvement is larger than the initial difference in comprehension between their sample of the general public and their sample of postgraduate economics students. For the public sample, providing the visual summary also leads to a higher likelihood of inflation expectations being in line with the Bank of England projections. Bholat et al. (2019) further test versions of the visual summary which were shorter or more relatable to people’s daily lives, and find that this further improves both comprehension and trust. The challenge when using “layered” communication is to ensure the consistency of the simplified and the in-depth information, and to avoid over-simplification in the layer aimed at the public.

Taken together, the studies discussed in this section highlight the challenges that remain for central banks’ communication with the general public. It seems that the greatest challenge lies in getting the attention of the public, which has low prior knowledge about inflation or monetary policy as well as low interest in being informed. Once attention is achieved, however, the experiments with information treatments show that large adjustments in expectations can be generated by providing simple, numerical information. This speaks to large potential gains from communication by alleviating (potentially rational) inattention. These effects can be even larger if the communication takes into consideration the diversity of the audience and targets underrepresented groups.

The Role of the Media in Central Bank Communication with the General Public

The gap between “getting the public’s attention” and the “message sent” by central banks is often closed by the media, acting as transmitter of information between the “sender” (the central bank) and the “receiver” (the public) (see also Müller, Chapter 13 in this volume). In this section, I discuss the empirical evidence on the role of the media in transmitting central bank communication to the general public.

The media are found to have a mixed effect. On the one hand, television and newspapers remain the most important news sources about economic policy in general and monetary policy in particular as cited by households, followed by the online press (Blinder and Krueger 2004; van der Cruysen et al. 2015; Conrad et al. 2022). More generally, media news can be an independent source of aggregate business cycle fluctuations, for instance when sectoral news receives disproportionate news coverage (Chahrour et al. 2021). Lamla and Lein (2014) show that more media coverage on inflation reduces the gap between households’ and experts’ inflation expectations, while Lamla and Vinogradov (2019, 2021) report that those consumers who did report hearing news after policy meetings subsequently gave more accurate inflation forecasts. This implies that central banks should aim for high media coverage for their message to be broadcast widely to consumers and firm managers. Ferrara and Angino (2022) show that readability and clarity of speeches and press statements

is important in this regard, presenting evidence that clearer communication is reflected in more media coverage.

On the other hand, the media are not necessarily neutral agents simply interested in transmitting the message given to them by central banks. Instead, they may add interpretation or critique and shape the message following their own agenda (see also Müller, Chapter 13 in this volume). This may in turn influence the views and expectations by the general public, thus biasing the communication. Soroka (2006) presents evidence that the media report more on negative economic developments than on positive ones and that in turn, public views on the state of the economy correlate more with negative news reports as well as negative economic outcomes, rather than with positive ones. Similarly, Lamla and Lein (2014, 2015) demonstrate an asymmetric effect of news on rising versus falling inflation on consumers' inflation expectations. A higher share of "negative" news on rising inflation is negatively correlated with consumers' forecast accuracy, thus biasing consumers' expectations. The same effect is reported for news from TV broadcasts, while no bias is found for news from newspaper sources or news on falling inflation. A similar asymmetric relationship is found by Pinter and Kocenda (2023). Dräger (2015) as well as Dräger et al. (2016) also report asymmetric media effects on consumers' macroeconomic expectations in Sweden and the US. For instance, a higher share of news reports about inflation correlates negatively with the share of consumers forming macroeconomic expectations consistent with a Phillips curve or the Taylor rule in Dräger et al. (2016), and this effect seems to be driven by consumers remembering news about high prices or price increases, rather than about low or falling prices.

If asymmetric media reports about inflation or monetary policy threaten to bias consumer inflation expectations, can central banks influence the favorableness of media reports about their policy? This question is evaluated by Berger et al. (2011) for media reports about the ECB's monetary policy throughout Euro area news outlets. On the one hand, the authors present evidence that the media take on a monitoring role in the sense that reports are more critical if monetary policy decisions came as a surprise to financial markets or if inflation in the Euro area is higher. On the other hand, there is evidence that the ECB in turn can influence the favorableness of media reports by explaining the policy decision well in its statement or by issuing more statements by the ECB president in the intermeeting period. Explanation and engagement—to name two of the 3 E's in Haldane et al.'s 2021 paper—thus help to convey the central bank's message via the media without the media adding a critical interpretation.

The importance of the relationship between central bank communication and the media for the transmission of the central bank's message to the public is further analyzed in a recent literature using textual analysis. Both Pinter and Kocenda (2023) and ter Ellen et al. (2022) emphasize that central bank communication via the media displays shocks that are orthogonal to standard monetary policy shocks identified in financial market interest rate data. For instance, Pinter and Kocenda (2023) present evidence from France that in their sample, 85 percent of monetary policy shocks measured in overnight index swaps for short-term interest rates during the week of a monetary policy event are not described as a surprise in the media or are even discussed with the opposite sign (i.e., a shock that is perceived as restrictive by the market might be described as expansive in the media). Similarly, ter Ellen et al. (2022) construct a measure of "narrative monetary policy shocks" from differences in topics identified in textual analysis of central bank policy statements and economic media reports prior to the policy meeting. These "narrative shocks" are not

correlated with monetary policy shocks derived from financial market data. Importantly, the authors show that narrative monetary policy shocks lead to more media coverage and correlate positively with interest rates, stock markets, house prices, consumer confidence, and industrial production. Finally, Munday and Brookes (2021) use textual analysis to identify how central bank communication should be constructed to maximize media coverage, evaluating news coverage in British media during the 1.5-day windows around Bank of England communication events. In line with the results in Berger et al. (2011), the authors report that the interaction between the state of the economy and the textual features of central bank communication are important to explain the pass-through from central bank communication to media coverage. In general, the results suggest that simple texts that engage the reader personally and include facts and figures or refer to prominent central bank staff are found to influence news coverage the most.

Conclusion

This chapter surveys the recent empirical literature on central bank communication with the general public, relating the findings to theories of macroeconomic expectation formation. As the empirical literature shows, macroeconomic expectations by firms and households are typically not formed under the full rationality benchmark, as they display persistence and large cross-sectional heterogeneity (Souleles 2004; Coibion and Gorodnichenko 2012; Coibion et al. 2018). While other behavioral biases may also play a role, the heterogeneity and dynamics in the macroeconomic expectations of firm managers and households may be well explained with theories of expectation formation under rational inattention (Kumar et al. 2015; Binder and Rodrigue 2018; Coibion et al. 2022; Dräger et al. 2024). This theory supposes that agents are rational in principle, but face constraints on their ability to absorb and process information, thus staying rationally inattentive toward some information. For instance, as long as inflation is low and stable, it is rational for most agents to know little about monetary policy and the processes affecting inflation.

Nevertheless, both firm managers and households form beliefs about future macroeconomic outcomes, such as inflation, and changes in these beliefs in turn affect their economic choices regarding investment or consumption spending (see, for instance, Coibion et al. 2020, 2023a, 2023b; Dräger et al. 2024). Communication by central banks about their policy objectives thus enables the formation of more informed, and thereby more “rational,” expectations. Moreover, in a period with, first, inflation below target and interest rates close to the effective lower bound, and after that, rapidly rising inflation, central banks today face the difficult task of explaining their policy to the population. This is crucial to maintain central banks’ accountability as institutions guarding price stability and the public’s trust therein.

The challenges in this endeavor are manifold. First, ordinary consumers or company managers are typically not well informed about what central banks do, what their targets are, or even about the concept of inflation. Second, they show little interest in learning more about these issues and often do not listen when the central bank talks. During the “Great Moderation” period, when inflation was low and stable over several decades, this could even be regarded as a sign of a successful monetary policy, where the public had little reason to think about inflation. However, the public discussion surrounding unconventional monetary policy in the aftermath of the financial crisis of 2008 shows that it becomes more important to engage the public in times with frequent economic crises and high economic uncertainty (Coibion et al. 2024).

An important aspect in this regard is trust in the central bank. Average trust in the ECB fell after the financial crisis and recovered only slowly afterward (Wälti 2012; Blinder et al. 2024). With recent high inflation rates hurting the purchasing power of consumers, trust in the ECB has again fallen strongly (van der Cruijssen et al. 2023). Moreover, trust is lower in consumers with less knowledge of inflation and monetary policy, and higher trust correlates with higher accuracy in consumer inflation expectations (Rumler and Valderrama 2020; Haldane et al. 2021). At the same time, informing consumers about general facts on inflation and how monetary policy affects the economy, may cause an increase in trust (Dräger and Nghiem 2025). Similarly, addressing diversity in terms of gender, race, or ability in central bank communication raises trust in the institution (Haldane and McMahon 2018; Bholat et al. 2019; D'Acunto et al. 2021). In this regard, the three E's discussed by Haldane et al. (2021)—Explanation, Engagement, and Education—could be important elements for central banks aiming to build trust by using communication. In fact, enhancing credibility and trust is named as the most important objective in a recent survey among former members of the ECB Governing Council (Ehrmann et al. 2023).

Once the attention of the general public is gained, the literature using survey experiments with information treatments finds that consumers' and firms' inflation expectations can be guided effectively by providing simple and numerical information, for instance about the inflation target, the most recent inflation rate, or about inflation projections (Binder and Rodrigue 2018; Coibion et al. 2022, 2023a; Dräger et al. 2024). Moreover, the message sent by central banks is easier to get across if communication uses simple, short texts that relate to people's daily lives (Bholat et al. 2019). In this regard, using “layered” communication that offers simple summaries of monetary policy decisions for the general public, and more in-depth content for experts, seems a promising route, provided that the layers convey the information consistently and that the simple layer avoids creating a false sense of certainty.

Finally, the traditional media remain the most important transmitter of central bank communication to the general public (van der Cruijssen et al. 2015; Gardt et al. 2021; Conrad et al. 2022). However, the media may add critique and interpretation to the central bank's message, which in turn could bias consumers' inflation expectations (Lamla and Lein 2014, 2015; Pinter and Kocenda 2023). To avoid this and to ensure that news coverage of central bank communication is maximized, studies find that statements explaining the policy decision in relation to the current state of the economy, that engage the reader personally and include facts or figures, are more likely to receive media coverage and less likely to be reported on critically (Berger et al. 2011; Munday and Brookes 2021).

Overall, it seems that central banks would do well to practice engaging more personally, and less technically, with the general public in order to reap the gains in terms of trust and credibility. At the same time, this could overcome some of the hurdles in gaining the attention, and thereby overcoming parts of the rational inattention, of the public. This chapter shows that much has been learned in this regard in recent years, but at the same time much remains to be done.

Acknowledgements

I thank Michael Ehrmann, Laetitia Lenel, and one anonymous referee for insightful comments and Luca Strickrodt for excellent research assistance.

Notes

- 1 Throughout this chapter, macroeconomic expectations by “firms” refers to expectations formed by the managers of those firms.
- 2 As we discuss in detail below (see, for instance, Section 3), this applies to both firm managers and households.
- 3 In the euro area, the ECB policy rate stayed at 0 percent from March 2016 to July 2022.
- 4 See, for instance, Jonung (1981) and D’Acunto et al. (2021).
- 5 Contrary to a monetary policy strategy of *inflation targeting*, where a central bank targets a numerical inflation target, say 2 percent, a strategy of *average inflation targeting* implies that the inflation target should be fulfilled on average over a certain time horizon. This means that if inflation stays below target over some time, the central bank will then allow inflation above target over some period.
- 6 In this speech, delivered at the Global Investment Conference in London on July 26, 2021, Dr. Draghi pledged that “within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough,” which at the time immediately led to falling spreads of government bonds in European countries affected by the debt crisis.

References

- Armantier, Oliver, Wändi Bruine de Bruin, Giorgio Topa, Wilbert van der Klaauw, and Basit Zafar. 2015. “Inflation Expectations and Behavior: Do Survey Respondents Act on their Beliefs?” *International Economic Review* 56, no. 2: 505–536.
- Berger, Helge, Michael Ehrmann, and Marcel Fratzscher. 2011. “Monetary Policy in the Media.” *Journal of Money, Credit and Banking* 43, no. 4: 689–709.
- Bholat, David, Nida Broughton, Janna Ter Meer, and Eryk Walczak. 2019. “Enhancing Central Bank Communications with Behavioural Insights.” *Journal of Monetary Economics* 108: 1–15.
- Binder, Carola. 2017. “Fed Speak on Main Street: Central Bank Communication and Household Expectations.” *Journal of Macroeconomics* 52: 238–251.
- Binder, Carola, and Alex Rodrigue. 2018. “Household Informedness and Long-Run Inflation Expectations: Experimental Evidence.” *Southern Economic Journal* 85, no. 2: 580–598.
- Blanchflower, David G., and Roger Kelly. 2008. “Macroeconomic Literacy, Numeracy and the Implications for Monetary Policy.” Unpublished manuscript. URL: https://www.researchgate.net/publication/228663282_Macroeconomic_Literacy_Numeracy_and_the_Implications_for_Monetary_Policy.
- Blinder, Alan S., and Alan B. Krueger. 2004. “What Does the Public Know about Economic Policy, and How Does It Know It?” *Brookings Papers on Economic Activity* 1: 327–387.
- Blinder, Alan S., Michael Ehrmann, Jakob de Haan, and David-Jan Jansen. 2024. “Central Bank Communication with the General Public: Promise or False Hope?” *Journal of Economic Literature* 62, no. 2: 425–457. DOI: 10.1257/jel.20231683.
- Blinder, Alan S., Michael Ehrmann, Marcel Fratzscher, Jakob de Haan, and David-Jan Jansen. 2008. “Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence.” *Journal of Economic Literature* 46, no. 4: 910–945.
- Braun, Benjamin. 2015. “Governing the Future: The European Central Bank’s Expectation Management During the Great Moderation.” *Economy and Society* 44, no. 3: 367–391.
- Burke, Mary A., and Michael Manz. 2014. “Economic Literacy and Inflation Expectations: Evidence from a Laboratory Experiment.” *Journal of Money, Credit and Banking* 46, no. 7: 1421–1456.
- Candia, Bernardo, Olivier Coibion, and Yuriy Gorodnichenko. 2020. “Communication and the Beliefs of Economic Agents.” *Navigating the Decade Ahead: Implications for Monetary Policy*, Economic Policy Symposium (Jackson Hole, WY) Proceedings, Federal Reserve Bank of Kansas City, 2020. URL: <https://www.kansascityfed.org/documents/7828/JH2020-Gordon.pdf>.
- Candia, Bernardo, Oliver Coibion, and Yuriy Gorodnichenko. 2021. “The Inflation Expectations Of U.S. Firms: Evidence From A New Survey.” NBER Working Paper No. 28836. URL: <https://www.nber.org/papers/w28836>, forthcoming in *Journal of Monetary Economics*.
- Carvalho, Carlos, and Fernanda Nechio. 2014. “Do People Understand Monetary Policy?” *Journal of Monetary Economics* 66: 108–123.

- Chahrour, Ryan, Kristoffer Nimark, and Stefan Pitschner. 2021. "Sectoral Media Focus and Aggregate Fluctuations." *American Economic Review* 111, no. 12: 3872–3922.
- Clarida, Richard, Jordi Galí, and Mark Gertler. 1999. "The Science of Monetary Policy: A New Keynesian Perspective." *Journal of Economic Literature* 37, no. 4: 1661–1707.
- Coibion, Olivier, Dimitris Georgarakos, Yuriy Gorodnichenko, Geoff Kenny, and Michael Weber. 2024. "The Effect of Macroeconomic Uncertainty on Household Spending." *American Economic Review* 114, no. 3: 645–677.
- Coibion, Olivier, Dimitris Georgarakos, Yuriy Gorodnichenko, and Michael Weber. 2023a. "Forward Guidance and Household Expectations." *Journal of the European Economic Association* 21, no. 5: 2131–2171.
- Coibion, Olivier, and Yuriy Gorodnichenko. 2012. "What Can Survey Forecasts Tell Us about Information Rigidities?" *Journal of Political Economy* 120, no. 1: 116–159.
- Coibion, Olivier, Yuriy Gorodnichenko, and Michael Weber. 2022. "Monetary Policy Communications and their Effects on Household Inflation Expectations." *Journal of Political Economy* 130, no. 6: 1537–1584.
- Coibion, Olivier, Yuriy Gorodnichenko, Edward S. Knotek II, and Raphael Schoenle. 2023b. "Average Inflation Targeting and Household Expectations." *Journal of Political Economy Macroeconomics* 1, no. 2: 403–446.
- Coibion, Olivier, Yuriy Gorodnichenko, and Saten Kumar. 2018. "How Do Firms form Their Expectations? New Survey Evidence." *American Economic Review* 108, no. 9: 2671–2713.
- Coibion, Olivier, Yuriy Gorodnichenko, and Tiziano Ropele. 2020. "Inflation Expectations and Firm Decisions: New Causal Evidence." *Quarterly Journal of Economics* 135, no. 1: 165–219.
- Conrad, Christian, Zeno Enders, and Alexander Glas. 2022. "The Role of Information and Experience for Households' Inflation Expectations." *European Economic Review* 143: 104015.
- Crump, Richard K., Stefano Eusepi, Andrea Tambalotti, and Giorgio Topa. 2022. "Subjective Intertemporal Substitution." *Journal of Monetary Economics* 126: 118–133.
- D'Acunto, Francesco, Andreas Fuster, and Michael Weber. 2021. "Diverse Policy Committees Can Reach Underrepresented Groups." NBER Working Paper No. 29275. URL: <https://www.nber.org/papers/w29275>.
- D'Acunto, Francesco, Daniel Hoang, Maritta Paloviita, and Michael Weber. 2020. "Effective Policy Communication: Targets versus Instruments." Chicago Booth Research Paper No. 20–38. DOI: 10.2139/ssrn.3713355.
- D'Acunto, Francesco, Ulrike Malmendier, Juan Ospina, and Michael Weber. 2021. "Exposure to Grocery Prices and Inflation Expectations." *Journal of Political Economy* 129, no. 5: 1615–1639.
- De Fiore, Fiorella, Marco Lombardi, and Johannes Schuffels. 2021. "Are Households Indifferent to Monetary Policy Announcements?" BIS Working Paper No. 956. URL: <https://www.bis.org/publ/work956.pdf>.
- Dräger, Lena. 2015. "Inflation Perceptions and Expectations in Sweden—Are Media Reports the Missing Link?" *Oxford Bulletin of Economics and Statistics* 77, no. 5: 681–700.
- Dräger, Lena, and Michael J. Lamla. 2012. "Updating Inflation Expectations: Evidence from Microdata." *Economics Letters* 117: 807–810.
- Dräger, Lena, and Michael J. Lamla. 2017. "Imperfect Information and Consumer Inflation Expectations: Evidence from Microdata." *Oxford Bulletin of Economics and Statistics* 79, no. 6: 933–968.
- Dräger, Lena, Michael J. Lamla, and Damjan Pfajfar. 2016. "Are Survey Expectations Theory-Consistent? The Role of Central Bank Communication and News." *European Economic Review* 85: 84–111.
- Dräger, Lena, Michael J. Lamla, and Damjan Pfajfar. 2022. "The Hidden Heterogeneity of Inflation and Interest Rate Expectations: The Role of Preferences." CESifo Working Paper No. 9637. URL: <https://www.cesifo.org/node/68721>.
- Dräger, Lena, Michael J. Lamla, and Damjan Pfajfar. 2024. "How to Limit the Spillover from an Inflation Surge to Inflation Expectations?" *Journal of Monetary Economics* 144, no. 103546. DOI: 10.1016/j.jmoneco.2023.12.004.
- Dräger, Lena, and Giang Nghiem. 2021. "Are Consumers' Spending Decisions in Line with an Euler Equation?" *The Review of Economics and Statistics* 103, no. 3: 580–596.

- Dräger, Lena, and Giang Nghiem. 2025. "Inflation Literacy, Inflation Expectations, and Trust in the Central Bank: A Survey Experiment." *The Review of Economics and Statistics*, March 2025, 1–45. DOI: https://doi.org/10.1162/rest_a_01576.
- Duca-Radu, Ioana, Geoff Kenny, and Andreas Reuter. 2021. "Inflation Expectations, Consumption and the Lower Bound: Micro-Evidence from a Large Multi-Country Survey." *Journal of Monetary Economics* 118: 120–134.
- Ehrmann, Michael, and Alena Wabitsch. 2022. "Central Bank Communication with Non-Experts: A Road to Nowhere?" *Journal of Monetary Economics* 127: 69–85.
- Ehrmann, Michael, Sarah Holton, Danielle Kedan, and Gillian Phelan. 2023. "Monetary Policy Communication: Perspectives from Former Policymakers at the ECB." *Journal of Money, Credit and Banking* 56, no. 4: 837–864. DOI: 10.1111/jmcb.13054.
- Enders, Zeno, Franziska Hünnekes, and Gernot J. Müller. 2019. "Monetary Policy Announcements and Expectations: Evidence from German Firms." *Journal of Monetary Economics* 108: 45–63.
- Farvaque, Etienne, Muhammad Azmat Hayat, and Alexander Mihailov. 2017. "Who Supports the ECB? Evidence from Eurobarometer Survey Data." *The World Economy* 40, no. 4: 654–677.
- Ferrara, Federico Maria, and Siria Angino. 2022. "Does Clarity Make Central Banks More Engaging? Lessons from ECB Communications." *European Journal of Political Economy* 74: 12146.
- Gardt, Marius, Siria Angino, Simon Mee, and Gabriel Glöckler. 2021. "ECB Communication with the Wider Public." Published as part of the *ECB Economic Bulletin* 8/2021. URL: https://www.ecb.europa.eu/pub/economic-bulletin/articles/2022/html/ecb.ebart202108_02~5c1e5a116d.en.html.
- Haldane, Andrew. 2018. "Climbing the Public Engagement Ladder." Speech at the Royal Society for the Encouragement of Arts, Manufactures and Commerce (RSA), London. March 6, 2018. URL: <https://www.bis.org/review/r180323b.htm>.
- Haldane, Andrew, Alistair Macaulay, and Michael McMahon. 2021. "The 3 E's of Central Bank Communication with the Public." In *Independence, Credibility, and Communication of Central Banking*, edited by Ernesto Pastén, and Ricardo Reis, 279–342. Santiago: Banco Central de Chile.
- Haldane, Andrew, and Michael McMahon. 2018. "Central Bank Communications and the General Public." *AEA Papers and Proceedings* 108: 578–583.
- Hayo, Bernd, and Edith Neuenkirch. 2014. "The German Public and its Trust in the ECB: The Role of Knowledge and Information Search." *Journal of International Money and Finance* 47: 286–303.
- Hayo, Bernd, and Florian Neumeier. 2020. "Public Knowledge about and Attitudes towards Central Bank Independence in New Zealand." *Journal of Banking and Finance* 113: 1–13.
- Hoffmann, Mathias, Emanuel Moench, Lora Pavlova, and Guido Schulte Frankenfeld. 2022. "Would Households Understand Average Inflation Targeting?" *Journal of Monetary Economics* 126 (supplement): S52–S66.
- Jonung, Lars. 1981. "Perceived and Expected Rates of Inflation in Sweden." *American Economic Review* 71, no. 5: 961–968.
- Jost, Adriel. 2017. "Is Monetary Policy Too Complex for the Public? Evidence from the UK." Swiss National Bank Working Paper No. 2017–15. URL: https://www.snb.ch/en/publications/research/working-papers/2017/working_paper_2017_15.
- Kumar, Saten, Hassan Afrouzi, Olivier Coibion, and Yuriy Gorodnichenko. 2015. "Inflation Targeting Does Not Anchor Inflation Expectations: Evidence from Firms in New Zealand." *Brookings Papers on Economic Activity* Fall: 151–225. URL: <https://www.brookings.edu/articles/inflation-targeting-does-not-anchor-inflation-expectations-evidence-from-firms-in-new-zealand/>.
- Lamla, Michael J., and Dmitri V. Vinogradov. 2019. "Central Bank Announcements: Big News for Little People?" *Journal of Monetary Economics* 108: 21–38.
- Lamla, Michael J., and Dmitri V. Vinogradov. 2021. "Is the Word of a Gentleman as Good as his Tweet? Policy Communications of the Bank of England." Working Paper Series in Economics 403, University of Lüneburg Institute of Economics. URL: <https://ideas.repec.org/p/lue/wpaper/403.html>.
- Lamla, Michael J., and Sarah M. Lein. 2014. "The Role of Media for Consumers' Inflation Expectation Formation." *Journal of Economic Behavior and Organization* 106: 62–77.
- Lamla, Michael J., and Sarah M. Lein. 2015. "Information Rigidities, Inflation Perceptions, and the Media: Lessons from the Euro Cash Changeover." *Economic Inquiry* 53, no. 1: 9–22.

- Lenel, Laetitia. 2023. "Economic Narratives and Economic Crises." *Journal of Modern European History* 21, no. 4: 426–429.
- Lewis, Daniel J., Christos Makridis, and Karel Mertens. 2020. "Do Monetary Policy Announcements Shift Household Expectations?" Federal Reserve Bank of New York Staff Report No. 897. URL: https://www.newyorkfed.org/research/staff_reports/sr897.html.
- Maćkowiak, Bartosz, Filip Matějka, and Mirko Wiederholt. 2023. "Rational Inattention: A Review." *Journal of Economic Literature* 61, no. 1: 226–273.
- Maćkowiak, Bartosz, and Mirko Wiederholt. 2009. "Optimal Sticky Prices under Rational Inattention." *American Economic Review* 99, no. 3: 769–803.
- Mellina, Sathya, and Tobias Schmidt. 2018. "The Role of Central Bank Knowledge and Trust for the Public's Inflation Expectations." Deutsche Bundesbank Discussion Paper No. 32/2018. URL: <https://www.bundesbank.de/en/publications/research/discussion-papers/the-role-of-central-bank-knowledge-and-trust-for-the-public-s-inflation-expectations-759070>.
- Munday, Tim, and James Brookes. 2021. "Mark My Words: The Transmission of Central Bank Communication to the General Public Via the Print Media." Bank of England Staff Working Paper No. 944. URL: <https://www.bankofengland.co.uk/working-paper/2021/the-transmission-of-central-bank-communication-to-the-general-public-via-the-print-media>.
- Pinter, Julien, and Evžen Kocenda. 2023. "Media Treatment of Monetary Policy Surprises and Their Impact on Firms' and Consumers' Expectations." *Journal of Money, Credit and Banking*. URL: <https://doi.org/10.1111/jmcb.13096>.
- Pons-Novell, Jordi. 2003. "Strategic Bias, Herding Behaviour and Economic Forecasts." *Journal of Forecasting* 22, no. 1: 67–77.
- Rumler, Fabio, and María Teresa Valderrama. 2020. "Inflation Literacy and Inflation Expectations: Evidence from Austrian Household Survey Data." *Economic Modelling* 87(C): 8–23.
- Sims, Christopher A. 2003. "Implications of Rational Inattention." *Journal of Monetary Economics* 50, no. 3: 665–690.
- Soroka, Stuart N. 2006. "Good News and Bad News: Asymmetric Responses to Economic Information." *The Journal of Politics* 68, no. 2: 372–385.
- Souleles, Nicholas S. 2004. "Expectations, Heterogeneous Forecast Errors, and Consumption: Micro Evidence from the Michigan Consumer Sentiment Surveys." *Journal of Money, Credit and Banking* 36, no. 1: 39–72.
- Stanisławska, Ewa, and Maritta Paloviita. 2021. "Medium- vs. Short-Term Consumer Inflation Expectations: Evidence from a New Euro Area Survey." NBP Working Paper No. 338. URL: https://static.nbp.pl/publikacje/materialy-i-studia/338_en.pdf.
- ter Ellen, Saskia, Vegard H. Larsen, and Leif Anders Thorsrud. 2022. "Narrative Monetary Policy Surprises and the Media." *Journal of Money, Credit and Banking* 54, no. 5: 1525–1549.
- Tillmann, Peter, and Andreas Walter. 2019. "The Effect of Diverging Communication: The Case of the ECB and the Bundesbank." *Economics Letters* 176(C): 68–74.
- van der Crujsen, Carin, David-Jan Jansen, and Jakob de Haan. 2015. "How Much Does the Public Know about the ECB's Monetary Policy? Evidence from a Survey of Dutch Households." *International Journal of Central Banking* 11, no. 4: 169–218.
- van der Crujsen, Carin, Jakob de Haan, and Maarten van Rooij. 2023. "The Impact of High Inflation on Trust in National Politics and Central Banks." DNB Working Paper No. 762. URL: <https://www.dnb.nl/en/publications/research-publications/working-paper-2023/762-the-impact-of-high-inflation-on-trust-in-national-politics-and-central-banks/>.
- Wälti, Sébastien. 2012. "Trust No More? The Impact of the Crisis on Citizens' Trust in Central Banks." *Journal of International Money and Finance* 31, no. 3: 593–605.

NARRATIVES AND THE MEDIA

Henrik Müller

Information, Expectations, and Narratives

Jack Balkin (1998), the cultural theorist and scholar of constitutional law at Yale University, strove to decipher the “cultural software” of societies. Why are people collectively inclined to adopt a particular belief system or ideology? What is the purpose? How could the features of a particular cultural matrix be captured? And how does this software influence human behavior? Balkin’s answers came down to this: the code in which societies condense their collective experiences and from which they derive their conceptions of the future is set in the form of narratives. Meaningful stories, or narratives, carry “social myths and shared memories that unite groups we are a part of, frame their experience of contemporary events, and produce shared expectations about how the group is supposed to behave” (Balkin 1998, 189).

Balkin’s proposition may sound far off-topic in a book about economic expectations. It is not. Gauging the future requires informed guesses about the behavior of social systems, markets, institutions, and, not least, other people. If individual decisions are made in line with shared beliefs about the workings of the world in general and the economy in particular, the social environment becomes more predictable. Expectations are formed by taking into account the likely actions of others, who are influenced by shared belief systems that in turn are captured in the form of narratives. As humans “reason about the social world,” they rely on “networks of narratives,” that is, sense-making stories “easily transmitted through communication” that are “deeply entrenched in human thought,” Balkin argued (Balkin 1998, 188).

The notion that studying narratives may indeed enhance our understanding of expectations formation, and economic behavior more generally, has become widely acknowledged in recent years. Following Robert Shiller’s (2017, 2019) forceful argument, which called for developing “narrative economics” as a new sub-discipline, a fertile field of research has sprung up. Unlike other social sciences that have undergone “narrative turns” in recent decades, economics is not bound to give up its tried and tested methodology. Rather, narrative approaches are now supplementing analytical ones. They come from different starting points. That the sentiment or “animal spirits” prevailing in social groups exerts an influence

on economic aggregates has long been an issue in economics (e.g., Keynes 1936; Akerlof and Shiller 2009). While survey data such as purchasing manager indices and financial analysts' assessments of the economy have served as early indicators for decades, they provide little explanation of the origins of sentiment and the mood swings it frequently undergoes. That is, a micro-foundation is lacking. Psychology has provided behavioral economics with a framework stressing the impulsive nature of human cognition and decision making (e.g., Kahneman 2011; Thaler 2017). In the mode of "thinking fast," in circumstances characterized by the need to make quick choices under uncertainty, humans are prone to turn to narratives that store the experiences of others. Conviction Narrative Theory (Tuckett and Nicholic 2017, and Tuckett, Chapter 5 in this volume) has refined this approach, stressing that decision-making requires comparisons of perceived yields of different options. Seen this way, narratives serve as a vehicle connecting causes (actions) and effects (results). "Narratives arise from the interplay between individual cognition and the social environment, with reasoners adopting a narrative to explain the available evidence; using that narrative to imagine plausible futures; and affectively evaluating those imagined futures to make a choice" (Johnson et al. 2020, 2).

Roos and Reccius (2021) draw on several disciplines, most notably literature studies. They propose that "[a] collective economic narrative is a sense-making story about some economically relevant topic that is shared by members of a group, emerges and proliferates in social interaction, and suggests actions" (Roos and Reccius 2021, 13). Importantly, they stress that narratives are about stating *causal relationships*. While empirical economics has a hard time distinguishing between correlation and causality, narratives are largely about eliminating ambiguity by stating clear-cut connections between causes and effects, in line with the findings of behavioral science. For social groupings to be able to act collectively, they rely on shared narratives that provide them with a common understanding of the problems with which they are confronted.

The study of narratives in economics is not driven solely by the academic quest to better understand human decision-making, but also by practitioners in economic policy. To give an example: monetary policy-making has become an increasingly narrative-based discipline since the financial crisis of 2008. As interest rates were trending downward in the 2010s, the attempt to influence expectations by talking about future central bank actions ("forward guidance") augmented, and for a while supplanted, traditional policy instruments such as short-term interest rates, reserve requirements, and asset purchases (see also the discussion by Dräger, Chapter 12 in this volume). As interest rates hit the lower bound, central bankers turned themselves into storytellers.

If "radical uncertainty" (Kay and King 2020) is a feature of twenty-first-century economic conditions, narratives should be studied and taken into account. In this vein, the Bank of England pursues narrative analyses of the stories and convictions that guide company executives' decisions (Tuckett et al. 2020). The Bank also has striven to use these narrative accounts to calibrate its communication, which in turn is supposed to influence economic agents' expectations.

There are plenty of applications that strive to include narrative concepts into economic analysis, including finance, where "Narrative Disclosure Tone" has become an approach to measure the language used by managers to present information to external stakeholders (e.g., Bassyouny and Abdelfattah 2022). Still, studies often lack a precise definition of what an economic narrative actually is; sometimes the term is used as a fancy synonym for some kind of text-mining exercise. It often remains unclear where narratives come from,

how they develop, and how they spread. They are seen as coming into being spontaneously, emanating in social intercourse where, in Shiller's (2017) analogy, they disperse like epidemics, infecting more and more people, mutating in the process, until eventually immunity kicks in, ultimately causing the number of cases (i.e., people who subscribe to a particular narrative) to decline again.

The epidemiological analogy may be an elegant thought experiment. But it is a gross simplification. That narratives spread in a non-hierarchical manner among social groups, in the same way that rumors may have spread on an ancient city square, is hardly an appropriate approximation of contemporary societal communication. Modern mass societies are characterized by "the mediated construction of reality" (Couldry and Hepp 2016), where it is journalistic media's role to disseminate the narratives containing the "cultural software" of societies, thereby governing their self-perception and charting their paths to the future. Hence, to understand the dynamics involved, it is necessary to take note of the mechanisms that drive the media. However, approaches that incorporate a specific media sector are rare, with Chahrour et al. (2021), Goldman et al. (2022), and Schmidt et al. (2023) being notable exceptions.

This chapter focusses on the role of the media in the context of expectation-influencing narratives. The next section highlights how the media turn information into news, the former being an unwieldy resource mostly kept private, while the latter is a marketable good. The third, subsequent section proposes a workable definition of media narratives as well as a taxonomy of different dimensions of social narratives. A case study for the measurement of inflation narratives is presented in the fourth section, before I finally draw some conclusions concerning the media's coordinating role in expectations formation.

Journalistic Behavior: How the Media Transform Information into News

Media-based time series have been used for forecasting inflation, investment, business cycles, and financial market developments (e.g., Lamla and Lein 2014; Larsen and Thorsrud 2019; Lamla et al. 2020; Conrad et al. 2021; ter Ellen et al. 2021; Flynn and Sastry 2022), as well as to measure uncertainty (Baker et al. 2016). Interestingly, economists tend to treat media content as an exogenously provided source of data, often presupposing that journalists report real-world events and developments in a timely, correct, and unbiased fashion. This is an heroic assumption. From a media economic perspective (e.g., Hamilton 2004; Fengler and Ruß-Mohl 2005; Fengler 2016), news is a product that is manufactured under a set of constraints. Therefore, what makes the news is not necessarily a matter of superior objective importance but rather the result of media organizations' economic incentives, professional standards, hierarchies of influences (Shoemaker and Reese 2016), and media users' behavior. News producers (journalists, publishing houses, broadcasting corporations) face trade-offs, and not just budgetary ones. The production of news is costly. Revenues need to be generated, whether from subscriptions or advertising or other sources. Reaching a paying (or marketable) audience of considerable size is a necessary condition for the very existence of "the news." Product differentiation is well developed; different news outlets cater to different political and ideological tastes (Müller and Hornig 2020).

The *New York Times*' traditional claim "All the news that's fit to print" was rephrased by media economist James T. Hamilton as "All the news that's fit to sell" (Hamilton 2004), implying that news, as a product, should not be confused with pure and comprehensive

information. There may be some objective reality out there, but its representation in the media can only be partial and biased one way or another, because news has to sell, resources are scarce, and user attention is limited.

Editorial decisions on what to cover and what to ignore are guided by *news values*. These criteria can be interpreted both as a positive description of what media are actually doing and as a normative set of rules that editors should follow. Communication scientists have come up with a multitude of factors that govern these choices (e.g., Galtung and Ruge 1965; Harcup and O'Neill 2017). The essential news values can be summarized as follows: timeliness, negativity, conflict, proximity, prominence, and consonance. In practice, that means that what is happening today is more important than what happened yesterday. It helps if a problem is addressed, and even better, if it results in a clash between persons, groups, or other entities. The closer to home all this takes place, or the more it affects the readers personally, the better. The involvement of well-known figures enhances a story's news value. If it resonates with established narratives, or if other media are reporting on it intensively, an issue's priority tends to increase. Conversely some issues rarely make the news: slowly-evolving problems that cannot be pinned to a certain event; positive developments, and abstract ones happening in far-away places; new trends, or new interpretations of established trends. For example, over-leveraging and asset price bubbles rarely make the news until an acute crisis hits. Complicated and abstract policy areas such as monetary or tax policy, when addressed in general media, tend to be reduced to emotion-arousing spin (Müller 2023, 46).

Consonance has become more important, driven in part by publishing on the internet where editors observe the editorial choices of competitors in real time (on the double contingency in expectation formation, see also Lenel and Reichmann, Chapter 16, Köhler and Logemann, Chapter 17, and Mata, Chapter 18 in this volume). Issues that attract attention elsewhere can be easily adapted. Since speed is of the essence, replicating prevailing *frames* (see next section) is an instant way to inform new facts with established meaning. The results are episodes of herd behavior when virtually all the “mainstream” news media cover the same issue with a similar spin. *Issue attention cycles* (Downs 1972; Dayan and Katz 1992; Kepplinger 2001; Waldherr 2014) have become faster and stronger (Lorenz-Spreen et al. 2019). Such herd behavior is rational from the perspective of individual news media—maximizing user attention while a topic is “trending” at low cost.

The mechanisms of the news are firmly grounded in both professional practices and in patterns of media perception. After all, the media need to attract an audience, and mass media cannot exist without a mass audience. Journalism needs to attract users' attention and try to hold on to it as long as possible. News websites and programs are designed to induce curiosity, not necessarily to enlighten their audience. Stories are composed in ways that keep users reading, watching, or clicking. Journalism is part of a vast attention industry, governed by “attention merchants” (Wu 2017). Individual news outlets compete with other journalistic media, and with entertainment media such as streaming and gaming services, for users' limited time budgets and attention spans.

However, journalism's particular incentives and instincts are tamed by the *experience good* (Nelson 1970) properties of news products. Since individual users mostly cannot judge the quality of a story ex ante, they need to be able to rely on a media outlet's expertise and sincerity to emphasize the most important issues and to report the most relevant facts correctly. Trust is built over time by the frequent use of the same media brand and by observing which brands other people use and trust; this is why the established names

of legacy print and TV journalism are still major news sources in the digital age (Nielsen 2016). To ensure consistent quality, professional standards and editorial procedures have been established. Journalism as a “knowledge profession” (Donsbach 2014) relies on specialization and educational programs designed to train journalists to be up to the task. Facticity, impartiality, multi-perspectivity, never relying on a single source alone—such characteristics of quality journalism strive to reconcile the public’s demand for trustworthy information with journalism’s own limitations. News media do not only compete for attention, but also for the audience’s trust.

Today, the interplay of social and traditional journalistic media sets a society’s agenda in terms of perceptions of which problems need to be tackled urgently and which can wait; or, viewed differently, which issues citizens should know the key facts of and have an opinion about and can thus discuss with their peers. Politicians in liberal democracies react to headlines, to the effect that the political agenda is largely driven by the media, which in turn are influenced by political decision-makers, business lobbyists, activists, and researchers trying to convince the public of what to pay attention to (“agenda setting,” Lippman 1922; McCombs and Shaw 1972) and how to think about it (“second-level agenda setting,” e.g., McCombs 2008). This process used to be centered on journalistic media, and is now driven by social media as well as “hybrid media systems” (Chadwick 2017).

Despite their limitations, news media help citizens make sense of an otherwise incomprehensibly complex world. The news not only informs individuals about matters important to them personally but also about what other people are preoccupied with, which in turn influences expectations and economic decisions (on this point, see also Lenel and Reichmann, Chapter 16 in this volume,). This “third person effect” is a powerful channel of media influence (Davison 1983; Peiser 2009). An individual may deem certain issues unimportant or misinterpreted, but is influenced by their presentation in the media nonetheless, due to the belief that other people or institutions find them important, and act accordingly. Typically, people underestimate the influence of the news on themselves and overestimate its influence on others (Perloff 2009). Even people with expert knowledge in some areas, like business executives, investors, or entrepreneurs, are influenced by economic news, since the third-person effect typically increases with social distance (Lischka 2016). The media also exert considerable influence on professional forecasters, as Boumans et al. (2023) found in a global survey of economic experts. The majority of respondents agreed with the notion that media content played a decisive role in shaping their convictions about future economic developments, and hence their expectations. Underlining the power of the third-person effect, this result also holds for authoritarian countries where censorship and propaganda prevail and the media consequently enjoy low levels of credibility: even where economic experts themselves are skeptical concerning the quality and accuracy of media content, they assume that other people are not.

Journalistic Content: Media Frames and Narratives

While the previous section dealt with basic mechanisms deemed to explain the behavior of journalistic media, we now turn to their content: how to capture what the media are reporting? In communication science, the concept of the *media frame* is widely used, particularly as a framework for quantitative content analyses. A media frame captures journalism’s sense-making role. It is related to concepts such as news values (stressing negativity) and agenda-setting (formulating political priorities). A frame informs media users of

problems a society is confronted with at a given point in time, pondering causes, responsibilities, and options to alleviate them.

In his influential definition, Entman (1993, 52) proposed that a media frame consists of four elements: (a) a problem definition; (b) a diagnosis; (c) a moral judgment; and (d) possible problem-solving solutions. A news piece may contain one frame, or several; it may also be rudimentary in the sense that it doesn't comprise all four elements but only a subset. Interpreted through the lens of media economics, a frame is a time- and cost-saving way to interpret new information. Think of natural disasters such as floods or hurricanes that are frequently referred to as manifestations of global warming. Once a frame is established, it plays to the news value of consonance: reporters, editors, and their audiences are primed, with the effect that the meaning of a piece of new information is more easily understood, raising interest and attention.

However, *frame* is a somewhat static concept that is centered on a short period of time. In contrast, a *narrative* features "temporal qualities" that are largely missing in the frame concept (Tenenboim-Weinblatt et al. 2016, 153). After all, narratives are supposed to inform decision-making in uncertain situations by harking back to (collective) memory. Squaring literature studies with neuroscience, Breithaupt (2022) stresses the episodic nature of narratives: without narratives to structure the passage of time, the human brain would be overwhelmed. Segmenting experiences and memories into episodes with a distinct, albeit temporary endpoint brings order to the perception of an otherwise chaotically complex reality. Note that the episodic nature of narratives resonates with the concept of the attention cycle mentioned above—although the decline of an attention cycle is typically *not* associated with some narrative endpoint, or the actual resolution of a problem, but with the latter's drowning-out by the next awareness-arousing issue.

To arrive at a workable, and empirically verifiable, concept of a media narrative, a broad definition is needed. Given the close relation to the media frame, Müller et al. (2018) add two more categories to Entman's definition: (e) actors—persons, institutions, or social groups (nations, classes, etc.)—who are set in (often antagonistic) relationships; (f) events that are placed in temporal sequences and deemed to constitute causal relationships. Hence, a media narrative comprises several frames plus elements (e) and (f).

Economic narratives are only rarely spelt out explicitly in media content. Rather, news pieces contain insinuations of latent narratives that serve as points of orientation. Consider how journalists produce news stories. Media economic objectives call for reaching a maximum audience in a fast and cost-efficient manner; long-term objectives also include quality requirements, particularly factual correctness, in order to bolster trust and hence a media brand's market value. To be a viable product, journalistic content needs to be true, convincing, and exciting. It also needs to be digestible, that is, not overly complex. Complexity, in turn, is reduced when new facts are linked to established narratives (catering to the news value of consonance).

Typically, a particular story comes into being as an event triggers one or several news values. A useful example is the release of labor market data. New information is deemed all the more important if it constitutes a problem (the news value of negativity). Hence, high and rising unemployment rates are newsworthier than low and falling ones. The editorial process involves not only picking and thereby prioritizing an issue (unemployment), but also choosing a narrative that helps make sense of a piece of data. The inherent newness of information implies that reporters and editors face considerable degrees of uncertainty themselves. They too do not know exactly what is going on at the current

juncture, a complication they deal with by contextualizing the news through gathering further information and referring the results to prevailing interpretative patterns.

In alignment with the elements of a media narrative, a reporter ponders questions concerning cause and effect (why are people out of work?), their history (how did current conditions come about?), responsibilities (whose fault is it?), possible remedies (what can be done?), and how the situation is bound to play out (what will happen next?). While doing research she or he is usually confronted with several narratives that are already present in public discourse. In our example of the high unemployment scenario, several narratives may be prevalent: one that blames high unemployment rates on corporations off-shoring jobs; one that points to insufficient aggregate demand as the root cause; one emphasizing job-killing red tape and unionization; one claiming that immigration is driving the domestic labor force out of their jobs; one that targets new labor-saving technologies—and maybe some more. It is the reporter's job to compare prevailing narratives with evidence. If the facts do not fit the story, a narrative should be rejected, or else a journalism outfit risks its credibility.

Still, there may be several plausible narratives floating around in the public sphere at a given point in time. Of these, a reporter, or her editor, picks the one that is expected to capture the largest share of viewers, which, in turn, depends on a publication's core audience. Consequently, expert voices, political opinions, and additional information are gathered to support the chosen narrative (Attfield and Dowell 2003). While the quality criterion of multi-perspectivity calls for an issue to be covered in adequate complexity, a certain "spin" is often inevitable.

The five example narratives provided above may be attributed as "leftist," "Keynesian," "neoliberal," "nativist," and "Luddite" respectively. These labels indicate that the respective economic policy narrative is linked to deep, long-lasting meta-narratives with roots in ideology, national identity, or religion. Hence, current developments are informed by underlying belief-systems that, in turn, attach judgements to facts. While all of the five unemployment narratives cited above may be true (i.e., supported by facts) to some extent, linking them to meta-narratives renders some of them mutually exclusive. After all, it is hard to be a neoliberal (believing in the blessings of private property) and a leftist (seeing things through the lens of class struggle and exploitation) at the same time.

Therefore, as new (selections of) data are released, a complex mechanism is evoked. It involves the preferences of the audience, the content of the surrounding public sphere, and not least, the predispositions of a specific media brand itself. A reporter sitting down to write a news story first needs to convince herself, then her editor, and lastly her audience. What is more, a narrative gains credibility in the news business if important actors throw their weight behind it (the news value of prominence). Personally, editors and reporters may consider an argument baloney, but if a government minister, a central bank governor, or an eminent investor puts it forward, it is bound to be reported nonetheless.

By linking pieces of information to possible consequences, media narratives influence expectations. They provide answers to the question of what will happen next. A narrative works both in direct and indirect ways: it offers a (crude) model of the workings of the economy, and it also informs individuals about the consequences other people (and institutions) anticipate and hence their likely actions (the third-person effect). To return to the example above, if a Keynesian narrative prevails about the meaning of rising unemployment that is shared not only by swaths of the media but also by the authorities, the observation of new facts leads to an expectation of less inflation and lower policy rates in

an attempt to bolster aggregate demand. That is, it is believed to indicate the future course of policies and markets.

To further efforts of conceptualization, I have proposed a taxonomy of social narratives (Müller 2023, Chapter 4). In Figure 13.1, a hierarchy is depicted, starting with the most basic and longest-lasting belief systems: meta-narratives, or grand narratives, a term coined by Lyotard (1984), encompass historic experience, values, social norms, and moral inclinations. They purport what are deemed to be deeper truths and attach legitimacy to power and meaning to other, lesser stories; they are particularly long-lived and usually not called into question. Thus, meta-narratives form the foundations of societies. They come in a range of shapes, religions, ideologies, or national histories that, referring to Balkin's (1998) software analogy, serve as societies' operating systems.

Economic narratives link these deep-seated belief systems to more concrete issues. Think of liberalism as a meta-narrative that stresses individual rights and freedom of choice. In terms of economic issues, these values translate into protecting property rights and open markets, limiting the redistribution of income and wealth, and prioritizing price signals over command-and-control regulation. Economic policy narratives, in turn, translate a thus-defined liberal economic narrative into concrete policy areas. According to this view, for example, monetary policy should refrain from interfering with private decisions but provide stable currency in a neutral manner. To achieve this, central banks should operate in a transparent, rules-based, and non-manipulative manner.

In a pluralistic society, where deliberation happens in ways resembling the Habermasian ideal, there is not just one monolithic economic (policy) narrative, but a diversity of frames, and possibly entire narratives, that compete for the best interpretation of observable reality as well as ways to reconcile conflicting interests. As experience evolves over time, so do narratives. New episodes are added, possibly letting older ones fade into oblivion. This process of deliberation unfolds in the media. They provide platforms for public discourse as well as a foundation of reliable facts as a precondition for deliberation, even though they add their own biases, as discussed in the previous section. In this sense, journalistic media have an "illuminating quality," without which "the citizens' will" could neither be formed nor voiced (Habermas 2021).

Contrary to authoritarian political systems, where hegemonic narratives are forced upon societies by state propaganda and censorship, open democratic societies and their media never stop arguing. This does not prevent some narratives from becoming dominant for a period of time; that is, they are widely accepted and frequently referred to by the media, thereby shaping the perception of economic reality and potentially influencing expectations. In a survey concerning the bout of inflation that began in the US in the fall of 2021, Andre et al. (2022) found that respondents, aside from economic experts, resorted to rather simplistic narratives that were primarily influenced by their political leanings and corresponding media use. Republicans relying on media outlets such as Fox News opined that the Biden administration and the Federal Reserve were responsible for rising prices. In contrast, Democrats mainly blamed higher mark-ups and "corporate greed" for inflation; this group of participants largely consumed liberal media such as the *New York Times* and the cable news program MSNBC. According to the respondents' perceptions, different courses of action would be considered appropriate in response.

By establishing cause and effect nexuses, narratives enable individuals and social groups to make ad hoc predictions. If perceived wisdom maintains that X causes Y, observing some occurrence of X leads to expecting a related manifestation of Y. This is particularly

helpful under “radical uncertainty.” To be able to make quick choices, vagaries need to be eschewed by presupposing unequivocal relationships between X and Y—until they are refuted by reality. This narrative-based trial-and-error approach can be considered rational in situations where comprehensive, analytically-tested knowledge is not to hand.

Dominant narratives take the form of social conventions that evolve over time and are eventually discarded. Seen this way, economic narratives can be likened to the economic models at the heart of the rational expectations hypothesis (Muth 1961). As Muth put it, “the way expectations are formed depends specifically on the structure of the relevant system describing the economy” (Muth 1961, 316). This “relevant system” was understood by Muth as meaning the most accurate description, at a given time, of the underlying economic structure, an empirically verified “true” model. Naturally, this model must be the result of ongoing scientific competition. It needs to be altered when the underlying structure of the economy changes and it is no longer capable of explaining observable phenomena; or when new methods, new data sources, and enhanced computing power produce better results. Neither in econometrics nor in narrative formation are there eternally correct descriptions of reality. To make sense of reality as it unfolds, simplified models or narratives are needed that social groups share as orientation points—until a better explanation ensues, or, as is often the case in social sciences like economics, the phenomena to be explained change (on this point, see also the introduction and Born, Enders, and Müller, Chapter 10 in this volume).

Case Study: Toward Measuring Inflation Narratives

In the previous section it was argued that a media narrative contains six elements, thereby capturing collective memories that will fade over time as they are overwritten by new experiences. We also asserted that narratives evolve over time, typically taking on an episodic structure. To measure narrative, therefore, a method is called for that includes all of these features.

In Müller et al. (2021, 2022) an approach is laid out that makes use of the dynamic topic modeling procedure “RollingLDA” developed by Rieger et al. (2021, 2023). Latent Dirichlet Allocation (LDA, Blei et al. 2003) has become a workhorse method in text mining. In its original formulation, it is well-suited for the identification of media frames (di Maggio et al. 2013). *Frame* being an inherently static concept and LDA being a static method, they fit together well over limited observation periods and for thematically limited text corpora. Over longer periods, however, the correspondence between research object and method is less obvious. LDA assumes the structural stability of topics over time, which collides with the more fluid nature of narratives. Accordingly, RollingLDA allows topic structures to change over time by modeling fading collective memory, as newer versions of stories overwrite older ones. New data are fitted to a topic model that is calculated based on a rolling window of past observations. The past informs the perception of the present, but older memories sink into oblivion. If LDA in its original formulation can be compared to a snapshot of the past, RollingLDA turns it into a motion picture (for detailed methodical considerations see Müller et al. 2021; for an emerging alternative approach making use of the RELATIO method see Lange et al. 2022).

This type of corpus dissection produces what may be called macro-content analyses. It is not focused on the identification of more extreme occurrences on the edges of polarized media spheres, but on some kind of mean thematic media coverage. In this vein, Müller

et al. (2022) constructed an Inflation Perception Indicator (IPI) that captures the coverage of inflationary developments in mainstream media.

The IPI is based on a corpus of three leading German newspapers with a national circulation: *Süddeutsche Zeitung* (center left), *Die Welt* (center right), and *Handelsblatt* (business, liberal). The data was obtained from LexisNexis and from the publishing houses. The time series start on January 1, 2001. At the time of writing, the combined corpus contains about 3 million articles. A filter is applied to distill a thematically-focused analysis corpus of about 50,000 newspaper articles dealing with inflation in some fashion. In subsequent steps the RollingLDA method is put to work to sort the corpus into thematic clusters of articles (“topics”). The calibration of the topic model is guided by the above-cited definition of a narrative and the objective of producing coherently interpretable and distinguishable topics.

The rationale behind the IPI is the notion that there is a link between media coverage of inflation and expectation formation. As company executives, employees, and consumers obtain information about the macro economy from television, news websites, and newspapers, media content influences conceptions of price dynamics (de Fiore et al. 2022). Different perceived causes should lead to different anticipations of the duration and strength of an impending inflationary period: if an inflation narrative prevails that purports that soaring energy prices and strained supply chains are the main causes of inflation, it would be straightforward for economic agents to expect a more or less automatic slowdown of price rises once these supply-side bottlenecks have been worked out. By contrast, if the conduct of macroeconomic institutions (central banks, governments) was considered to be the major cause of inflationary dynamics, it would be sensible to assume inflation would stay higher for longer. This is why the IPI model is calibrated to carve out perceived causes and consequences of inflation as they are reported by the media.

Figure 13.2 shows the relative overall inflation coverage (corpus before thematic decomposition by the topic modelling procedure) and German consumer price inflation from January 1, 2001 to February 28, 2023. The exceptionality of the most recent inflationary episode is obvious. Over most of the period considered, inflation was not a significant issue. Local peaks in reporting are associated with data releases and business cycle forecasts, while the overall volume of inflation coverage remained rather low.

However, an upward shift of the IPI frequency curve can be noticed after the financial crisis of 2008 and the ensuing euro crisis, with newspaper attention roughly doubling in the period afterward compared with the level in the 2000s. This is somewhat remarkable given the low and declining readings of official consumer price inflation over this period.

When inflation took off in the second half of 2021, media attention followed, peaking in the fall of 2022. At that point, the intensity of media coverage started declining, even though inflation, and particularly core inflation (excluding food and energy), remained at elevated levels.

The RollingLDA procedure allows a more detailed look into the narrative structure of media coverage. Figure 13.3 shows the IPI model’s topics in relation to causes of inflation. It can be seen that the elevated inflation coverage during the 2010s was driven by debates about central banking and the fiscal rules of the Eurozone.

The German debate about the appropriateness and long-term viability of the set-up of Eurozone macro policies centered particularly on the ECB’s bond-buying programs, with the 2019 peak of the central bank topic associated with the resurgence of quantitative easing being a case in point. The years-long macroeconomic argument about Euro policies primed

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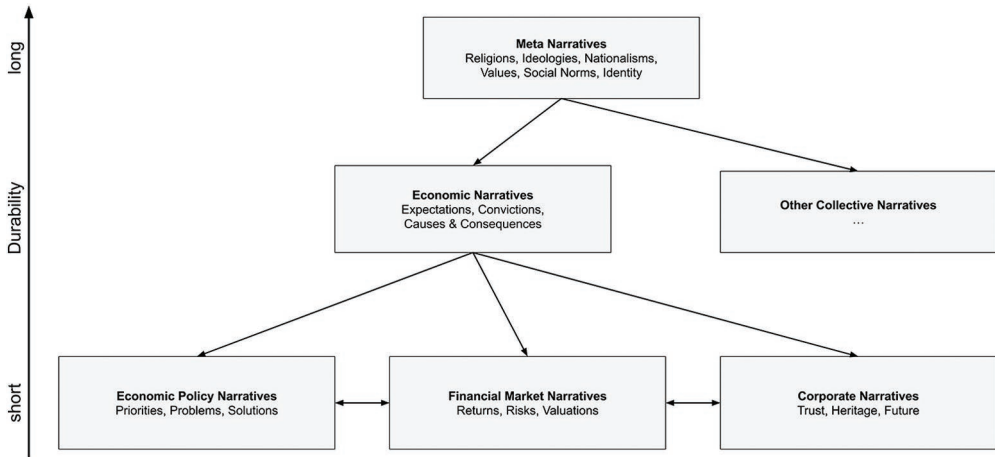


Figure 13.1 A taxonomy of social narratives.

Source: Author creation.

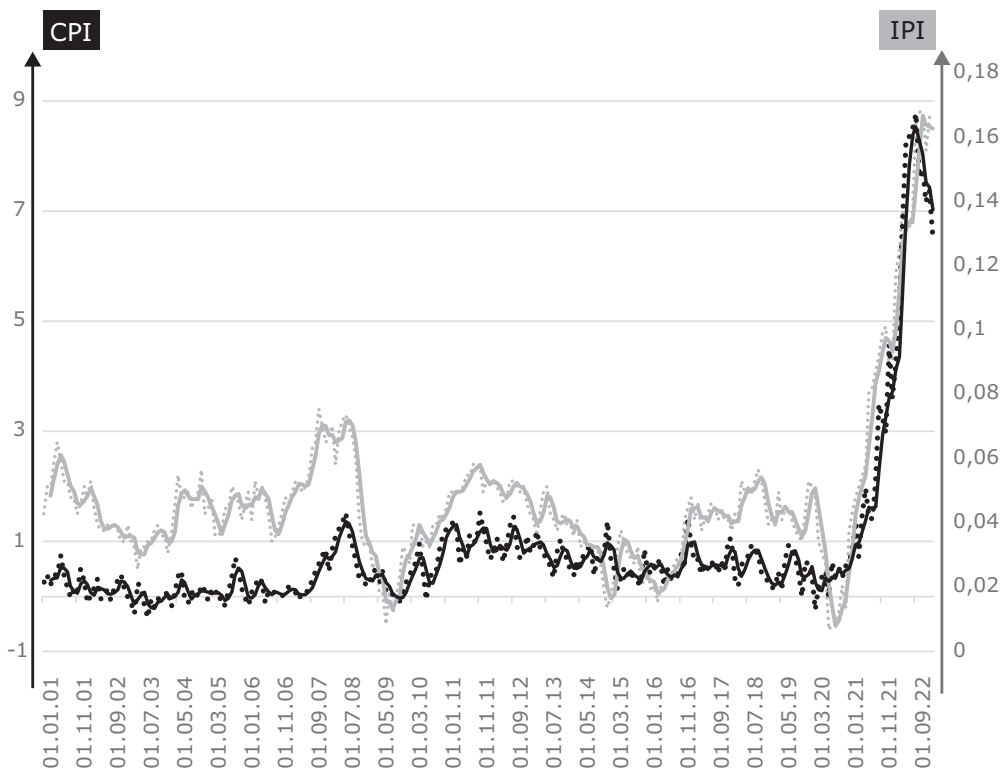


Figure 13.2 German Consumer Price Index (CPI) and Inflation Perception Indicator (IPI), percent (left-hand side) share of overall news coverage* January 1, 2001 to February 28, 2023.

*Three-month moving average and monthly data (dotted lines), analysis corpus relative to entire news coverage. Source: Destatis, Müller, et al. (2023)

Source: Author creation.

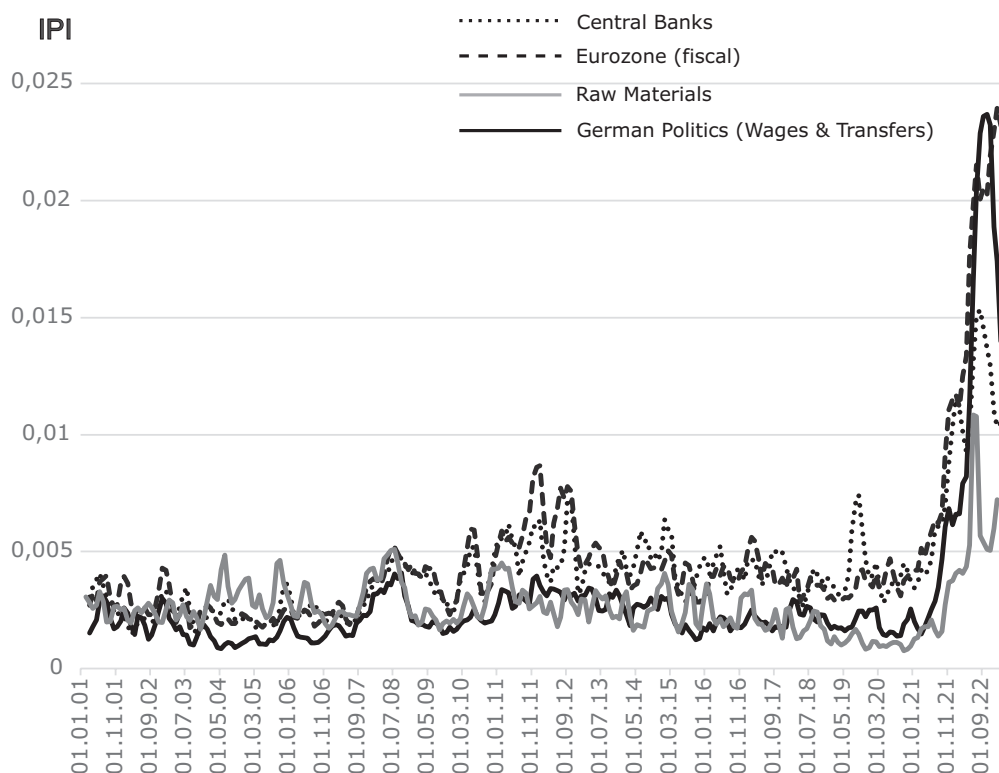


Figure 13.3 Causal IPI topics. (Shares of overall news coverage, 3-month backward-looking moving averages.)

Source: Author creation.

the German public. Unsurprisingly, when inflation actually took off in 2021, the coverage centered on monetary and fiscal policy initially. The rising prices of raw materials as a cause of inflation played only a minor role, even though they might have been considered an obvious driver at the time. After the initial inflation shock was journalistically digested, second-round effects (wage negotiations, debates about rising transfers) and the fiscal implications of dearer energy took center stage. Toward the end of the observation period, we can detect a marked decline in coverage concerning monetary and redistributive policies.

Applying the properties of a media narrative proposed in the previous section, the IPI model's results can be summarized as follows:

- a *Problem definition*: inflation hurts, particularly savers and consumers, but also companies unable to shift the burden of higher input prices to their customers.
- b *Problem diagnosis*: inflation is driven by rising raw material prices (short-term), longer-term inflationary developments are caused by monetary and fiscal policy, with second-round effects contributing to the persistence of price dynamics.
- c *Moral judgement*: inflation is bad, though the low rates during the period of time considered here have not been much of a problem. However, the expropriation of savers, due to extreme low or negative real yields, is to be condemned.

- d *Possible remedies*: tighter monetary and fiscal policies, even if that hurts financial markets in the short-run.
- e *Protagonists*: Villains: central banks, finance ministries, raw material-exporting countries. Victims: savers, investors, workers.
- f *Events*: during the IPI's observation period three episodes can be detected: 2008, associated with higher import prices and substantial wage demands; 2011, associated with higher import prices and substantial loosening of monetary conditions by the ECB; from 2021, associated with post-Covid supply constraints, expensive raw materials, ultra-loose monetary and fiscal policies, followed by the Ukraine war.

To be sure, the supreme role of journalism is its function in pointing to detrimental developments. As the media address an issue with priority, they move it up on the political agenda (McCombs and Shaw 1972; McCombs et al. 2013; Camargo et al. 2021). News cycles, or issue-attention cycles, typically follow a pattern in which different aspects of an issue are stressed by the media in sequential ways (Downs 1972; Waldherr 2014; Lörcher and Neverla 2015). Figure 13.4 dissects the inflation coverage during the bout of inflation starting in 2021 using Downs' (1972) five-phase model as a framework.

As the frequency curves indicate, it took the media several months to realize that inflation was indeed a problem which would not go away by itself anytime soon. When CPI readings crept up, starting in the second half of 2021, the initial media response was somewhat cautious. At the time, central bankers and economic forecasters mostly considered

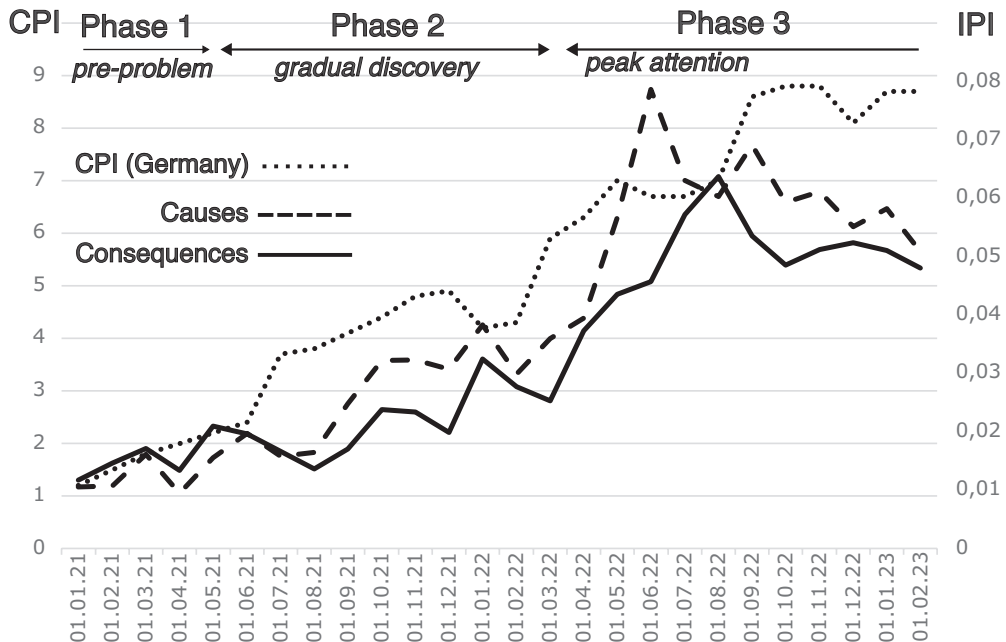


Figure 13.4 Causes vs. consequences of inflation, related IPI topics, CPI (dotted), January 2021 to February 2023. (Share of overall news coverage, annual percentage change. Causes topics: Central Banks, Eurozone, German Politics, Raw Materials. Consequences topics: Private Investment, Financial Markets, Companies.)

Source: Author creation.

inflation to be “transitory,” caused by temporary supply bottlenecks due to Covid-19 related production hold-ups. Accordingly, the newspapers kept their coverage at fairly low volumes. German CPI inflation rose from 2 percent in April 2021 to 5 percent by the end of that year, with reporting intensity reacting only modestly.

This changed drastically in the spring of 2022, when three developments coincided: first, headline and core inflation kept rising; thus, it became clear that underlying price pressures would not fade away automatically, as central banks had maintained for months. Second, the Russian invasion of Ukraine in February 2022 and the ensuing energy embargoes and sanctions drove price indices up severely. Third, central banks realized that they had been complacent for too long and started signaling that they were ready to step on the brakes; the Fed started hiking policy rates on March 17, 2022, the ECB followed on July 27 of the same year.

Note that there is no clearly detectable key event in the inflation attention cycle. As is often the case with economic phenomena, tensions build up slowly. What may seem obvious in hindsight, is highly uncertain at the time when editorial choices need to be made. As a result, media attention does not take off at a distinct point in time, but the “alarmed discovery” (Downs’ terminology) that there indeed is a problem only sinks in gradually. At some point, though, the untenable nature of the situation becomes unequivocally obvious. In this case, it was central banks’ admission that decisive monetary tightening was needed that triggered “peak attention.” In this phase of reporting, the media primarily focused on the causes of inflation, including (re-)distributional second-round effects. Consequences of inflation only played a secondary role, as Figure 13.4 shows. Eventually, the issue went into “gradual decline of intense public interest,” Downs’ fourth phase. Even though the underlying problem remained unresolved, public attention was turning to other issues that were entering phase 2. Toward the end of the observation period the inflation attention cycle was already past its peak, as the intensity of media coverage trickled away, with inflation remaining high and core inflation still on the rise (Müller et al. 2023).

This type of media mechanism may have consequences for expectation formation. With respect to the gross volume of reporting, there is a connection to the “rational inattention” approach (for an overview, e.g., Maćkowiak et al. 2023; see also Dräger, Chapter 12 in this volume). People do not need to concern themselves with the specifics of the current state of macroeconomic affairs as long as things are going well. When growth is robust and inflation low and stable, there are plenty of issues to pay attention to that are more interesting, and more entertaining. This calculus changes when things are not running smoothly anymore.

When inflation is gaining momentum, people start paying attention more closely, as they strive to adapt to altered macroeconomic circumstances. As Federal Reserve chairman Jerome Powell stressed in his 2022 Jackson Hole address, “inflation has just about everyone’s attention right now, which highlights a particular risk today: The longer the current bout of high inflation continues, the greater the chance that expectations of higher inflation will become entrenched” (Powell 2022). The volume of inflation-related reporting matters, because otherwise inattentive economic agents start paying attention and shift their expectations upward, thereby potentially inducing further deviations from the goal of price stability.

In the first phases of an attention cycle, rational inattention is overcome by the sheer volume of reporting, prompting economic agents to watch events closely and adjust their expectations accordingly. As media attention peters out, they revert to inattention, with expectations remaining unaltered, even if economic conditions change. Inflation expectations stay at elevated levels somewhat irrespective of actual price developments, bar

the emergence of additional attention-arousing news shocks. Hence, it would be media mechanisms that contributed to the well-known stickiness of inflation expectations (Carroll 2003). Schmidt et al.'s (2023) analysis points in the same direction: using IPI data, they find that inflation expectations are significantly influenced by media coverage in times of intensive media coverage, with statistical significance fading when reporting intensity is low. A text data-based analysis of earnings calls transcripts concludes that fading attention after an inflation shock contributes to the delayed adjustment of inflation expectations (IMF 2023, 65).

However, the possible shift from a low-inflation regime to a high-inflation one (Borio et al. 2023) may change attention patterns concerning overall price developments in long-lasting and hitherto unknown ways.

Conclusion

This chapter highlights the role of the media in the evolution of economic narratives and their role in expectation formation. In particular, it strives to provide a workable definition of a media narrative firmly rooted in communication science, as well as a strategy to measure media narratives. As a case study, the coverage of inflation by German newspapers was analyzed using a dynamic topic modeling method, RollingLDA, able to capture the dynamics of narrative formation. A German inflation narrative was isolated.

The reasoning can be summed up by formulating five take-away messages:

- 1 Human cognition and decision-making partly rely on narrative patterns, particularly in situations characterized by uncertainty. Therefore, including narratives in economic analyses promises additional insights into the behavior of individuals and social groups.
- 2 Since the media play an important part in forming and disseminating narratives, it is straightforward to draw on communication science. Importantly, the media turn information into news, the latter being a product shaped by the constraints and incentives faced by journalists and media corporations. This results in a biased representation of economic reality in the news.
- 3 The intensity and the thematic focus of media coverage changes over time, though not necessarily in line with real-world developments. Media attention comes in cycles that have the tendency to peter out even if underlying problems have not been resolved.
- 4 Empirical evidence suggests that media coverage influences economic expectations when reporting intensity is high. This effect fades to insignificance when the relative volume of coverage is at low levels, as economic agents resort to rational inattention with regard to issues that are not high on the agenda.
- 5 The tendency of the media to engage in attention cycles is likely to contribute to the stickiness of expectations. Expectations that have been formed in periods of intensive media coverage may be slow to change, even if this would be justified by incoming new information, complicating the role of communication performed by institutions such as central banks.

Taken together, while *managing* expectations is clearly not a job that should be assumed by independent media in a liberal society, their coverage clearly contributes to *coordinating* expectations, albeit in imperfect ways.

The field of narrative economics may be flourishing, but it is hardly an established sub-discipline yet. Clearly, much more research is needed. In the process, drawing from other social sciences and the humanities promises to enhance scientific progress.

References

- Akerlof, George A., and Robert J. Shiller. 2009. *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton, NJ: Princeton University Press.
- Andre, Peter, Ingar Haaland, Christopher Roth, and Johannes Wohlfart. 2022. "Narratives about the Macroeconomy." Econtribute Discussion Paper No. 127. URL: https://www.econtribute.de/RePEc/ajk/ajkdps/ECONtribute_127_2021.pdf.
- Attfield, Simon, and John Dowell. 2003. "Information Seeking and Use by Newspaper Journalists." *Journal of Documentation* 59, no. 2: 187–204.
- Baker, Scott R., Nicholas Bloom, and Steven J. Davis. 2016. "Measuring Economic Policy Uncertainty." *The Quarterly Journal of Economics* 131, no. 4: 1593–1636. DOI: 10.1093/qje/qjw024.
- Balkin, Jack M. 1998. *Cultural Software: A Theory of Ideology*. New Haven, CT: Yale University Press.
- Bassyouny, Hesham, and Tarek Abdelfattah. 2022. "Executives vs. Governance: Who Has the Predictive Power? Evidence from Narrative Tone." *Review of Quantitative Finance and Accounting* 58, no. 1: 361–382. DOI: 10.1007/s11156-021-00997-y.
- Blei, David. M., Andrew Y. Ng and Michael I. Jordan. 2003. "Latent dirichlet allocation." *Journal of Machine Learning Research*, 3, 993–1022.
- Borio, Claudio, Marco Lombardi, James Yetman, and Egon Zakrajšek. 2023. "The Two-Regime View of Inflation." BIS Paper No. 133. URL: <https://www.bis.org/publ/bppdf/bispap133.pdf>.
- Boumans, Dorine, Henrik Müller, and Stefan Sauer. 2023. "How Media Content Influences Economic Expectations: Evidence from a Global Expert Survey." *Journal of Forecasting* 42: 1295–1308. DOI: 10.1002/for.2961.
- Breithaupt, Fritz. 2022. *Das narrative Gehirn. Was unsere Neuronen erzählen*. Berlin: Suhrkamp.
- Camargo, Chico Q., Peter John, Helen Z. Margetts, and Scott A. Hale. 2021. "Measuring the Volatility of the Political Agenda in Public Opinion and News Media." *Public Opinion Quarterly* 85, no. 2: 493–516.
- Carroll, Christopher D. 2003. "Macroeconomic Expectations of Households and Professional Forecasters". *The Quarterly Journal of Economics* 118, no. 1: 269–298. DOI: 10.1162/00335530360535207.
- Chadwick, Andrew. 2017. *The Hybrid Media System: Politics and Power*. Oxford Studies in Digital Politics. Oxford: Oxford University Press.
- Chahrour, Ryan, Kristoffer Nimark, and Stefan Pitschner. 2021. "Sectoral Media Focus and Aggregate Fluctuations." *American Economic Review*, 111, no. 12: 3872–3922.
- Conrad, Frederick G., Johann A. Gagnon-Bartsch, Robyn A. Ferg, Michael F. Schober, Josh Pasek, and Elisabeth Hou. 2021. "Social Media as an Alternative to Surveys of Opinions about the Economy." *Social Science Computer Review*, 39, no. 4: 489–508. DOI: 10.1177/0894439319875692.
- Couldry, Nick, and Andreas Hepp. 2016. *The Mediated Construction of Reality*. Cambridge, MA: Polity Press.
- Davison, W. Phillips. 1983. "The Third-Person Effect in Communication." *Public Opinion Quarterly* 47, no. 1: 1–15. DOI: 10.1086/268763.
- Dayan, Daniel, and Elihu Katz. 1992. *Media Events. The Live Broadcasting of History*. Cambridge, MA: Harvard University Press.
- De Fiore, Fiorella, Tirupam Goel, Deniz Igan, and Richhild Moessner. 2022. "Rising Household Inflation Expectations: What are the Communication Challenges for Central Banks?" *BIS Bulletin* 55: 9.
- DiMaggio, Paul, Manish Nag, and David Blei. 2013. "Exploiting Affinities between Topic Modeling and the Sociological Perspective on Culture: Application to Newspaper Coverage of US Government Arts Funding." *Poetics* 41, no. 6: 570–606. DOI: 10.1016/j.poetic.2013.08.004.
- Donsbach, Wolfgang. 2014. "Journalism as the New Knowledge Profession and Consequences for Journalism Education." *Journalism* 15, no. 6: 661–677. DOI: 10.1177/1464884913491347.

- Downs, Anthony. 1972. "Up and Down with Ecology: The Issue-Attention Cycle." *The Public* 28: 38–50.
- Entman, Robert M. 1993. "Framing: Toward Clarification of a Fractured Paradigm." *Journal of Communication* 43, no. 4: 51–58. DOI: 10.1111/j.1460–2466.1993.tb01304.x.
- Fengler, Susanne. 2016. "Journalismus als rationales Handeln." In *Handbuch Journalismustheorien*, edited by Martin Löffelholz, and Liane Rothenberger, 235–248. Wiesbaden: Springer VS.
- Fengler, Susanne, and Stephan Ruß-Mohl. 2005. *Der Journalist als "Homo oeconomicus."* Munich and Tübingen: UVK.
- Flynn, Joel P., and Karthik Sastry. 2022. "The Macroeconomics of Narratives." SSRN Scholarly Paper No. 4140751. DOI: 10.2139/ssrn.4140751.
- Galtung, Johan, and Mari Holmboe Ruge. 1965. "The Structure of Foreign News: The Presentation of the Congo, Cuba and Cyprus Crises in Four Norwegian Newspapers." *Journal of Peace Research* 2, no. 1: 64–90.
- Goldman, Eitan, Jordan Martel, and Jan Schneemeier. 2022. "A Theory of Financial Media." *Journal of Financial Economics* 145, no. 1: 239–258. DOI: 10.1016/j.jfineco.2021.06.038.
- Habermas, Jürgen. 2021. "Überlegungen und Hypothesen zu einem erneuten Strukturwandel der politischen Öffentlichkeit." *Leviathan* 49. Special issue 37/2021: 470–500.
- Hamilton, James T. 2004. *All the News That's Fit to Sell: How the Market Transforms Information into News*. Princeton, NJ: Princeton University Press.
- Harcup, Tony, and Deirdre O'Neill. 2017. "What is News? News Values Revisited (Again)." *Journalism Studies* 18, no. 12: 1470–1488.
- International Monetary Fund (IMF). 2023. *World Economic Outlook: Navigating Global Divergences*. Washington, DC: IMF.
- Johnson, Samuel G. B., Avri Bilovich, and David Tuckett. 2020. *Conviction Narrative Theory: A Theory of Choice under Radical Uncertainty*. DOI: 10.31234/osf.io/urc96.
- Kahneman, Daniel. 2011. *Thinking, Fast and Slow*. New York: Farrar, Straus and Giroux.
- Kay, John A., and Mervyn A. King. 2020. *Radical Uncertainty—Decision-Making beyond the Numbers*. London: The Bridge Street Press.
- Kepplinger, Hans M. 2001. "Der Ereignisbegriff in der Publizistikwissenschaft." *Publizistik* 46: 117–139.
- Keynes, John Maynard. 1936. *The General Theory of Employment, Interest and Money*. New York: Harcourt, Brace & Co.
- Lamla, Michael J., and Sarah M. Lein. 2014. "The Role of Media for Consumers' Inflation Expectation Formation." *Journal of Economic Behavior & Organization* 106: 62–77. DOI: 10.1016/j.jebo.2014.05.004.
- Lamla, Michael J., Sarah M. Lein, and Jan-Egbert Sturm. 2020. "Media Reporting and Business Cycles: Empirical Evidence Based on News Data." *Empirical Economics* 59, no. 3: 1085–1105. DOI: 10.1007/s00181-019-01713-5.
- Lange, Kai-Robin, Matthias Reccius, Tobias Schmidt, Henrik Müller, Michael Roos, and Carsten Jentsch. 2022. "Towards Extracting Collective Economic Narratives from Texts." *Ruhr Economic Papers* No. 963. DOI: 10.4419/96973127.
- Larsen, Vegard H., and Leif A. Thorsrud. 2019. "The Value of News for Economic Developments." *Journal of Econometrics* 210, no. 1: 203–218. DOI: 10.1016/j.jeconom.2018.11.013.
- Lippmann, Walter. 1922. *Public Opinion*. New York: Harcourt, Brace and Co.
- Lischka, Juliane A. 2016. *Economic News, Sentiment, and Behavior: How Economic and Business News Affects the Economy*. Wiesbaden: VS Verlag für Sozialwissenschaften. DOI: 10.1007/978-3-658-11541-8.
- Lörcher, Ines, and Irene Neverla. 2015. "The Dynamics of Issue Attention in Online Communication on Climate Change." *Media and Communication* 3, no. 1: 17–33. DOI: 10.17645/mac.v3i1.253.
- Lorenz-Spreen, Philipp, Bjarke Mørch Mønsted, Philipp Hövel, and Sune Lehmann. 2019. "Accelerating Dynamics of Collective Attention." *Nature Communications* 10, no. 1759. DOI: 10.1038/s41467-019-09311-w.
- Liotard, Jean-François. 1984. *The Postmodern Condition: A Report on Knowledge*. Manchester: Manchester University Press.
- Maćkowiak, Bartosz, Matějka, Filip, and Mirko Wiederholt. 2023. "Rational Inattention: A Review." *Journal of Economic Literature* 61, no. 1: 226–273.

- McCombs, Maxwell E. 2008. *Setting the Agenda: The Mass Media and Public Opinion*. Cambridge, MA: Polity Press.
- McCombs, Maxwell E., and Donald L. Shaw. 1972. "The Agenda-Setting Function of Mass Media." *Public Opinion Quarterly* 36, no. 2: 176–187.
- McCombs, Maxwell E., Donald L. Shaw, and David H. Weaver. 2013. "New Directions in Agenda-Setting Theory and Research." *Mass Communication and Society* 16, no. 6: 781–802.
- Müller, Henrik. 2023. *Challenging Economic Journalism. Covering Business and Politics in an Age of Uncertainty*. Cham: Palgrave Macmillan. DOI: 10.1007/978-3-031-31030-0.
- Müller, Henrik, and Nico Hornig. 2020. "‘I Heard the News Today, Oh Boy’—An Updated Version of our Uncertainty Perception Indicator (UPI)—and Some General Thoughts on News-Based Economic Indicators." DoCMA Working Paper #2. DOI: 10.17877/DE290R-21669.
- Müller, Henrik, Jonas Rieger, and Nico Hornig. 2021. "‘We’re Rolling.’ Our Uncertainty Perception Indicator (UPI) in Q4 2020: Introducing RollingLDA, a New Method for the Measurement of Evolving Economic Narratives." DoCMA Working Paper #6, Mar 2021. DOI: 10.17877/DE290R-21974.
- Müller, Henrik, Tobias Schmidt, Jonas Rieger, Nico Hornig, and Lena Marie Hufnagel. 2022. "A German Inflation Narrative—How the Media Frame Price Dynamics: Results from a RollingLDA Analysis." DoCMA Working Paper #9. DOI: 10.17877/de290r-22632.
- Müller, Henrik, Tobias Schmidt, Jonas Rieger, Nico Hornig, and Lena Marie Hufnagel. 2023. "The Inflation Attention Cycle. Updating the Inflation Perception Indicator (IPI) Up to February 2023—A Research Note." DoCMA Working Paper #13. DOI: 10.17877/DE290R-23141.
- Müller, Henrik, Gerret von Nordheim, Karin Boczek, Lars Koppers, and Jörg Rahnenführer. 2018. "Der Wert der Worte—Wie digitale Methoden helfen, Kommunikations- und Wirtschaftswissenschaft zu verknüpfen." *Publizistik* 63, no. 4: 557–582. DOI: 10.1007/s11616-018-0461-x.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica* 29, no. 3: 315–335.
- Nelson, Phillip. 1970. "Information and Consumer Behavior." *Journal of Political Economy* 78, no. 2: 311–329.
- Nielsen, Rasmus K. 2016. "The Business of News." In *The SAGE Handbook of Digital Journalism*, edited by Tamara Witschge, C. W. Anderson, David Domingo, and Alfred Hermida, 51–67. London: Sage Publications. DOI: 10.4135/9781473957909.
- Peiser, Wolfram. 2009. "Allgemeine Vorstellungen über Medienwirkungen." In *Wissenschaft mit Wirkung: Beiträge zu Journalismus- und Medienwirkungsforschung*, edited by Christina Holtz-Bacha, Gunter Reus, and Leandro Buss Becker, 143–159. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Perloff, Richard M. 1999. "The Third Person Effect: A Critical Review and Synthesis." *Media Psychology* 1, no. 4: 353–378. DOI: 10.1207/s1532785xmep0104_4.
- Powell, Jerome. 2022. "Monetary Policy and Price Stability." Speech at Reassessing Constraints on the Economy and Policy, an economic policy symposium, sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 26, 2022. URL: <https://www.federalreserve.gov/newsevents/speech/powell20220826a.htm>.
- Reese, Stephen D., and Pamela J. Shoemaker. 2016. "Media Sociology and the Hierarchy of Influences Model: A Levels-of-Analysis Perspective on the Networked Public Sphere." *Mass Communication and Society* 19, no. 4: 389–410.
- Rieger, Jonas, Nico Hornig, Tobias Schmidt, and Henrik Müller. 2023. "Early Warning Systems? Building Time Consistent Perception Indicators for Economic Uncertainty and Inflation Using Efficient Dynamic Modeling." In *Proceedings of Third International Workshop on Modelling Uncertainty in the Financial World (MUF'in 23)*. February 13, 2023, Washington, DC.
- Rieger, Jonas, Carsten Jentsch, and Jörg Rahnenführer. 2021. "RollingLDA: An Update Algorithm of Latent Dirichlet Allocation to Construct Consistent Time Series from Textual Data." In *Findings Proceedings of the Association for Computational Linguistics: EMPNL 2021*, edited by Marie-Francine Moens, Xuanjing Huang, Lucia Specia, and Scott Wen-Tau, 2337–2347. DOI: 10.18653/v1/2021.findings-empnl.201.
- Roos, Michael, and Matthias Reccius. 2021. "Narratives in Economics." *Ruhr Economic Papers* No. 922. DOI: 10.4419/96973068.

- Schmidt, Torsten, Henrik Müller, Jonas Rieger, Tobias Schmidt, and Carsten Jentsch. 2023. "Inflation Perception and the Formation of Inflation Expectations." *Ruhr Economic Papers* No. 1025. DOI: 10.4419/96973191.
- Shiller, Robert J. 2017. "Narrative Economics." *American Economic Review* 107, no. 4: 967–1004. DOI: 10.1257/aer.107.4.967.
- Shiller, Robert J. 2019. *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*. Princeton, NJ: Princeton University Press. DOI: 10.1515/9780691212074.
- Tenenboim-Weinblatt, Keren, Thomas Hanitzsch, and Rotem Nagar. 2016. "Beyond Peace Journalism: Reclassifying Conflict Narratives in the Israeli News Media." *Journal of Peace Research* 53, no. 2: 151–165.
- ter Ellen, Saskia, Vegard H. Larsen, and Leif A. Thorsrud. 2021. "Narrative Monetary Policy Surprises and the Media." *Journal of Money, Credit and Banking* 54, no. 5: 1525–1549. DOI: 10.1111/jmcb.12868.
- Thaler, Richard H. 2017. "Behavioral Economics." *Journal of Political Economy* 125, no. 6: 1799–1805.
- Tuckett, David, Douglas Holmes, Alice Pearson, and Graeme Chaplin. 2020. "Monetary Policy and the Management of Uncertainty: A Narrative Approach." Bank of England Working Paper 870. DOI: 10.2139/ssrn.3627721.
- Tuckett, David, and Milena Nikolic. 2017. "The Role of Conviction and Narrative in Decision-Making under Radical Uncertainty." *Theory & Psychology* 27, no. 4: 501–523. DOI: 10.1177/0959354317713158.
- Waldherr, Annie. 2014. "Emergence of News Waves: A Social Simulation Approach." *Journal of Communication* 64, no. 5: 852–873.
- Wu, Tim. 2017. *The Attention Merchants: How Our Time and Attention Are Gathered and Sold*. London: Atlantic Books.

14

CIVIL JURISDICTION AND REGULATION

Louis Pahlow

Economic expectations assume action-guiding functions in economic policy and influence the legislative implementation of the goals formulated therein. If, for example, the federal government decides to abolish or introduce tax incentives for companies, certain expectations of market players are automatically linked to this. Legal history differentiates the practical implementation of the regulations created in this way in terms of whether it is at the level of policy or through legislation. Both will be analyzed in this chapter as a legal decision-making process. More specifically, I explore the question of whether and to what extent courts and regulatory authorities take economic expectations into account in their decision-making processes. Do economic expectations play a role at all in government agencies and courts? And if so, how do officers and judges form their expectations and base their decision-making processes on them? Can certain patterns be identified in the relationship with politics on the one hand, and with the regulatory addressees (such as companies) on the other, which allow us to speak of “expectation coordination” or “expectation management”?

Economic expectations as a factor in the application of law have so far played a visible role only in legal theory, especially in the law-and-economics school that has been on the rise since the 1970s (fundamentally Posner 1972; Mercuro and Medema 1997; Teles 2008; Pahlow 2019). In this school, legal issues are specifically examined in light of economic theory models and logics of action, which also have to take the expectations of lawyers into account. The spectrum covers rational, boundedly rational, and game-theoretical models, which are usually used to confirm or question the efficiency of legal regulations (Eidenmüller 1995; Ruffner 2000; Towfigh and Petersen 2015; Langenbucher 2017). For example, legal conflicts and their regulation have received particular attention in the past in behavioral economics, which has also influenced the law-and-economics school. Amos Tversky and Daniel Kahnemann (1974) were able to show that people prefer certain judgment heuristics when making decisions under uncertainty. More recently, research has focused on the importance of actual contexts for judges’ decision-making behavior (Baker and Mezzetti 2012; Bordalo, Gennaioli, and Shleifer 2015; Chen, Moskowitz, and Shue 2016). Following the literature on heuristics and biases, judges have been modeled as agents and their perceptual biases, together with the effects of these on their decision-making behavior, have

been studied (Guthrie, Rachlinski, and Wistrich 2001; Schweizer 2005). This finding is not essentially new: legal scholars and sociologists have assumed for some time that judges do not follow exclusively legal principles when they judge facts or subsume facts under norms (Frank 1949; Peters 1973; Sisk, Heise, and Morriss 1998; Segal and Spaeth 2002). As early as the 1930s, adherents of American “legal realism” doubted that disputes could be decided on the basis of legal rules alone or that the “resolution” of legal conflicts could be derived from abstract concepts (e.g., Llewellyn 1930, 1931; see also Schlegel 1995). In contrast, the decision-making behavior of regulatory authorities was often assumed to be a subject in theoretically-based models (Stigler 1971; Martimort 1999; Laffont and Tirole 2002).

Research so far, however, has not provided any indications as to whether judges or officials include economic expectations of legal players (like officials or judges) in their considerations or react to them, nor has it discussed the legal instruments that could be used by such actors if this were the case. This is also due to the fact that the logics of legal decision-making are sometimes difficult and rather laborious to understand. The basis for evaluation is often the written decisions of the courts. Transformations of the previously applicable law, which have also been “developed” by the courts themselves, are difficult to decipher even for lawyers (Kähler 2004; Fischer 2007). In German law, for example, the “abandonment,” “deviation from,” or “modification” of precedent law is not specifically defined; the procedural codes presuppose such processes, but avoid restrictive standardizations of the prerequisites necessary for them. Judgments then also use terms like “modification” extremely rarely and instead use a variety of variants and ciphers. These can range from a clearly articulated “departure” to a more veiled “further development” or “supplement,” in which a change is possible but not necessary (Kähler 2004, 21–25). Moreover, the methods of law formation are even more convoluted; “new” laws are not overtly developed or “found.” Rather, transformation processes often play out under the guise of legal norms and their changing interpretation (Fischer 2007, 227; Brennecke 2018).

This chapter tackles these problems by using previously unpublished archival material and examining the decision-making behavior of German and European merger control in the 1970s and 1980s. Material from the German Federal Cartel Office (*Bundeskartellamt*, hereinafter BKA) and the EU Commission, and relevant decisions of the civil courts, has been systematically used. The corpus chosen for analysis is characterized by the fact that these decision-making processes required the legal players involved (who were mainly officials of the cartel offices and judges of the competent civil courts) to make an assessment of the future development of the respective relevant market after a merger. “Expectations” thus became a central decision-making criterion in the application of the law at both the national and supranational level. Expectations played a dual role here: on the one hand, they were a matter of taking into account the economic policy objective of the legislator (political expectations). On the other hand, the expectations of companies with regard to specific merger projects influenced the decision-making behavior of authorities and courts (expectations of market players). Since in a law-based economic order legal rules are considered to have a “guiding,” even “corrective” function (North 1992), the lawyers would have to anticipate the economic expectations of the cartel officers in order to achieve a guiding function of law. These perspectives on expectation formation can be illuminated by looking at legal practice.

At both the national (German) and supranational (European) levels, the legislature has used its prerogative of assessment and bound the legal players involved in merger control to certain legal frameworks, which, however, differ significantly from one another. This has

resulted in different practices of cartel offices and courts in Germany in comparison with the supranational level. In conclusion, the chapter shows how this comparison reveals a dynamic expectation management that contains both coordinative and conflictual elements.

Economic Policies and Legislative Differences

The practice of preventive merger control in Germany as well as in Europe has been characterized by the idea of not only keeping competition in the respective markets “functional” (Höhne 2022, 66–99), but also of thereby providing economic policy with steering instruments to prevent or redirect market developments perceived as harmful. At the European level, this has led to considerable tensions among member states since 1970, each of which has pursued different economic policies and was initially only willing to transfer national competencies to the supranational level to a limited extent.

As early as 1973, the Federal Republic of Germany (at the time West Germany) introduced preventive merger control, primarily to protect small and medium-sized enterprises from takeovers by large (foreign) corporations (Pahlow and Rassow 2018). Economic policy objectives influenced the design of merger control to a significant extent. In Germany, the legislature required BKA officials to make a forecasting decision on the impact of the merger on competition in the relevant markets, which could also lead to the prohibition of planned corporate concentrations. State intervention in the entrepreneurial freedom of organization was linked to a network of presumptions and counter-presumptions. The Act for the Prevention of Competition Restraints (*Gesetz gegen Wettbewerbsbeschränkungen*, GWB) limited and concretized the officials’ market assessment, for example, through quantitatively defined market share thresholds, turnover figures, and rules on the burden of proof that defined the question of “market dominance” or “substantial competition” ex ante, which was intended to channel and bind the scope of the BKA for assessment accordingly (Höhne 2022, 55–66, 127–140). From the outset, policymakers relied on a BKA procedure that was supposed to be “without bureaucratic cumbersomeness” or “informal” (Pahlow and Rassow 2018, 355).

With the “qualified oligopoly presumption” introduced in 1980, the legislator expanded the regulatory instruments in oligopolistic markets through techniques of shifting the burden of proof: if the market share requirements were met, the standard presumed market dominance and it was now solely up to the companies to present and prove facts that could rebut this presumption. If this evidence was not provided, the legislator believed that “the entirety of the oligopoly companies was dominant” and a merger was therefore to be rejected. Although the new regulation made it considerably easier to prohibit proposed mergers in oligopolistic markets, it once again made clear the extent to which the legislator continued to define desirable market concepts in terms of structural policy and limited the decision-making scope of the BKA in this respect.

At the European level, however, there was no special legal basis for decision-making until 1989. Although the European Commission (EC) had been able to act as a “competition authority” since 1962 under Regulation 17/62, the question of whether this also entailed the possibility of concrete intervention to control and prohibit mergers remained unregulated by law until the introduction of the first Merger Regulation in 1989. The only thing that was clear was that competition was to determine the common market. The founding states of the EEC thus deliberately did not adopt the model of the European Coal and Steel Community (ECSC) of 1951, whose executive body, the “High Commission,” was responsible

for practising control of corporate concentration in the coal and steel sector. This was related to the premises of Article 66 of the ECSC Treaty, which was primarily understood not as a regulatory framework but as a control provision to ward off a reconcentration of the German coal and steel industry as an arms industry (Witschke 2009, 41–79).

The EEC Treaty of 1957 standardized comparatively vague competition rules for the “common market” in Articles 85 and 86. Article 86 prohibited “abuse by one or more undertakings of a dominant position within the common market or in a substantial part thereof in so far as it may affect trade between Member States” (EEC Treaty 1957). The conditions of an “abuse” were not formulated, nor were more precise indications of an effect on “trade between Member States” given. If Article 86 of the EEC Treaty had been interpreted as an enabling provision for the Commission, this would have entailed considerable latitude of judgment on the part of the officials. The lack of specification—in contrast to the *GWB* of 1973—was due to the controversial discussions among the founding members about the future economic policy orientation of the EEC. The opposing poles were primarily Germany with a free-market, ordoliberal approach and France with a planning, interventionist approach (Küsters 1982, 364; Nörr 2007, 32–36; Pitzer 2009, 208 with further references). Despite various initiatives, both countries were for long periods unwilling to compromise and transfer economic policy competencies to the EEC level. This was not only due to different starting positions in terms of competition policy. Rather, a differentiated picture emerged: in the area of competition policy, the causes were, for example, protectionist objectives, domestic political dependencies (for example, the drafting of a competition law in Germany), foreign policy crises, budgetary considerations, and dependencies on other Community projects such as the common agricultural policy (Patel 2009).

In order not to let the European project fail due to the economic policy divergences of individual states, the implementation of Articles 85 and 86 of the EEC Treaty was to be reserved for a special regulation. It was not until the early 1960s, under the German Council presidency, that this “Regulation 17/62” was pushed through, which largely corresponded to the ordoliberal ideas of the German delegation. Thus, competition as the ordoliberal “organizing principle” (Müller-Armack 1965, 237) was to determine the common market. Intervention was to be possible only if it represented a correction of “competition-distorting” behavior, but was not to be permitted for “industrial policy” considerations. Regulation 17/62 entrusted the Commission with the implementation and enforcement of Articles 85 and 86 of the EEC Treaty. Only with this regulation did the Commission also become an independent competition authority. However, the regulation did not contain any concrete intervention standards, for example in favor of merger control. Here, the Commission was basically dependent on further specifications, which, within the framework of the European norm-setting structure, could only be achieved by a consensus of the member states. This was basically the often described but equally persistent weakness of the European integration project, which, despite the formal supranationality of the European institutions, still had to keep a political consensus among the member states in mind when it came to the creation of European law.

Levels of Coordination. The Expectation Management of the BKA and the Courts under the *GWB*

The roughly outlined differences in the legislative bases had a corresponding effect on merger control practices. With the *GWB* of 1973, the BKA had a prohibition norm at its

disposal, but its requirements were largely determined by the legislator. German merger control was thus not a “black box,” but rather the legislature itself provided transparent assessment standards, for example, through quantitative market share thresholds and concrete sales revenues as statutory “market dominance presumptions” that were intended to limit the decision-making discretion of judges and officials from the outset. However, they were quite different from what we would understand by “economic expectations.” For one thing, from the perspective of the BKA, it was not a matter of “permanent” uncertainty or risk assessment, but of meeting legally defined market share thresholds, i.e., real-time facts, not assessments of the future. Second, although economic insights and theories played a visible role in the legitimization and legal design of preventive merger control for the legislature, they could not be observed in decision-making practice, i.e., in the concrete assessment of the market situation or future market developments by authorities and courts (Höhne 2022, 66–99).

At the national level, the legal practice of the BKA officers initially developed into a coordinative model of expectation making, which by 1989 had shifted toward a more one-sided expectation management. This was mainly due to the fact that the problem of implementation in compliance with the law was reduced from a forward-looking decision to a factual level: only if the office had the necessary information about the relevant markets could officials invoke the statutory presumption rules. Because, as mentioned above, the proceedings before the BKA were to be handled “as far as possible without bureaucratic cumbersomeness” or “essentially informally” (Pahlow and Rassow 2018, 355), officials initially resorted to informal negotiation processes. Independent, informal procedural routines were established between the BKA and the companies involved as early as the mid-1970s. Their main purpose was to reconcile the actual market conditions with regard to a planned merger with the legal provisions, to obtain market data with and about the companies, to identify obstacles to mergers and to look for ways to overcome them. Initially, the BKA still often relied on data and assessments provided by the companies themselves.

Cooperative negotiation processes can be traced right up to the stage of the substantive decision on the admissibility of a merger. Until the beginning of the 1980s, the BKA approved numerous merger projects under a so-called commitment procedure. This involved an agreement between the companies and the authority in which the companies undertook to fulfill certain conditions. Acceptance of the commitment by the BKA implied the latter’s approval of the merger, without any actual implementation of the promised commitment being important (Höhne 2022, 157–158). The “informal” procedures had thus developed into cooperative decision-making mechanisms that made the companies equal negotiating partners, and also enabled the differing expectations of politicians and companies to be brought into balance.

While cooperative instruments between authorities and companies initially dominated both the identification of relevant market data and compliance with competition law targets, this regulatory practice changed in the 1980s. The commitment procedure had made it easier for officials to comply with legal requirements by simply making the compliance reliant on a binding agreement with the firms. And yet, it also opened up opportunities for abuse and manipulation by firms via the existing asymmetries in information gathering and processing (Höhne 2022, 163–180 with examples). Cases of targeted disinformation and failure to keep promises led to a change in officials’ thinking in the course of the 1980s. Decision-making departments now increasingly relied on unilateral interventions and hierarchical investigative procedures; accordingly, the commitment procedures became

increasingly rare. Informal negotiation processes were still possible and even politically desirable, but officials rarely relied on market assessments and promises made by the companies; they thus deviated from the political requirements of a procedure that was as “informal” as possible.

The “qualified oligopoly presumption” introduced in 1980 had done little to prevent this. Although an “overall consideration of all relevant circumstances” was required in oligopolistic markets, this was not intended to limit the officials to one, exclusive interpretation, but rather to give the companies the opportunity to respond with their own factual presentation. The decision-making process of preventive merger control thus no longer had to be limited solely to the subsumption of presumed facts, but could lead to a negotiation process of all conceivable “structural characteristics” of the relevant market, admittedly with the BKA retaining authority in the final decision (Höhne 2022, 139–140).

The introduction of qualified presumption rules further differentiated the justification of the required market forecast, as different structural characteristics of the identified market could now be used—these being conclusively defined by the legislator (Höhne 2022, 213–220). However, this only changed an aspect of the mechanisms of the BKA’s expectation management insofar as the BKA was now obliged to consider the company’s position in relation to evidence. In practice, the scope and limits of the standardized features were always defined on a case-by-case basis and were widely weighed and weighted—sometimes controversially—between the BKA and the company. The various “structural characteristics” of the “relevant market” were reduced to the provable, because present-day-related, level.

The spectrum of cooperative action before the courts was reduced even further. The limits of an intervention mechanism that could be expected and assessed became particularly apparent here, as the courts, as independent bodies, developed their own standards with regard to market share thresholds, presumption rules, or rules on the burden of proof, which in some cases differed significantly from the practices of the BKA. As the highest authority, the Federal Court of Justice (the German supreme court, *Bundesgerichtshof*, BGH) based in Karlsruhe also had the final say in the assessment and interpretation of the GWB. In Germany, both the BGH and the lower courts, by virtue of their decision-making authority, also developed divergent criteria of market assessment based on the present, and expanded existing ones or restricted them. Thus, actual experience with corporate concentrations played a role in the courts, too, which also influenced decision-making behavior (BGH, December 2, 1980 – KVR 1/80 – Klöckner-Becorit; Höhne 2022, 214 with more references). This in no way resulted in a principled partisanship in favor of the BKA. For example, it was not only in defining the term “substantial competition” that the BGH did not endorse the BKA, but rather the opposing view of the Berlin Court of Appeal (BGH, February 5, 1968—KVR 1/67—Fensterglas II). The courts thus decided the question of market dominance largely autonomously.

Coordination Without Regulation. The EEC Commission and the European High Court until 1989

In Europe, the situation was fundamentally different. Here, the Commission initially lacked a reliable competence for merger control, which was by no means established by the EEC Treaty. In the mid-1960s, however, the Commission came under considerable pressure to act in the face of a merger boom that could hardly be ignored and had drastic consequences

for European companies. Encouraged by externally obtained expert opinions, it determined in its 1966 concentration memorandum that certain mergers could be regarded as abuse of a dominant position within the meaning of Article 86 of the EEC Treaty. In 1971, the Commission then prohibited a merger in the “common market” for the first time, basing its decision solely on Article 86. An American packaging manufacturer (“Continental Can”) had acquired substantial stakes in European competitor companies and obliged them to set up a holding company under Continental Can’s management, which would have demonstrably dominated the relevant market in Europe. The Commission prohibited this action, finding “that Continental Can Company Inc. [...] held a dominant position in a substantial part of the common market” and had “abused this position,” thereby “virtually eliminating competition for the said packaging in a substantial part of the common market” (Commission, December 9, 1971, reprinted in: ABl. No. L 7, January 8, 1972, 25–39, 39).

The decision was a sensation, but remained an exception. While the BKA prohibited a total of 90 merger projects between 1973 and 1989, there were only three prohibitions at the European level (Höhne 2022, 146). Above all, the Commission focused less on an economic assessment of the common market in its reasons for its decision than on the justification of its supranational decision-making competence, i.e., predominantly legal or legal policy considerations. Although the legal foundations of the German GWB as well as the decision-making practice of the BKA served as a kind of model in this regard, the Commission did not have anything close to corresponding legal bases for decision-making or assessment at hand.

In the absence of concrete statutory intervention standards for merger control at the European level in the period 1973–1989, and since the Commission’s competence to issue prohibition orders was also challenged in legal terms, lawsuits against the Commission’s decisions were hardly surprising. As the highest court of the Community and “guardian of the Treaties” (Höpner 2011, 224), under Article 173 of the EEC Treaty the European Court of Justice (ECJ) had jurisdiction to hear, among other things, actions directed against the violation of primary law (such as the EEC Treaty, for example). Although the ECJ overturned the Commission’s first decision in 1973, it not only confirmed the applicability of Article 86 of the EEC Treaty as an intervening norm for corporate mergers, but even extended its regulatory scope in its reasoning. The ECJ thus actively intervened in the discourse on competition policy that had been going on since the 1960s. What is interesting here is not so much the judges’ legal approach, but the fact that they deliberately used the judgment to answer open questions of legal policy—namely that of merger control within the EEC—by means of the judicial consideration in the judgment; the judges need not have included these judicial considerations but could have simply given the annulment.¹

Strengthened by this allocation of competence under judicial law, the Commission nevertheless deliberately held back on further prohibition decisions. In view of the need to interpret the provisions of the EEC founding treaties, the Commission had considerably more scope for decision-making, which led neither to an expansion of merger control or restrictive regulatory measures, nor to any consideration of economic expertise. The effects that resulted from this practice of the Commission were nevertheless noticeable. On several occasions, the Commission threatened to prohibit or review planned mergers and in this way achieved a noticeable change in the behavior of companies. That this threat was taken seriously by the companies concerned can be seen from the fact that they tried to negotiate a compromise with the Commission,² but mostly refrained from a proposed merger.³ The lack of sufficiently concrete legal bases limiting the decision-making competence apparently

led to an opposite effect. Cooperative negotiation processes did take place, but they were not able to form a viable basis for both sides to balance the conflicting expectations. On the contrary, the majority of companies even abandoned their merger plans altogether.

With the decision of the ECJ, the Commission was indeed in a position to initiate a regulation at the supranational level to subject mergers to “systematic control.”⁴ However, the negotiations on corresponding draft regulations in 1973 soon became bogged down in political disputes among the member states. In the 1980s, the Commission therefore pursued a double-edged strategy. On the one hand, in its reports on competition policy and in response to inquiries from the European Parliament and the business press, it expressed deliberate ambivalence about the possible application of Article 86 of the EEC Treaty, thus increasing the already existing legal uncertainty. On the other hand, it began to notify the application of Article 86 directly to the companies involved in mergers that it considered problematic for competition. In contrast to the situation under the GWB, however, there was still no transparent basis for deciding when and under what conditions a merger was permissible or impermissible, bound by standardized criteria. The Commission was virtually alone in assuming or rejecting the existence of an “abuse of a dominant position” on a case-by-case basis. Increasingly, therefore, companies were in favor of the adoption of a “Merger Regulation” (*Fusionskontrollverordnung*, FKVO) in order to obtain binding conditions and thus certainty of expectation for forthcoming mergers.⁵

The turning point in the negotiations on a merger control regulation was again the ECJ, which was called upon in the context of an action brought by companies against a minority shareholding declared permissible by the Commission. In its “Philip Morris” ruling, the ECJ applied Article 85 of the EEC Treaty, an antitrust provision, to a concentration process for the first time. Its comments on the applicability of Article 85 as a further merger control provision were not relevant to the decision in this case either, but rather an expression of its self-appointed function as a law-shaping body of the Community (“political player”).⁶ As in the context of Article 86 of the EEC Treaty, the Commission used the ECJ decision primarily as a means of exerting pressure on the companies, but also on the Council of Ministers. It signaled to the Council of Ministers that, although Articles 85 and 86 of the EEC Treaty did not provide it with optimal control instruments, it was prepared to use them as a legal basis for achieving its competition policy objectives.

The examples not only illustrate the difficulties of supranational lawmaking in this area, which depended heavily on different national economic policies. They also provide insight into the legislative structure of the EEC, which had an impact on the formation of expectations by the players. As a supranational body, the ECJ used its function as “guardian of the treaties” to intervene in the European integration process in a formative way as well, to expand (or narrow) provisions of the EEC treaty in order to strengthen (or limit) the sphere of competence of supranational law and its organs. The example of competition law can be used to demonstrate that the ECJ, as the highest court, assumed a law-shaping, basically legal policy-making function (“judicial law making”) to a much greater extent than in national legal systems (Höpner 2011, 224; Bogdandy 2012; Florczak-Wator 2020, 203–220). When the ECJ is described as the “engine” of the European unification process or European law as “law without a state,” this has much to do with this judicial component. In its autonomous decision-making, it certainly resembles national courts.

On the basis of the Commission’s European merger control, however, it is also possible to identify clear differences compared with the (initially cooperative) expectation management of the BKA, which confirm the cooperative momentum in a quasi-negative way. It is

true that companies have certainly tried to overcome the existing uncertainties by means of informal negotiations, including at the supranational level, in order to sound out merger opportunities or reduce regulatory obstacles. However, without any foreseeable concretization of the economic policy requirements within the framework of a European merger control regulation—which for a long time had no chance of realization in the political conflict between the member states—many companies preferred to withdraw their merger plans. Apparently, the lack of a sufficiently concrete legal basis in the face of divergent economic policy views among the member states meant that a calculable basis for negotiations from this side was lost. Without a foreseeable, sufficiently concrete framework of expectations on the part of the political standard-setter, it was evidently impossible to reconcile the conflicting interests (expectations of politicians versus expectations of market players).

Findings

Not only politicians and legislators, but also courts and regulatory authorities intervene in the rules of the economy and define the legal framework for market participants. Through their decisions, they can significantly influence the expectations and thus the actions of market participants, creating room for maneuver but also challenging familiar institutional frameworks. The genesis of European merger control is just one example (Herget and Pahlow 2020; Herget 2020). In constitutional systems, courts, but also regulatory agencies downstream of the executive, perform a concretizing function for the law by entering into a negotiation process with market players through legally codified procedures (law in action). Judges can (and sometimes should) detach national or supranational law from traditional interpretations and adapt it to changing economic conditions; under certain circumstances they can even rule “*contra legem*.” This creates a latent uncertainty not only for established decision-making routines, but also for the institutional framework as a whole. This can be observed at both the national and supranational levels.

Against this background, the example of merger control shows that regulatory authorities and courts can be understood as the interface of different expectations, having to coordinate the expectations of the economic policymaker and those of the companies in a sometimes dynamic negotiation process. On the one hand, with the legal implementation policymakers harbor certain expectation goals for the respective markets. On the other, companies associate certain expectations with their merger projects and the question of their legal permissibility. The BKA and the courts functioned here as legal players in an “expectation management” that had to use legal means to channel the sometimes conflicting expectations and bring them into a legally binding balance. Different degrees of coordination were evident here, which also changed over time. The practices of this legal expectation management did not only contain rational or boundedly rational elements of action, for example, when it was a matter of implementing legal rules largely in conformity with norms. Rather, the selection of the chosen procedural instruments as well as the handling of the legal requirements were characterized by adaptive experiences and learning processes. In the Federal Republic of Germany pre-1989, merger control under the GWB was initially characterized by considerable information asymmetries; however, over the years, the officials of the BKA developed their own strategies for overcoming these by, among other things, relying on their own investigative findings or foregoing commitments from the companies. At the European level, by contrast, the

ECJ, as a court and supranational institution, had the stronger power to shape the law, which could also develop legislative power (“judicial law making”). Here, it was primarily the companies that had to deal with the resulting uncertainty and in the end increased the pressure for binding regulations and thus the reduction of uncertainty vis-à-vis the member states. In contrast, the BGH, as a state court, was far more dependent on justifying its decision based on positive law due to its involvement in the judicial constitutional structure, but this does not mean that no further judicial law making was possible here at all. Ultimately, regulatory authorities and courts expanded their legally prescribed scope of action and established their own system of dynamic expectation management, subject to legal logics, which contained and had to cope with both coordinative and confrontational elements.

Authorities and courts are largely beholden to the political norm-setter, whose legal regime determines the framework for action even when the basis for decision-making remains undefined, as can be seen from the example of European merger control since 1971. At both the national and supranational levels, the legal-theoretical assumptions of the so-called law-and-economics movement, which had begun in the US but was received and discussed in West Germany from the 1970s, were not relevant to decision-making until 1989. While in the US the models met with a much stronger political response until 1989—and there is even evidence of a rethinking of merger control within judicial practice—the impact on legal practice in Germany, as in Europe, was minimal. Neither at the European nor at the national level were “economic analyses” based, for example, on allocation efficiencies or transaction cost theories, evident until 1989. This is consistent with the findings of existing work on the reception history of the “economic analysis of law” in Germany (Pahlow 2019), and indicates that we cannot speak of an “economization” of the legal matters studied here. The formation of expectations by authorities and courts with regard to the relevant markets remained a normative process that had to keep in mind the legal boundaries and the political considerations behind them.

Notes

- 1 ECJ, February 21, 1973, *Europemballage Corp., Continental Can vs. Commission*, Rs. 6/72, 218–251.
- 2 See the *Pilkington/BSN-Gervais-Danone* cases; Commission, 10th Report on Competition Policy, Brussels 1981, 113–115 and *British Airways/British Caledonian*; Commission, 18th Report on Competition Policy, Brussels 1989, 84.
- 3 See the *Amicon Corp./Fortia AB and Wright Scientific Ltd.* case; Commission, 11th Report on Competition Policy, Brussels 1982, 73–74.
- 4 Proposal for a Council Regulation (EEC) on the control of concentrations between undertakings, published in: ABl. No. C 92, October 31, 1973, 1–7.
- 5 Opinion of the Economic and Social Committee on the “Amended proposal for a Council Regulation (EEC) on the control of concentrations between undertakings” (doc. COM (88) 97 final), of June 2, 1988, BArch B 102/359836; “BDI against a decoupling from the concept of market dominance,” *Handelsblatt*, January 20, 1988, BArch B 102/359837.
- 6 ECJ, November 17, 1987, *BAT and Reynolds v. Commission*, Rs. 142 u. 156/84, 4566–4586.

Archival Sources

Bundesarchiv, Koblenz, Germany. Bundesrepublik Deutschland (1949ff), B 102 Bundesministerium für Wirtschaft (BArch B 102).

References

- Baker, Scott, and Claudio Mezzetti. 2012. "A Theory of Rational Jurisprudence." *Journal of Political Economy* 120, no. 3: 513–551. DOI: 10.1086/666655.
- Bogdandy, Armin von., ed. 2012. *International Judicial Lawmaking. On Public Authority and Democratic Legitimation in Global Governance*. Heidelberg: Springer.
- Bordalo, Pedro, Nicola Gennaioli, and Andrei Shleifer. 2015. "Salience Theory of Judicial Decisions." *The Journal of Legal Studies* 44, no. S1: S7–S33. DOI: 10.1086/676007.
- Brenncke, Martin. 2018. *Judicial Law-Making in English and German Courts. Techniques and Limits of Statutory Interpretation*. Cambridge: Cambridge University Press. DOI: 10.1017/9781780687902.
- Chen, Daniel L., Tobias J. Moskowitz, and Kelly Shue. 2016. "Decision Making Under the Gambler's Fallacy: Evidence from Asylum Judges, Loan Officers, and Baseball Umpires." *The Quarterly Journal of Economics* 131, no. 3: 1181–1242. DOI: 10.1093/qje/qjw017.
- Eidenmüller, Horst. 1995. *Effizienz als Rechtsprinzip. Möglichkeiten und Grenzen der ökonomischen Analyse des Rechts*. Tübingen: J.C.B. Mohr (Paul Siebeck).
- Fischer, Christian. 2007. *Topoi verdeckter Rechtsfortbildungen im Zivilrecht*. Tübingen: Mohr Siebeck.
- Florczak-Wator, Monika., ed. 2020. *Judicial Law-Making in European Constitutional Courts*. Abingdon: Routledge. DOI: 10.4324/9781003022442.
- Frank, Jerome. 1949. *Courts on Trial: Myth and Reality in American Justice*. Princeton, NJ: Princeton University Press.
- Guthrie, Chris, Jeffrey J. Rachlinski, and Andre J. Wistrich. 2001. "Inside the Judicial Mind." *Cornell Law Review* 86, no. 4: 777–830.
- Herget, Lukas. 2022. "Der Europäische Gerichtshof als 'Motor der Integration'." Themenportal Europäische Geschichte. URL: <https://www.europa.clio-online.de/essay/id/fdae-98960>.
- Herget, Lukas, and Louis Pahlow. 2020. "Erwartungs(un)sicherheit durch Gerichte. Methoden und Chiffren der Justiz." Working Papers of the Priority Programme 1859 "Experience and Expectation. Historical Foundations of Economic Behaviour", no. 28 (December), Berlin.
- Höhne, Verena. 2022. *Entstehung und Praktiken der deutschen Fusionskontrolle. Eine Untersuchung zu Verfahren der chemischen Industrie vor dem Bundeskartellamt (1973–1989)*. Berlin: Duncker & Humblot.
- Höpner, Martin. 2011. "Der Europäische Gerichtshof als Motor der Integration. Eine akteursbezogene Erklärung". *Berliner Journal für Soziologie* 21, no. 2: 203–229.
- Kähler, Lorenz. 2004. *Strukturen und Methoden der Rechtsprechungsänderung*. Baden-Baden: Nomos.
- Küsters, Hanns Jürgen. 1982. *Die Gründung der Europäischen Wirtschaftsgemeinschaft*. Baden-Baden: Nomos.
- Laffont, Jean-Jacques, and Jean Tirole. 2002. *A Theory of Incentives in Procurement and Regulation*. 5th ed. Cambridge, MA: MIT Press.
- Langenbucher, Katja. 2017. *Economic Transplants. On Lawmaking for Corporations and Capital Markets*. Cambridge: Cambridge University Press. DOI: 10.1017/9781139976701.
- Llewellyn, Karl. 1930. *The Bramble Bush*. New York: Columbia University Press.
- Llewellyn, Karl. 1931. "Some Realism about Realism—Responding to Dean Pound." *Harvard Law Review* 44: 1222–1264.
- Martimort, David. 1999. "The Life Cycle of Regulatory Agencies: Dynamic Capture and Transaction Costs." *Review of Economic Studies* 66, no. 4: 929–947. DOI: 10.1111/1467-937X.00114.
- Mercuro, Nicholas, and Steven G. Medema. 1997. *Economics and the Law. From Posner to Post-Modernism*. Princeton, NJ: Princeton University Press.
- Müller-Armack, Alfred. 1965. "Die Wirtschaftsordnung des Gemeinsamen Marktes." In *Weltwirtschaftliche Probleme der Gegenwart. Verhandlungen auf der Tagung im Ostseebad Travemünde 21.-24. September 1964*, edited by Erich Schneider, 231–244. Berlin: Duncker & Humblot.
- Nörr, Knut Wolfgang. 2007. *Von der sozial-liberalen Koalition bis zur Wiedervereinigung*. Tübingen: Mohr Siebeck.

- North, Douglass C. 1992. *Institutionen, institutioneller Wandel und Wirtschaftsleistung*. Tübingen: Mohr Siebeck.
- Pahlow, Louis. 2019. “‘Ökonomisierung’ des Rechts? Der Diskurs um die ‘Economic Analysis’ und die Politik der Deregulierung.” In *Ökonomisierung. Debatten und Praktiken in der Zeitgeschichte*, edited by Rüdiger Graf, 215–241. Göttingen: Wallstein Verlag.
- Pahlow, Louis, and Verena Rassow. 2018. “Marktprognosen im Interesse der Strukturpolitik. Fusionskontrollverfahren vor dem Bundeskartellamt in den 1970er und 1980er Jahren”. *Jahrbuch für Wirtschaftsgeschichte/Economic History Yearbook* 59, no. 2: 343–376. DOI: 10.1515/jbwg-2018-0012.
- Patel, Kiran Klaus. 2009. *Europäisierung wider Willen. Die Bundesrepublik Deutschland in der Agrarintegration der EWG 1955–1973*. Munich: Oldenbourg.
- Peters, Dorothee. 1973. *Richter im Dienst der Macht. Zur gesellschaftlichen Verteilung der Kriminalität*. Stuttgart: Verlag Enke.
- Pfitzer, Frank. 2009. *Interessen in Wettbewerb. Grundlagen und frühe Entwicklungen der europäischen Wettbewerbspolitik 1955–1966*. Stuttgart: Steiner.
- Posner, Richard A. 1972. *Economic Analysis of Law*. Boston, MA: Little, Brown and Company.
- Ruffner, Markus. 2000. *Die ökonomischen Grundlagen eines Rechts der Publikumsgesellschaft. Ein Beitrag zur Theorie der Corporate Governance*. Zürich: Schulthess.
- Schlegel, John Henry. 1995. *American Legal Realism and Empirical Social Science*. Durham: University of North Carolina Press.
- Schweizer, Mark. 2005. “Kognitive Täuschungen vor Gericht. Eine empirische Studie.” Doctoral diss., University of Zurich. DOI: 10.5167/uzh-165152.
- Segal, Jeffrey A., and Harold J. Spaeth. 2002. *The Supreme Court and the Attitudinal Model Revisited*. Cambridge: Cambridge University Press.
- Sisk, Gregory C., Michael Heise, and Andrew P. Morriss. 1998. “Charting the Influences on the Judicial Mind: An Empirical Study of Judicial Reasoning.” *New York University Law Review* 73, no. 5: 1377–1500.
- Stigler, George Joseph. 1971. “The Theory of Economic Regulation.” *The Bell Journal of Economics and Management Science* 2, no. 1: 3–21. DOI: 10.2307/3003160.
- Teles, Steven Michael. 2008. *The Rise of the Conservative Legal Movement. The Battle for Control of the Law*. Princeton, NJ: Princeton University Press.
- Towfigh, Emanuel Vahid, and Niels Petersen. 2015. *Economic Methods for Lawyers*. Cheltenham: Edward Elgar Publishing.
- Tversky, Amos, and Daniel Kahneman. 1974. “Judgment under Uncertainty. Heuristics and Biases.” *Science* 185, no. 4157: 1124–1131. DOI: 10.1126/science.185.4157.1124.
- Witschke, Tobias. 2009. *Gefahr für den Wettbewerb? Die Fusionskontrolle der Europäischen Gemeinschaft für Kohle und Stahl und die „Rekonzentration“ der Ruhrstahlindustrie 1950–1963*. Berlin: Akademie Verlag.

15

BEYOND EXPECTATIONS

Consultants as the Modern-Day Oracle

Matthias Kipping and Sebastian Schöttler

Today, management consultants play a crucial role in shaping expectations about the future in business and beyond. This has not always been the case. Until the Second World War, management consulting remained a business limited in scope and geographic presence (Engwall and Kipping 2002; McKenna 2006). During the second half of the twentieth century and the first two decades of the new millennium, however, management consulting firms became powerful actors in many societies. While the degree of their direct or indirect impact on the decision-making of their clients is still under academic debate (e.g., Sturdy 2011; Nikolova and Devinney 2012), consultants have managed to establish themselves as “authorities” on all kinds of topics, from business to public health, migration policy to national security, in ever more regions of the world (Engwall, Kipping, and Üsdiken 2016; see also Kipping 2020, 2021a). The resulting challenge for researchers has been to understand how consultants gradually gained sufficient legitimacy to “predict” future developments and shape expectations across the globe, and to identify what prompted business and other leaders to seek out their opinion and advice about the future—similar to the way in which the ancient Greeks consulted the Oracle at Delphi.

Building on and contributing to the extant literature, this chapter explores the temporal dimension of the consultant-client interaction. It namely examines (a) how management consulting firms used expectations to promote their own businesses, (b) which tools and methods they offered to their clients to deal with uncertainty, and, finally, (c) to what extent they were successful in influencing the ways these clients managed expectations in their own organizations. We argue that this has to be discussed from an historical perspective, since consulting activities as well as the problems that potential client organizations face have changed significantly since the beginning of the twentieth century (Wright 2000; Kipping 2002). In addition, we consider a broad understanding of the concept of “expectations” to be necessary, as provided recently by Jens Beckert (2016, 9), who defines them as “interpretative frames that structure situations through imaginaries of future states of the world and of causal relations.” While having a narrative form, expectations “make use of theories, models, plans, marketing instruments, and forecasts as ‘instruments of imagination’” (Beckert 2016, 10). This wide definition of expectations allows us to capture the multiple manifestations of future narratives when it comes to the work of management consultants.

We suggest that with respect to future expectations one can distinguish three overlapping periods, marked by both consultants' own efforts and the broader context in which they were operating. We will show that, while management consulting is often portrayed as a *future-focused business* (e.g., Kiechel 2010; Whittington 2019), historically, expectations about the future have not necessarily been a major concern for consulting firms, but have become more central to and more explicit in their projects and publications over the last few decades. Thus, while their ability to influence expectations and corporate decision-making processes initially grew only slowly, albeit steadily, the most visible of these consulting firms have now reached a position akin to a modern-day oracle.

In terms of its structure, the chapter first succinctly summarizes the contributions and insights from the extant research regarding the complex relationship between consultants, their clients, and expectations for the future. The main part of the chapter then discusses that relationship across three broad chronological periods starting in the late nineteenth century, illustrating our argument that the use and understanding of expectations by management consultants have shifted over time. The first period, from the beginning of the twentieth century to the 1960s, saw consultants engaged in efforts to provide certainty, initially mainly in terms of increasing efficiency and controlling costs, then through the introduction of organizational structures that facilitated a long-term orientation, namely through financial planning and control. While expectations were not explicitly a concern for consulting firms, their approaches rested on the assumption that the future would be relatively stable and, therefore, controllable. The subsequent period, which lasted into the 1990s, saw them deal with the fallout from the crumbling of earlier certainties—and the institutions designed to stabilize contextual conditions—by deploying tools designed to provide guidance and possible options to their clients in the absence of external stability. As will be illustrated by the example of the “experience curve,” expectation-based values were built into these tools and played an important role in them, as did a general reference to the now less controllable future in the promotion of consulting services. In the third, ongoing period, management consulting firms have built on earlier efforts aimed to encourage a perception of them as “thought leaders.” In so doing, they tried to construct a role for themselves as predictors of a future in which those espousing their visions and recipes will be rewarded with competitive success—largely achieved through self-fulfilling prophecies. As an important caveat, it should be noted that despite the growing influence of consultants, in all three periods many clients ultimately implemented the suggestions made by the consultants only superficially, if at all. The chapter concludes with the summary of the main insights and some suggestions for future research.

Limited Literature on Consultants and Expectations

Research on management consulting has generated many insights on the industry's origins, its development, and the nature of its services (Avakian and Clark 2012). However, the question of how consultants influence their clients' expectations has rarely been discussed explicitly. This is surprising insofar as both contemporary observers and researchers have described the work of consultants to be, by definition, future-related, as consultants “address the utopian character of potential future change” and, therefore, offer “knowledge of potentiality” (Hoof 2020, 4). This dearth of research on the temporal dimension of management consulting may be due to the fact that questions of time and temporality have long been absent from organization studies—the field that, together with business history,

has contributed most to our understanding of consulting (Dawson 2014). Even though this has changed over the last decade (see, among others, Reinecke et al. 2020), consultants are rarely mentioned when it comes to the question of how “organizations manage the future” (Krämer and Wenzel 2018).

Nevertheless, while not specifically addressing the question of the extent to which management consultants influence their client’s expectations about the future, the extant literature provides some insights. There are those who take a “functional” view, portraying consultants as transmitters of knowledge which was circulated between firms, industries, and countries, or, somewhat more broadly, as part of an increasingly international “management knowledge industry” that also included management academics, business schools, and management gurus (Micklethwait and Wooldridge 1996; Faust 2002; Sahlin-Andersson and Engwall 2002). According to this strand of research, this strand knowledge can include forecasts as well as expertise on future trends of markets and industries. Given the considerable economies of scale and scope when knowledge is generated by consulting firms, clients have a strong incentive to procure this knowledge externally rather than producing it internally (Armbrüster 2006, 49; McKenna 2006). The function of consultants as transmitters of managerial and organizational knowledge has also been emphasized by business historians, who have identified consultants as one of the main channels of the Americanization of European businesses after 1945 (Schröter 2005). In line with a more critical strand of the literature on consulting, however, many studies have concluded that such external knowledge was only partially implemented, often in a hybridized form, and that it required recipients to play an active role (see, for example, Hilger 2004).

However, rather than looking at the diffusion of knowledge, the critical perspective has emphasized the symbolic value of consulting activities, since their value to client remains highly “ambiguous” and can only be assessed long after a project is finished, if at all (Alveson 1993). Relatedly, Abrahamson (1991, 1996) and others have linked consultants to the rapid succession of increasingly ephemeral management fashions or fads since the 1970s as part of what they termed the “management-fashion-setting community.” These fashions, they argue, were adopted by many organizations not because they represented more efficient innovations but due to mimetic and normative pressures. This goes back to the neo-institutional literature, which had already highlighted the role of very visible consulting firms like McKinsey in this process (DiMaggio and Powell 1983). While not explicitly referring to the future, these approaches imply that organizations can cope with uncertainty by mimicking the behavior of their competitors or peers. One way of doing so is to employ the same consulting firm, either in the hope of getting insider information or, more commonly, to base decisions on the same information or expectations. Moreover, when actions turn out to be misguided, blame can be shifted to the consultants. Since most organizations have acted in a similar way, the strategy of following “management fashions” and specific management fashion setters also reduces the risk for managers to be singled out and blamed individually (Abrahamson 1996; Kieser 1997).

Kieser and his co-authors went even further by suggesting that consulting firms purposefully create new fashions to exploit managers’ fear of losing control and missing out on new management tools, especially in times of economic turmoil or rapid technological change. By presenting themselves as able to restore such control, the argument continues, the consultants address these fears, but only temporarily. Ultimately, by constantly launching new fashions, they make managers “addicted” to their services (Ernst and Kieser 2002; Kieser

2002). Thus, management fashions not only rely on existing uncertainties in the general economic environment, but also add to the insecurities of managers. As we will argue, this is one of the reasons why the period from the 1970s saw such a multiplication and acceleration of management fashions and an increasingly explosive growth in the consulting industry.

Rather than focusing on the short-term, fashion-like succession of management ideas, others have tried to explain the succession of “management models” over a longer time horizon. Rather simplistically, the management history literature portrays their evolution as a progression to ever better management (Wren and Bedeian 2020). Others stress the role of the broader context, including economy, society, and (geo-) politics (Barley and Kunda 1992) as well as national differences (Guillén 1994), often focusing on technological change as a major driver (esp. Bodrožić and Adler 2018). But since these authors look at long-term patterns, they do not necessarily account for the explosion of management fashions and of the consulting industry that has taken place since the last decades of the twentieth century and how this might possibly be related to the increasing uncertainty about the future.

Some have questioned the claims advanced by the literature on management fashions, pointing out that, empirically, it relies almost exclusively on measuring the frequency at which these fashion terms are mentioned in academic and practitioner publications; the rise and fall in their popularity, so the critique goes, are therefore only indicative of the way these publications have to constantly offer novelty, meaning they quickly move on from one idea to the next, without companies necessarily doing the same (see esp. Clark 2004). Even earlier, Sturdy (1997) pointed to the insecurity inherent in the consulting business itself, due to its project-based, temporary nature. Others have given examples where consultants were hired as part of internal power struggles, to take the blame for unpopular decisions or to provide a supposedly neutral, legitimizing expert opinion to pre-existing plans of management when dealing with other stakeholders such as workers or investors (Jackall 2009). The question remains of what part the potential ability to set and manage future expectations played in these observed and theorized roles by consultants, and what tools they might have used in doing so.

Some hints can be found in more micro-level studies, which were partially meant to address the shortcomings of the fashion literature. They point notably to the use of certain techniques, such as narratives and visualization, to create a need or emphasize the value of the tools and solutions being offered, while others, like humor, address tensions that arise during the client-consultant interactions (Clark and Fincham 2002; Sturdy et al. 2009). The need for consultants to convince clients of their value as experts appears greatest during the early stages of a project. Most importantly, consultants are paid to identify or narrow down a problem. Since it is often not clear where that problem lies, contradicting narratives compete within the client organization (Bloomfield and Danieli 1995) and become an “object of interest struggles,” which opens up space for “politics of expectations” (Beckert 2016, 11–12). In this situation, consultants can use narratives to create or narrow down expectations and push for certain interpretations that fit best with the solution they have to offer (Ernst and Kieser 2002; Kipping and Westerhuis 2014). Ultimately, all these techniques and rhetorical strategies are ways in which management gurus and consultants not only manage their “audiences” (Heusinkveld et al. 2021) but also establish and defend themselves as experts, which, as will be argued below, eventually allowed them to claim the authority to predict the future—and to do so without much contestation.

As with organization and management studies, historical accounts of consulting and its role in shaping expectations are rare. One notable exception has been Plumpe (2008), who argued that the tools and methods of consultants served as “useful fictions” for managers, propping up the belief that business organizations can act rationally despite the fundamental uncertainty of the future. Much of the empirical research has focused on think tanks and research institutes providing “futures research” during the 1950s and 1960s, based on the idea that the future was predictable—hence plannable—by attributing probabilities to various scenarios with high-profile clients in government and business (Seefried 2014). According to Andersson’s history of futurism in the twentieth century (Andersson 2018, 3, 188), it was only from the 1970s onward that future expertise turned from “an object of social science” to the “market-based and business-oriented activities of consultancy”—a timeline that was maybe not quite so clear cut, as we will try to show below.

Some further indications of how consultants incorporated the future into the solutions they offered can be found in historical case studies. Thus, in their in-depth study of the adoption of the decentralized multidivisional organization or “M-form” in European banks in the late 1960s, Kipping and Westerhuis (2014) show how the consultants, in this case McKinsey, had developed a “blueprint” for what the bank organization of the future should look like and then narratively framed the challenges each bank and the sector as a whole were facing (or, more often, were likely to face going forward), to then offer their blueprint as an ideal solution. To increase the mimetic pressure, they also pointed to the parallels with the situation that manufacturing firms like General Motors (GM) had faced in the interwar-period, when the M-form supposedly allowed them to deal with increasing competition and address the growing complexity of their own organizations—a process that had been studied in some detail by Alfred D. Chandler (1962) in his book on *Strategy and Structure* and described by GM’s Alfred P. Sloan (1964) in his memoirs, both published during the 1960s.

In general, the M-form, which is one of the most prevalent and widely researched management and organizational models of the twentieth century (e.g., Whittington and Mayer 2000), can be understood as a kind of permanent structural solution to the uncertainties created by competition, which increased in different industries and in different geographies at different points in time. And consultants, notably McKinsey, played important roles in its global diffusion, often stressing both present and possible future competition as a rationale (see Kipping and Westerhuis 2014 and the contributions in Kipping 2000; also McKenna 2006). However, as we try to show below, while the M-form might have addressed concerns about the effects of increased competition and the complexity resulting from diversification, it seemed of more limited use to managers when dealing with the increasing turmoil of the 1970s and beyond. This new environment, as we also argue, somewhat stunned the dominant consulting firms, opening up opportunities for new service providers to offer tools that seemed more useful for managers having to deal with an increasingly indeterminate future, while forcing existing consulting firms to rethink and reinvent the ways they helped their clients create certainty.

The following section will build on the findings of the extant literature, distinguishing three successive, yet overlapping periods to show how, over time, management consultants and consulting firms have become ever more involved in shaping and ultimately determining future expectations for an ever-wider range of audiences.

How the Future Entered Consulting

Planning for a More or Less Certain Future (1910s to 1960s)

The earliest way of dealing with the future involving consultants—and in which the latter were to some extent instrumental—revolved around the notions of “planning” and “control.” The introduction of systems to measure and incentivize worker efforts and increase productivity, often subsumed under the labels “scientific management” or “Taylorism,” after Frederick W. Taylor (1856–1915), their most well-known pioneer and propagator, whom some have also characterized as the “grandfather of consulting” (Klein 1977, 21–25; see, for more detail, among others, Nelson 1980; Kanigel 1997). While more recently these systems have been seen as a way of speeding up production processes and, ultimately, of deskilling and exploiting workers (see, especially, Braverman 1974, and for the role of consultants Littler 1982), one could also argue that, by introducing controls over workers and their efforts, they provided more certainty for employers and allowed them to plan ahead. This was very evident during the First World War, when many Taylorist consultants became involved in production optimization and wartime planning. Perhaps the most well-known and enduring among the results of these efforts was the so-called “Gantt chart”—developed by the eponymous Taylor collaborator, Henry M. Gantt—that was applied to the US Navy’s shipbuilding program during the war (Hoof 2020). This graph-based planning tool has endured until the present day.¹ During the interwar period, it was disseminated in North America and Europe by other consultants, notably Wallace Clark (Wren 2015). Maybe even more telling is the involvement of Clark’s former collaborator, the Russian engineer Walter N. Polakov (1879–1948), as a consultant in the introduction of the Gantt chart to Soviet Russia during Stalin’s first five-year plan (Kelly 2020).

Planning—and consultants—took on renewed importance in the US and elsewhere in the run-up to and during the Second World War. New tools were developed, often based on quantitative data and sophisticated computational approaches. Thus, Nazi Germany drew on an existing institutional framework, namely the National Rationalization Board (*Reichskuratorium für Wirtschaftlichkeit*, RKW), to provide a wide range of indicators for benchmarking in many industries (Pohl 1997). In the US, the idea of a learning curve was first developed and formalized in the aircraft industry in the 1930s and then applied to bomber assembly during the war, with both benchmarking and the learning curve eventually taken up and disseminated by consulting firms. The Boston Consulting Group (BCG) was particularly astute in rebranding and disseminating the learning curve as the “experience curve” from the late 1960s, which would, allegedly, help client companies to gain a level of certainty in an increasingly competitive and unpredictable environment by offering quantifiable guidance on how to reduce costs and increase competitiveness (see below).

While consultants contributed significantly to the war effort in the US (McKenna 2006), their role as a bridge-builder between the military and business continued, or even increased, afterward. This needs to be highlighted, given the widespread view that “future studies” during the 1950s and 1960s were largely the purview of think tanks like the not-for-profit RAND Corporation (Abella 2009; see also Andersson 2018, Chapter 5). The latter emerged in 1948 from an eponymous project created in 1945 between the US Air Force and Douglas Aircraft to promote the application of operations research (OR) in industry. OR encompasses a set of mathematical techniques to optimize decision-making, developed for military applications during the Second World War and then increasingly applied in other contexts

afterward, including management, where researchers namely promoted the use of linear programming (see, for an overview, Vahrenkamp 2023). What needs to be stressed here is the important, yet sometimes forgotten involvement of consultants in the transfer of these techniques to the business world for planning and control purposes, often in collaboration with research institutions—though these ties became increasingly tenuous. One particularly active firm in this respect was Arthur D. Little (ADL), which had been founded as a contract research organization in the late nineteenth century and worked together with MIT in the early days of OR (Thomas 2012). Another example is Stafford Beer, a well-respected OR researcher (e.g., Beer 1968), who also provided consulting services to companies, like Canada's Manulife insurance, and participated in the ambitious, yet ultimately unfinished project Cybersyn, an attempt to create a computer- and telex-based system to manage the whole Chilean economy under the Allende government in the early 1970s (Medina 2011).

Among the most widely used future-oriented concepts during these decades was “long range planning,” defined, among others by Drucker (1959, 240) as

the continuous process of making *present entrepreneurial (risk taking) decisions* systematically and with the best possible knowledge of their futurity, organizing systematically *the efforts* needed to carry out these decisions, and measuring the results of these decisions against the expectations through *organized, systematic feed-back*.
(emphasis in the original)

A consulting organization that played a major role in helping firms with these efforts was the Stanford Research Institute (SRI). Founded in 1946 by the eponymous university as a not-for-profit subsidiary with lofty aims, including the development and dissemination of knowledge, the application of science, and world peace (Nielson 2006), its business group offered a collective forecasting service for corporations from 1959. The number of subscribers increased from an initial 73 to more than 400 and included, among others, IBM, Ford, and Shell. SRI also conducted projects for specific clients and had become the leading consulting firm in the US by revenue in the late 1960s (Higdon 1969). It was also active outside the US, namely in Scandinavia, in Germany, where it introduced the M-form at the consumer chemicals company Henkel (Hilger 2004), and in Japan, where, in 1965, it used its own model to create a research institute for financial services company Nomura (NRI). The latter became a template for other think tank-like collective Japanese consulting firms (Kipping 2021b).

However, within the consulting industry, companies like SRI and ADL with their research- and science-based approach were eventually eclipsed by McKinsey, a firm originally founded in 1926 by Chicago accountant James O. McKinsey, who relied on experienced businessmen to analyze and advise corporations (McKenna 2006; McDonald 2013). After his death in 1937, the firm's two offices in Chicago and New York moved increasingly apart. The former eventually adopted the name of its senior partner, A. T. Kearney, while the latter implemented a series of changes during the 1950s which mimicked the legal profession in nomenclature and practice. Offering a wide range of services, including executive compensation, McKinsey became well known, especially in Western Europe, for the introduction of the decentralized multidivisional structure or M-form. This organizational model, as discussed above, was designed to address growing competition and increasing complexity due to diversification and/or geographic expansion by relying on financial planning and control tools. However, such tools were much less suitable for increasingly unpredictable

challenges or even turmoil, which started affecting the capitalist economies from the late 1960s, creating opportunities for other consulting firms with different approaches.

Dealing in Quasi-Permanent Crises: How Consultants Addressed Growing Uncertainties (1970s–1980s)

The world did not become more uncertain overnight. But signs of broader changes to the established order in Western, capitalist countries, both in the economy and society, started to become apparent from the mid- to late 1960s. In the economic arena, one could cite the increasing troubles of the Bretton Woods system in ensuring exchange rate stability; concerning society, one could point toward the civil rights movement and the growing protests against the Vietnam War in the US, the student protests in many European countries, and the Prague Spring of 1968, even though the latter was crushed by the Soviet army. These events and their underlying trends did not immediately affect the established types of organization and management, such as the M-form and mass production. Rather, it was a gradual process with different actors moving at different speeds. But the future did become somewhat less predictable for corporations, which prompted consultants to offer and develop new kinds of ideas and tools.

By the mid-1970s, it was impossible to deny that economic circumstances had changed drastically for business. While McKinsey kept rolling out the M-form to more companies, many of the resulting industrial conglomerates, after decades of growth and diversification, eventually suffered from inefficiencies and poor performances, which were exacerbated by economic turmoil (see, especially, the introduction in Chandler 1990). European integration, GATT rounds, and other initiatives had reduced tariffs and trade barriers, prompting many companies to expand into foreign markets, which increased competition globally. The final breakdown of the Bretton Woods system in 1973 ended more than two decades of relative exchange rate stability. Companies now had to operate in a wide range of markets that in most cases had no common characteristics and required tailored strategies. These new challenges and uncertainties made corporate decision-making more complex, namely with respect to determining the markets and products that promised the highest returns, especially when investment capital became scarce due to falling profits (Goold and Luchs 2003).

Management consultants had to start offering solutions that appeared more appropriate for an increasingly uncertain environment. Consequently, they designed tools that accounted for the new uncertainties and learned how to use them for promoting their own services. For instance, the still popular “long range planning” gradually morphed into “scenario planning” (see, for the following, in particular, Kleiner 2008; Whittington 2019, 151–155). Rather than focusing on the most likely future with adjustments along the way, scenario planning considered different possible developments and outcomes. Not surprisingly, its origins were linked to military planning, especially in the context of the Cold War, in providing policy advice to the US government and the military industrial complex. One iconic figure was the “futurist” Herman Kahn, who had been with the RAND Corporation, but after publishing controversial ideas regarding a winnable nuclear war, he and a few colleagues established their own think tank, the Hudson Institute, in 1961 (Ghamari-Tabrizi 2005). As already discussed for the earlier period, consulting firms continued to play a role here too, something that is relatively underappreciated in the extant literature. Thus, SRI conducted scenario planning studies for the US Education Department

in 1967 and, somewhat later, for large, diversified corporations with international and long-term activities that required foresight into an ever more uncertain future. Among the early champions of scenario planning were General Electric (GE) and the Anglo-Dutch oil company Shell, which used this approach well into the twenty-first century (Whittington 2019, 35–36).

With scenario planning and, even more, with ideas and tools subsumed under the term “strategic planning,” management consulting firms shifted from a retrospective to a more prospective orientation for strategy-building that put expectation-based values at the center (Elfgén and Klaile 1987; see also Whittington 2019). The most prominent example was the Boston Consulting Group’s concepts of the experience curve and portfolio management, the latter also known as the “BCG matrix.” BCG was founded by Bruce Henderson in 1963, originally as part of the Boston Safe Deposit and Trust Company, from which it became fully independent only in the mid-1970s (Fink and Knoblach 2003; Kiechel 2010). Henderson derived the experience curve concept from the idea of the learning curve and first formalized it in 1966, developing it the further in the following years. In essence, the experience curve was about trying to predict costs and prices for a product. The fundamental observation was that production costs of a product decline by a rate of 20 to 30 percent if output is doubled, i.e., the company gains experience measured in cumulative output numbers. Experience not only referred to the production process but included marketing and administration as well.

Based on this relationship between cumulative output and reduced cost, BCG elaborated its entire approach to strategy: the higher a company’s share in a growing market, the lower the costs compared to its competitors. For corporate strategy, the importance of market share translated into setting lower entry prices for new products in order to ensure lower costs—and prices—in the future, rather than immediately recouping the related R&D investment via a higher price. In growing markets, expected future values of market share and market size were becoming more important than present values (BCG 1970, 36). BCG’s growth-share matrix, which was based on the experience curve, portrayed a company as a portfolio of different business units, organized by market share and expected cash flow. The concepts of the experience curve, growth matrices, and portfolio management were taken up by other consulting firms, which developed their own versions (Hahn 1997). The experience curve also caught the attention of management academics who discussed its empirical validity and value for strategy-building processes, with some considering it a “useful forecasting practice” (Ghemawat 1985).

However, the popularity of the experience curve did not stem from its scientific validity. On the contrary, emphasizing the scientific principles of their tools and concepts too much tended to be disadvantageous for consultants. That they were too theoretical and insufficiently practical was one of the most common complaints of their clients. The credibility of consultants primarily came from their claims to work with the leading firms in an industry, their outside perspective, and the fashionableness of their concepts.

While there were other ideas that preceded them (albeit with origins outside consulting, like Drucker’s (1954) “Management by Objectives”), one could argue that the visibility—and the success—of the experience curve, and in particular the portfolio matrix, kicked off the rush to launch new, competing management fashions. These concepts clearly helped BCG to evolve from a small upstart to a leading role within the consulting industry. The firm also internationalized quickly, opening offices, initially through acquisitions and joint ventures in Milan (1965), Tokyo (1966), and London (1968); then on their own in Paris

(1972) and Munich (1975). Their presence in Tokyo subsequently helped them develop and sell concepts drawn from Japanese practices, like time-based competition (Stalk and Hout 1990). BCG's competitors therefore had to react, launching their own concepts, which accelerated the development of novel ideas. Consultants may also have realized that they could use the succession of new fashions to increase their business by drawing on the mechanism of reassurance and fear (as discussed by Ernst and Kieser 2002). Last not least, the uncertainty in the environment continued to increase during the late 1970s and 1980s, namely with the oil shocks and the success of Japanese companies.

The growing competitive pressure on US corporations eventually allowed McKinsey to regain traction in the early 1980s after it had languished during the 1970s and even contemplated a sale or merger (Whittington 2019, 93). This dynamic changed with *In Search of Excellence*, written by the then consultants Tom Peters and Robert H. Waterman and published in 1982. It supposedly drew “lessons from America’s best run companies” to develop the “7-S framework,” which would allow others, too, to beat the increasingly overwhelming Japanese competition (Peters and Waterman 1982). *In Search of Excellence* became the best-selling business book of all time. It left us with the notion of excellence, which continues to be seen as a recipe for success, even in uncertain times (Collins and Collins 2023). It also launched the careers of both Peters and Waterman outside McKinsey, the former as a popular management author and performer (or “guru”), the latter as an influential academic. And it allowed McKinsey to reinsert itself into the strategy conversation with an approach based on thought leadership and “research”; this would become the foundation for the firm’s subsequent success in terms of setting the agenda for the future (see below).

Launching new fashions, however, was not sufficient. To spark clients’ interest, management tools and techniques had to be contextualized on the national, industry, or even firm level. Thus, relating to existing expectations and shaping them became key for consulting firms during this period. The consultants had to link their scenarios and proposed strategies to the prevailing worries of managers and at the same time provide a convincing narrative about why their tools would solve these challenges. Here, the above-mentioned definition of expectations as “interpretative frames” by Jens Beckert is helpful in understanding why consulting firms pushed certain narratives to convince potential clients to hire them. Formal models (such as the experience curve), planning tools, or vague scenarios of increasing global competition could all be part of this problem-framing process by consultants. Empirically, it is hard to determine to what extent clients’ own expectations were impacted by these narratives. While historical research on the implementation of the experience curve is scarce, journalistic accounts provide successful case studies as well as evidence of utter failures (Kiechel 2010).

However, in our view, the impact of consulting firms on their clients’ expectations and decision-making did not necessarily depend on the actual implementation of their tools and concepts but was a given for at least two reasons. First, consultants increased the general awareness of competitive markets and costs, not least by using visualization techniques that constantly compared different products and divisions in a client’s portfolio in terms of their cash flow potential and/or the cost position of the client relative to competitors. Following the application of the experience curve and portfolio management models, it was no longer enough for a company to know which of its units made a profit and which did not: they also had to know how their costs compared to their competitors’. This is also partially true for the introduction of the M-form in the 1950s and 1960s, which strengthened internal markets between business units. However, market and competition orientation became much

more pronounced in the 1970s and 1980s due to the global economic environment. While this shift was undoubtedly due to external, structural changes, consulting firms pushed the idea of competition at every level of the company and every stage of the product life cycle. This was true even when implementation failed, or clients decided not to follow recommendations.

Second, introducing these strategy-building tools allowed formal and informal decision-making and strategy building processes in complex organizations (such as large corporations) to take place at the same time. Mintzberg and Waters (1985) have described various kinds of strategy-building processes between the poles of “deliberate” and “emergent” strategies, with the former entailing more formal and the latter more informal, even ad hoc approaches. By involving external consultants in the formal decision-making processes—in conjunction with internal steering groups below the top tier of management—conflicts between internal stakeholders could be managed or at least neutralized for the duration of the consulting project, which often lasted many months and sometimes years. This opened up space for more informal, adaptive processes of strategy-building. So, instead of buying into the tools provided by consulting firms, top managers could use these firms as a tool to buy themselves time.

Becoming an “Oracle”—Despite a Mixed Track Record (1990s onward)

Since the 1980s, the general response to the uncertainty of the economic and, increasingly, political environment has manifested itself in a growing reliance on the “invisible” hand of the market, relaxing or even abandoning earlier approaches at regulation and coordination, which were seen to have contributed to the various crises. Often subsumed under the term “neoliberalism” or, more rarely, “market fundamentalism,” these changes are generally associated with the policies implemented by Ronald Reagan in the US and Margaret Thatcher in the UK. But they received major boosts when large parts of the global economy that had operated under planned systems rapidly and often radically espoused capitalism—China under Deng Xiaoping from the late 1970s, the former Soviet bloc countries after the fall of the Wall in 1989, and India with the abolishment of the so-called “license raj” in 1991. Not only did markets and capitalist principles spread geographically, they also transformed activities that had been governed differently, such as bureaucracies and professions, where approaches based on these principles came to be referred to as new public management (NPM) and corporate professionalism respectively (see, among many others, Hood 1991; Muzio et al. 2011).

Management consultants benefitted greatly from these developments. They became heavily involved in spreading capitalism globally, for example by privatizing state-owned enterprises and/or helping them compete (Kostera 1995; Kipping 2020), neither of which they did very successfully (Kostera 1995; Kipping 2020; see also Mazzucato and Collington 2023). The large international management consulting firms also expanded their public sector activities in many countries (e.g., Denis Saint-Martin 2000; Marktanner 2023); in the US all levels of government and many public sector organizations—first and foremost the federal government and the military—had already relied on outside consultants since the late nineteenth century (for an overview, see Kipping 2021a). In these contexts, the consulting firms presented themselves as someone that “interprets markets for you” (Leicht et al. 2009, 597). This interpretive ability was also what they offered to their corporate clients, where information overload and “fake news” made it ever more difficult to identify

what was relevant, and where markets immediately punished those making the “wrong” decision (Leicht et al. 2009, 597). Thus, during this period, consultants played an integral part in rolling out bureaucratic and administrative “markets” to all corners of the globe and into all economic, political, and even social activities. At the same time, they promised to help those affected by the increasing unpredictability that these same markets created.

To credibly claim an ability to help in this heightened uncertainty required consultants to go beyond offering tools or techniques that managers should apply themselves, which, as argued by Ernst and Kieser (2002), at best offered temporary relief. During the previous period, by reaching a wide audience of managers and promoting these tools, they had successfully established themselves as experts alongside practitioners and academics (Faust 2002). Although consultants highlighted a systematic and scientific approach when promoting their tools, their aim was not to gain academic credibility, but to attract the interest of clients in their services. Furthermore, academic journals were far too slow a publishing medium when it came to promoting concepts and tools to the business community. Since consulting firms have to appear to be at the forefront of management innovation, their outlets are generally quicker in discussing a certain idea and building a “hands-on” management tool around it than management academics, who take time to develop hypotheses, collect data and build complex scientific models and theories. As a result, the latter often take up ideas from consultants rather than the other way around (Spell 2001). But this also means that forecasts provided by consultants have tended to be simple extrapolations of past developments or resembled linear models of time, much to the disappointment of some clients. Moreover, up to the 1980s consulting firms based their forecasts on data collected by others. Their reports often referred to studies conducted by industry associations, international economic organizations such as the World Bank or the IMF, as well as publicly available statistical sources. In many cases, they also drew on internal client information and reports. Thus, hiring a consulting firm was not about acquiring new data but—at best—about getting a new interpretation of known facts.

But in the new economic environment, consulting firms needed to go beyond agenda-setting. Now, they had to establish an ability to predict what was going to happen, or at least create the belief that they had such an ability—akin to the oracles of old. This involved drawing on their earlier interaction with and emulation of academic “research” (see for this and the following in more detail, Kipping 2021b). And they ended up bundling and institutionalizing these research and forecasting efforts in their own “think tanks,” drawing on the legitimacy of an organizational form that had long been associated with mapping out the future, as noted above regarding the RAND Corporation and the Hudson Institute. From their beginnings, consulting firms had connections with think tanks, including, for example, the Twentieth Century Fund (TCF). And, after the Second World War, SRI displayed many think tank-like attributes, which continue to be apparent in its Japanese “clones” like NRI (see above). However, in the most recent period, the major consulting firms went further and created their own think tanks or, as Accenture put it, “think and act tanks.” The pioneer was, not surprisingly, McKinsey, which established the McKinsey Global Institute (MGI) in 1990 (see on its origins, McDonald 2013, 218–219). This allowed them to reaffirm their position as a “thought leader,” which they had begun building earlier through, for example, cooperation with various academic institutions and, from 1964, the publication of the *McKinsey Quarterly*, modelled on the *Harvard Business Review*.

Almost all other leading consulting firms eventually created their own similar think tanks. BCG has the Henderson Institute, based on the name of its founder; A. T. Kearney

the Global Business Policy Council; and Accenture the Institute for High Performance. Most of them are directed by partners from the firms and those labelled “research associates” tend to be consultants who are temporarily seconded to these outfits, but generally have limited training in research methodologies. Some rely on well-known, even “celebrity” academics, who, in the case of McKinsey, have included Nobel Prize laureates in economics²—though the extent of their actual involvement in the various studies remains unclear. The use of (pseudo-) scientific terminology and advisors serves to increase the legitimacy of these think tanks and the trustworthiness of their “research.” That this has worked can be gleaned from the *Global Go To Think Tank Index Report*, which draws on expert and peer evaluations and was last published for 2020 (McGann 2021). During the 2010s, the consulting firm think tanks have dominated the list of “Best For-Profit Think Tanks” (McGann 2021, 233–236), regularly occupying more than half of the top 20 spots, with the McKinsey Global Institute (MGI) in its own separate category as a “For Profit Center of Excellence” since 2016 (McGann 2021, 233). “For Profit” is arguably the wrong category, since their reports are widely disseminated and freely accessible.

The “research” that these think tanks generate and then publish in their reports is generally geared toward the future—though the terminologies tend to vary somewhat, including for instance the notion of “next generation.” Among their most recent topics have been the future of healthcare and the future of work. Findings and suggestions regarding both of these were already promoted before the pandemic, sometimes in collaboration with well-known academics or academic institutions. One of many examples is an article in the Harvard Business Review, entitled “Your Workforce Is More Adaptable Than You Think,” based on a questionnaire survey conducted by the Harvard Business School (HBS) and BCG (Fuller et al. 2019). Often, these ideas are subsequently picked up and amplified by the business media, where, as Faust (2002) has shown, consultants had already displaced actual managers (and academics) as the foremost experts on all things management by the turn of the millennium. Possibly most importantly—and ultimately worryingly—their predictions for the future also find their way as evidence into the publications of highly respected academic researchers and authors. To give but one example, in his book on *The Globotics Upheaval* (2019) macroeconomist Richard Baldwin makes more than 20 references to MGI and McKinsey, often as “experts,” and uses “data published by McKinsey Global Institute” as a source in six tables and figures (Baldwin 2019, 154, 156, 158, 246, 249, 252).

Past experiences, however, suggest caution in terms of the accuracy of both the “data” and the resulting predictions for the future emanating from McKinsey and, by extension, other consulting firms. Thus, Tom Peters, one of the authors of the best-selling *In Search of Excellence*, in a later interview initially admitted that some of the data used were modified, possibly even invented (Byrne 2001). More importantly, many of the US companies the book identified as “excellent” quickly ran into trouble and most have now disappeared. Enron is another telling case. Advised by McKinsey, and with one of its former partners, Jeff Skilling, as short-lived CEO, the company became the third largest in market capitalization on the US stock exchange before being exposed as largely built on dubious, partially fraudulent accounting practices. It collapsed in 2001, the same year various McKinsey publications had celebrated it as visionary and worthy of emulation (Foster and Kaplan 2001; Michaels et al. 2001). Skilling was convicted of multiple counts of fraud and conspiracy and spent over 12 years in jail (Stevens and Haag 2019). These and other scandals at the time led to a flurry of publications critical of consultants with telling titles such

as *Dangerous Company* (O'Shea and Madigan 1997), *Con Tricks* (Ashford 2000), and *Consulting Demons* (Pinault 2000).

Recently, there has been a renewed critique of top consulting firms by investigative journalists (Bogdanich and Forsyth 2022) and academics (Mazzucato and Collington 2023). These were largely prompted by similar failures as well as high-profile lawsuits and expensive settlements, such as the ones related to the involvement of McKinsey in the opioid epidemic, where the consulting firm paid hundreds of millions of dollars to state and local government in the US. Like before, the consulting firms involved in such scandals have chosen not to react publicly to these books or critical, often damning, reports in the media. This means that they are likely to lead to similar results as the past critiques: some publicity for their authors and, maybe, some soul-searching among clients. But there will be little actual change and a continuing reliance on the consultants and their advice to address the ever-present, if not increasing, uncertainty about the future—also because companies have few alternatives when it comes to predictions about the future, since most academics seem to be reluctant to engage in these kinds of speculative reasoning, or, as seen above, have been coopted by the consultants (and their easily accessible and ample resources). Moreover, given the “consulting explosion” since the 1980s, there is now an ever-growing number of former consultants in positions of prominence and power in business, society, politics, and even academia, who are likely to reach out to someone with a similar world view when seeking to reaffirm and legitimize their hunches, which, bar another epic and obvious failure like Enron, will ultimately lead to self-fulfilling prophecies—just like the Oracle of Delphi, where people strove to make its predictions come true.

Conclusion

This chapter has looked at the ways in which management consultants have addressed and increasingly shaped their clients' expectations about the future since the early twentieth century. The extent to which these expectations came to influence client-consultant interactions depended, on the one hand, on the broader economic, social and (geo-) political environment and the degree of uncertainty it created for businesses and other potential client organizations: simply put, the more uncertainty there was or, to be more accurate, the more the future was *perceived* as unpredictable, the more opportunity consultants had to peddle their solutions to counter that unpredictability. On the other hand, the extent to which clients turned to these consultants to address their concerns about the future depended on the ability of the consultants to offer broader concepts and more specific tools and techniques to shape the clients' “imaginaries of future states of the world” (Beckert 2016, 9). But, and this is important, the consultants' success did not only depend on the quality of the “narratives” they could provide—how convincing the story was—but also, if not more, on the legitimacy of the “narrator,” that is, how well-respected the storyteller was. In a nutshell, while the consultants were to some extent dependent on the environment in which they offered their services, they also had room to shape their own role (as a specific firm or as an industry) by offering better stories and enhancing their legitimacy. Moreover, once they had gained that legitimacy, they could use it to amplify their opportunities by creating more uncertainty and thus demand for their services by shaping client expectations, for instance by regularly launching novel narratives (Ernst and Kieser 2002). For a history of expectations in business and beyond, this could lead to a broader argument of taking legitimacy, credibility, and fashion into account when it comes to the dissemination and coordination

of expectations among businesses. As we have argued, a historical micro-perspective can be helpful to understand the mechanisms at play.

The main part of this chapter has traced the historical evolution of these processes, distinguishing three broadly defined and somewhat overlapping periods. The first from the beginning of the twentieth century to the late 1960s saw consultants trying to provide certainty for their clients, with approaches that rested on the assumption that the future would be relatively stable and predictable. This was particularly true for the period after the Second World War, marked, in the capitalist half of the world, by the *pax Americana* with its corresponding economic institutions, like the World Bank—though always under the ultimate threat of nuclear annihilation. The notions of planning and control were central to what consulting firms offered their clients to deal with the future, from early Taylorist shop floor management and project planning with the Gantt chart, to decentralized decision-making with centralized budget planning and controls in the M-form (popularized mainly by McKinsey), optimization via operations research (from the likes of Arthur D. Little (ADL)), and sophisticated long-range planning in the 1950s and 1960s (associated at least partially with the Stanford Research Institute (SRI)).

Yet, as the underlying conditions of the world economy and the certainties of the post-Second World War boom period crumbled, so did the usefulness of planning and control tools, especially for US companies, many of which faced increasing difficulties against the more focused and leaner Japanese competitors.

However, when trying to deal with their clients' expectations of the future and addressing their growing concerns about future challenges, "planning" did not disappear from the consultant's toolbox. And while the solutions offered were no longer the same from the late 1960s to the 1980s, they were not entirely new either and at times related to those in the earlier period. However, these solutions were now usually offered by different consulting firms, confirming the importance of the storyteller and their legitimacy. Thus, scenario planning was still planning but now for different possible outcomes—and it came from a newcomer, the Boston Consulting Group (BCG). And the solutions the firm proposed were not entirely new either. Thus, the experience curve had its origin in war-time production and mainly tried to reduce costs, while the portfolio matrix was based on diversified businesses with M-form structures, albeit taking into account positioning vis-à-vis the main competitors and stressing the need to have and evaluate various options. These seemingly novel tools promised clients a way of preparing for the unpreparable and making the future manageable (again). The umbrella concept of corporate strategy, espoused by many consultants, also had the management of the future at its core, suggesting that there were ways to win in an ever less predictable and ever more competitive environment. It was during this period that consultants seem to have learned that they could manage clients' expectations (and promote their own business), by emphasizing the need for constant change both in their direct interaction with clients and in the media, and even more insidiously, by contributing to this dynamic through the regular development of new management ideas, akin to the constant change in fashions.

From influencing client expectations of the future, it was only a small step to actually managing and predicting the future itself. By the beginning of the third period, from the 1990s onward, consultants had built up their reputation and legitimacy over the previous decades, partly by working with and emulating the leading business schools. And they could offer simpler and more immediate solutions, which seemed more important in an ever more swiftly changing environment than academically-driven, in-depth research and

sophisticated theorizing. Thus, consultants eventually went from using the data of others to collecting their own, with the establishment of the McKinsey Global Institute (MGI) both the culmination of long-standing efforts to establish the firm's "thought leadership" and the starting point for similar initiatives by its main competitors. It also signaled the return to a preeminence McKinsey had temporarily lost to others in the second period. Now, consultants no longer had to calculate the probabilities of possible outcomes or offer options for whatever possibilities the future might bring. Instead, the client only had to believe in the future laid out by the consultants and their think tanks and that future would invariably actually come to pass, i.e., turn into a self-fulfilling prophecy—just as the ancient Greeks would follow their oracles to victory. So far, neither the clear cases where the prophecy has proved horribly wrong, like Enron, nor the resurgence of literature demonizing consultants, seems to have done much to shake the belief of most clients in consultant infallibility, testifying to the strength of their legitimacy as narrators and the unquenchable thirst of managers, and possibly all humans, for certainty.

When it comes to possible avenues for additional research, our account has provided three insights, which deserve further study. The first concerns the widespread view regarding the dominant position of independent think tanks in future studies during the first post-1945 decades and the view that it was only weakened by neoliberalism since the 1980s, when markets and consultants became more important. Our review and research suggest that consultants and consulting firms already dealt in "futures" much earlier and also seem to have been closer to think tanks than is currently acknowledged. Thus, during the inter-war period several prominent consultants had relationships with various think tanks. And after the Second World War, one of the leading consulting firms, the Stanford Research Institute (SRI) in many respects resembled other think tanks at the time—though it eventually became marginalized by the more commercially oriented consulting firms (see Kipping 2021b). Thus, while the establishment of the McKinsey Global Institute in 1990 and similar consulting think tanks appears to be a new development, it has to be placed into this long-term context. And, as we have suggested in this contribution, it is also related to the consulting firms' efforts to be perceived as "thought leaders" since at least the 1960s. Consequently, all of these developments and interconnections deserve more research, ideally through a collaboration of scholars studying think tanks and those investigating consulting.

Second, what we have also touched upon repeatedly in our overview—without discussing in detail—are the multiple two-way interactions between consultants and the military (see also Kipping 2021a). Thus, throughout all three periods, the military has been (and continues to be) an important client of the consulting firms—which might have to do with the inherent uncertainty and unpredictability of warfare. At the same time, many ideas generated in the military have served as an inspiration if not direct source for many of the tools and techniques offered by the consultants, albeit often with a considerable time lag, with the experience curve a prime example. Why and how this has been the case for such a long time and whether the flow of ideas has started to be reversed in more recent decades, is also worthy of more research. Another related but even less well-studied aspect concerns the influence of military language and behavior on the consulting firms and their corporate cultures; thus, a fly-on-the-wall documentary of McKinsey's introductory training shows the crucial role of a retired military officer—but also points to the importance of religious imagery (Graef 1999).

A third, even broader area for further research concerns the national differences in the patterns identified in this chapter. They exist, or they at least existed in the past, because

consultants did not expand uniformly across the globe (Kipping 2020). And even if they are much more ubiquitous now, economic, cultural, and institutional factors might still lead to differences among countries in attitudes toward the future and in terms of dealing with uncertainty and expectations.

Notes

1 See <https://www.gantt.com/>.

2 See <https://www.mckinsey.com/mgi/our-people>, accessed February 8, 2024.

References

- Abella, Alex. 2009. *Soldiers of Reason: The Rand Corporation and the Rise of the American Empire*. Boston, MA: Mariner.
- Abrahamson, Eric. 1991. "Managerial Fads and Fashions: The Diffusion and Rejection of Innovations." *The Academy of Management Review* 16, no. 3: 586–612.
- Abrahamson, Eric. 1996. "Management Fashion." *The Academy of Management Review* 21, no. 1: 254–285. DOI: 10.2307/258636.
- Alvesson, Mats. 1993. "Organizations as Rhetoric: Knowledge-Intensive Firms and the Struggle with Ambiguity." *Journal of Management Studies* 30, no. 6: 997–1015. DOI: 10.1111/j.1467-6486.1993.tb00476.x.
- Andersson, Jenny. 2018. *The Future of the World. Futurology, Futurists, and the Struggle for the Post-Cold War Imagination*. Oxford: Oxford University Press.
- Armbrüster, Thomas. 2006. *The Economics and Sociology of Management Consulting*. Cambridge: Cambridge University Press.
- Ashford, Martin. 2000. *Con Tricks: The Shadowy World of Management Consultancy and How to Make it Work for You*. London: Simon & Schuster.
- Avakian, Stephanos, and Timothy Clark. 2012. *Management Consulting*. The International Library of Critical Writings on Business and Management Vol. 20. Cheltenham: Edward Elgar Publishing.
- Baldwin, Richard. 2019. *The Globotics Upheaval. Globalization, Robotics, and the Future of Work*. London: Weidenfeld & Nicolson.
- Barley, Stephen R., and Gideon Kunda. 1992. "Design and Devotion: Surges of Rational and Normative Ideologies of Control in Managerial Discourse." *Administrative Science Quarterly* 37, no. 3: 363–399.
- Beckert, Jens. 2016. *Imagined Futures. Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Beer, Stafford. 1968. *Management Science: The Business Use of Operations Research*. London: Aldus.
- Bloomfield, Brian P., and Ardha Danieli. 1995. "The Role of Management Consultants in the Development of Information Technology. The Indissoluble Nature of Socio-Political and Technical Skills." *Journal of Management Studies* 32, no. 1: 23–46.
- Bodrožić, Zlatko, and Paul S. Adler. 2018. "The Evolution of Management Models: A Neo-Schumpeterian Theory." *Administrative Science Quarterly* 63, no. 1: 85–129.
- Bogdanich, Walt, and Michael Forsythe. 2022. *When McKinsey Comes to Town. The Hidden Influence of the World's Most Powerful Consulting Firm*. New York: Doubleday.
- Boston Consulting Group. 1970. *Perspectives on Experience*. Boston, MA: Boston Consulting Group.
- Braverman, Harry. 1974. *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*. New York: Monthly Review Press.
- Byrne, John. 2001. "The Real Confessions of Tom Peters." Bloomberg Businessweek, December 3, 2001.
- Chandler, Alfred D., Jr. (1962) 1990. *Strategy and Structure: Chapters in the History of the Industrial Enterprise*. Cambridge, MA: MIT Press.
- Clark, Timothy. 2004. "The Fashion of Management Fashion: A Surge Too Far?" *Organization* 11, no. 2: 297–306.

- Clark, Timothy, and Robin Fincham. 2002. "Introduction. The Emergence of Critical Perspectives on Consulting." In *Critical Consulting. New Perspectives on the Management Advice Industry*, edited by Timothy Clark, and Robin Fincham, 1–18. Malden, MA: Blackwell Publishers.
- Collins, David, and Jack Collins. 2023. *The Emptiness of Business Excellence: The Flawed Foundations of Popular Management Theory*. Milton Park: Routledge.
- Dawson, Patrick. 2014. "Reflections: On Time, Temporality and Change in Organizations." *Journal of Change Management* 14, no. 3: 285–308.
- DiMaggio, Paul J., and Walter W. Powell. 1983. "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields" *American Sociological Review* 48, no. 2: 147–160.
- Drucker, Peter F. 1954. *The Practice of Management. A Study of the Most Important Function in American Society*. New York: Harper & Brothers.
- Elfgén, Ralph, and Beatrice Klaile. 1987. *Unternehmensberatung. Angebot, Nachfrage, Zusammenarbeit*. Stuttgart: C.E. Poeschel.
- Engwall, Lars, and Matthias Kipping. 2002. "Introduction. Management Consulting as a Knowledge Industry." In *Management Consulting. Emergence and Dynamics of a Knowledge Industry*, edited by Matthias Kipping, and Lars Engwall, 1–16. Oxford: Oxford University Press.
- Engwall, Lars, Matthias Kipping, and Behlül Üsdiken. 2016. *Defining Management*. Business Schools, Consultants, Media. New York: Routledge.
- Ernst, Berit, and Alfred Kieser. 2002. "In Search of Explanations for the Consulting Explosion." In *The Expansion of Management Knowledge: Carriers, Flows, and Sources*, edited by Kerstin Sahlin-Andersson, and Lars Engwall, 47–73. Stanford, CA: Stanford University Press.
- Faust, Michael. 2002. "Consultancies as Actors in Knowledge Arenas. Evidence from Germany." In *Management Consulting. Emergence and Dynamics of a Knowledge Industry*, edited by Matthias Kipping and Lars Engwall, 146–163. Oxford: Oxford University Press.
- Fink, Dietmar, and Bianka Knoblach. 2003. *Die großen Management Consultants: ihre Geschichte, ihre Konzepte, ihre Strategien*. Munich: Vahlen.
- Foster, Richard, and Sarah Kaplan. 2001. *Creative Destruction: From "Built to Last" to "Built to Perform"*. London: FT Prentice Hall.
- Fuller, Joseph B., Judith K. Wallenstein, Manjari Raman, and Alice de Chalendar. 2019. "Your Workforce Is More Adaptable Than You Think." *Harvard Business Review*, May–June. URL: <https://hbr.org/2019/05/your-workforce-is-more-adaptable-than-you-think>.
- Ghamari-Tabrizi, Sharon. 2005. *The Worlds of Herman Kahn: The Intuitive Science of Thermonuclear War*. Cambridge, MA: Harvard University Press.
- Ghemawat, Pankaj. 1985. "Building Strategy on the Experience Curve." *Harvard Business Review* 63, March–April: 143–149.
- Goold, Michael, and Kathleen Luchs. 2003. "Why Diversify? Four Decades of Management Thinking." In *The Oxford Handbook of Strategy*, edited by David Faulkner, and Andrew Campbell, 2: 17–42. Oxford: Oxford University Press.
- Graef, R. 1999. "Master of the Universe." Channel 4 Television.
- Guillén, Mauro F. 1994. *Models of Management: Work, Authority, and Organization in a Comparative Perspective*. Chicago, IL: University of Chicago Press.
- Hahn, Dietger. 1997. "Zweck und Entwicklung der Portfolio-Konzepte in der strategischen Unternehmensplanung." In *Strategische Unternehmensplanung—strategische Unternehmensführung. Stand und Entwicklungstendenzen*. 7th ed., edited by Dietger Hahn and Bernhard Taylor, 221–253. Heidelberg: Physica.
- Heusinkveld, Stefan, Marlieke van Grinsven, Claudia Groß, David Greatbatch, and Timothy Clark. 2021. *The Flow of Management Ideas. Rethinking Managerial Audiences*. Cambridge: Cambridge University Press.
- Higdon, Hal. 1969. *The Business Healers*. New York: Random House.
- Hilger, Susanne. 2004. "Reluctant Americanization? The Reaction of Henkel to the Influences and Competition from the United States." In *German and Japanese Business in the Boom Years. Transforming American Management and Technology Models*, edited by Akira Kudo, Matthias Kipping, and Harm G. Schröter, 193–220. London: Routledge.
- Hood, Christopher. 1991. "A Public Management for all Seasons?" *Public Administration* 69, no. 1: 3–19.

- Hoof, Florian. 2020. *Angels of Efficiency. A Media History of Consulting*. New York: Oxford University Press.
- Jackall, Robert. 2009. *Moral Mazes. The World of Corporate Managers*. Updated edition. Oxford: Oxford University Press.
- Kanigel, Robert. 1997. *The One Best Way: Frederick Winslow Taylor and the Enigma of Efficiency*. New York: Viking.
- Kelly, Diana. 2020. *The Red Taylorist: The Life and Times of Walter Nicholas Polakov*. Bingley: Emerald.
- Kiechel, Walter. 2010. *The Lords of Strategy. The Secret Intellectual History of the New Corporate World*. Boston, MA: Harvard Business Press.
- Kieser, Alfred. 1997. "Rhetoric and Myth in Management Fashion." *Organization* 4, no. 1: 49–74.
- Kieser, Alfred. 2002. "Managers as Marionettes? Using Fashion Theories to Explain the Success of Consultancies" In *Management Consulting: Emergence and Dynamics of a Knowledge Industry*, edited by Lars Engwall, and Matthias Kipping, 167–183. Oxford: Oxford University Press.
- Kipping, Matthias, ed. 2000. "Les consultants." *Entreprises et Histoire* 25, October.
- Kipping, Matthias. 2002. "Trapped in Their Wave. The Evolution of Management Consultancies." In *Critical Consulting. New Perspectives on the Management Advice Industry*, edited by Timothy Clark, and Robin Fincham, 28–49. Malden, MA: Blackwell.
- Kipping, Matthias. 2020. "Masters of Global: Consultants and Internationalization" In *The Routledge Companion to the Makers of Global Business*, edited by Teresa da Silva Lopes, Christina Lubinski, and Heidi J. Tworek, 138–155. London: Routledge.
- Kipping, Matthias. 2021a. "America First: How Consultants Got into the Public Sector." In *Professional Service Firms and Politics in a Global Era: Public Policy, Private Expertise*, edited by Chris Hurl, and Anne Vogelpohl, 29–52. London: Palgrave Macmillan.
- Kipping, Matthias. 2021b. "From Private Advice to Public Policy? The Evolution of Consultancy Think Tanks." In *Critical Perspectives on Think Tanks: Power, Politics and Knowledge*, edited by Julien Landry, 36–55. Cheltenham: Edward Elgar Publishing.
- Kipping, Matthias, and Gerarda Westerhuis. 2014. "The Managerialization of Banking: From Blueprint to Reality." *Management & Organizational History* 9, no. 4: 374–393. DOI: 10.1080/17449359.2014.980269.
- Klein, Howard J. 1977. *Other People's Business: A Primer on Management Consultants*. New York: Mason/Charter.
- Kleiner, Art. 2008. *The Age of Heretics: A History of the Radical Thinkers Who Reinvented Corporate Management*. 2nd ed. New York: Wiley.
- Kostera, Monika. 1995. "The Modern Crusade: The Missionaries of Management Come to Eastern Europe" *Management Learning* 26, no. 3: 331–352.
- Krämer, Hannes, and Matthias Wenzel, eds. 2018. *How Organizations Manage the Future. Theoretical Perspectives and Empirical Insights*. Cham: Springer.
- Leicht, Kevin T., Tony Walter, Ivan Sainsaulieu, and Scott Davies. 2009. "New Public Management and New Professionalism across Nations and Contexts." *Current Sociology* 57, no. 4: 581–605.
- Littler, Craig. 1982. *The Development of the Labour Process in Capitalist Societies: A Comparative Study of the Transformation of Work Organization in Britain, Japan, and the USA*. London: Heinemann Educational Books.
- Marktanner, Alina. 2023. *Behördenconsulting. Unternehmensberater in der öffentlichen Verwaltung der Bundesrepublik, 1970er- bis 2000er Jahre*. Berlin and Boston, MA: De Gruyter.
- Mazzucato, Mariana, and Rosie Collington. 2023. *The Big Con: How the Consulting Industry Weakens Our Businesses, Infantilizes Our Governments and Warps Our Economies*. London: Allen Lane.
- McDonald, Duff. 2013. *The Firm: The Story of McKinsey and its Secret Influence on American Business*. New York: Simon & Schuster.
- McGann, James G. 2021. "2020 Global Go To Think Tank Index Report" URL: <https://repository.upenn.edu/handle/20.500.14332/48577>
- McKenna, Christopher D. 2006. *The World's Newest Profession. Management Consulting in the Twentieth Century*. Cambridge: Cambridge University Press.
- Medina, Eden. 2011. *Cybernetic Revolutionaries: Technology and Politics in Allende's Chile*. Cambridge, MA: MIT Press.

- Michaels, Ed, Helen Handfield-Jones, and Beth Axelrod. 2001. *The War for Talent*. Boston, MA: Harvard Business School Press.
- Micklethwait, John, and Adrian Wooldridge. 1996. *The Witch Doctors. What the Management Gurus are Saying and Why it Matters*. New York: Times Books (Times Business).
- Mintzberg, Henry, and James A. Waters. 1985. "Of Strategies, Deliberate and Emergent." *Strategic Management Journal* 6, no. 3: 257–272.
- Muzio, Daniel, Damian Hodgson, James Faulconbridge, Jonathan Beaverstock, and Sarah Hall. 2011. "Towards Corporate Professionalization: The Case of Project Management, Management Consultancy and Executive Search." *Current Sociology* 59, no. 4: 443–464.
- Nelson, Daniel. 1980. *Frederick W. Taylor and the Rise of Scientific Management*. Madison, WI: University of Wisconsin Press.
- Nielson, Donald L. 2006. *A Heritage of Innovation: SRI's First Half Century*. Menlo Park, CA: SRI International.
- Nikolova, Natalia, and Timothy Devinney. 2012. "The Nature of Client-Consultant Interaction. A Critical Review." In *The Oxford Handbook of Management Consulting*, edited by Matthias Kipping, and Timothy Clark, 389–409. New York: Oxford University Press.
- O'Shea, James, and Charles Madigan. 1997. *Dangerous Company: The Consulting Powerhouses and the Businesses They Save and Ruin*. New York: Times Business.
- Peters, Tom, and Robert H. Waterman. 1982. In *Search of Excellence. Lessons from America's Best-Run Companies*. New York: Harper & Row.
- Pinault, Lewis. 2000. *Consulting Demons: Inside the Unscrupulous World of Global Corporate Consulting*. New York: HarperBusiness.
- Plumpe, Werner. 2008. "Nützliche Fiktionen? Der Wandel der Unternehmen in der Literatur der Berater." In *Unternehmen am Ende des "goldenen Zeitalters."* *Die 1970er Jahre in unternehmens- und wirtschaftshistorischer Perspektive*, edited by Morten Reitmayer, and Ruth Rosenberger, 251–269. Essen: Klartext.
- Pohl, Manfred. 1997. "75 Jahre RKW: Die Geschichte der Rationalisierung." *Berichte / Forschungsinstitut der Internationalen Wissenschaftlichen Vereinigung Weltwirtschaft und Weltpolitik e.V.* 7: 49–55.
- Reinecke, Juliane, Roy Suddaby, Ann Langley, and Haridimos Tsoukas. 2020. "Time, Temporality, and History in Process Organization Studies: An Introduction" In *Time, Temporality, and History in Process Organization Studies*, edited by Juliane Reinecke, Roy Suddaby, Ann Langley, and Haridimos Tsoukas, 1–14. Oxford: Oxford University Press.
- Sahlin-Andersson, Kerstin, and Lars Engwall, eds. 2002. *The Expansion of Management Knowledge; Carriers, Flows, and Sources*. Stanford: Stanford University Press.
- Saint-Martin, Denis. 2000. *Building the New Managerialist State*. Oxford: Oxford University Press.
- Schröter, Harm G. 2005. *Americanization of the European Economy. A Compact Survey of American Economic Influence in Europe Since the 1880s*. Dordrecht: Springer.
- Seefried, Elke. 2014. "Steering the Future. The Emergence of 'Western' Futures Research and its Production of Expertise, 1950s to Early 1970s." *European Journal of Futures Research* 2, Article 29. DOI: 10.1007/s40309-013-0029-y.
- Sloan, Alfred P. 1964. *My Years with General Motors*. New York: Doubleday.
- Spell, Chester S. 2001. "Management Fashions. Where Do they Come from, and are they Old Wine in New Bottles?" *Journal of Management Inquiry* 10, no. 4: 358–373.
- Stalk, George, and Thomas M. Hout. 1990. *Competing against Time: How Time-Based Competition is Reshaping Global Markets*. New York: Free Press.
- Stevens, Matt, and Matthew Haag. 2019. "Jeffrey Skilling, Former Enron Chief, Released After 12 Years in Prison." *The New York Times*, February 22, 2019. URL: <https://www.nytimes.com/2019/02/22/business/enron-ceo-skilling-scandal.html>.
- Sturdy, Andrew. 1997. "The Consultancy Process—An Insecure Business." *Journal of Management Studies* 34, no. 3: 389–413.
- Sturdy, Andrew. 2011. "Consultancy's Consequences? A Critical Assessment of Management Consultancy's Impact on Management." *British Journal of Management* 22, no. 3: 517–530.
- Thomas, William. 2012. "Operations Research Vis-à-Vis Management at Arthur D. Little and the Massachusetts Institute of Technology in the 1950s." *Business History Review* 86, no. 1: 99–122.

- Vahrenkamp, Richard. 2023. "Mathematical Management—Operations Research in the United States and Western Europe, 1945–1990." *Management Revue* 34, no. 1: 69–91.
- Whittington, Richard. 2019. *Opening Strategy: Professional Strategists and Practice Change, 1960 to Today*. Oxford: Oxford University Press.
- Whittington, Richard, and Michael Mayer. 2000. *The European Corporation: Strategy, Structure, and Social Science*. Oxford: Oxford University Press.
- Wren, Daniel A. 2015. "Implementing the Gantt Chart in Europe and Britain: The Contributions of Wallace Clark." *Journal of Management History* 21, no. 3: 309–327.
- Wren, Daniel A., and Arthur G. Bedeian. 2020. *The Evolution of Management Thought*. 8th ed. New York: Wiley.
- Wright, Christopher. 2000. "From Shop Floor to Boardroom: The Historical Evolution of Australian Management Consulting, 1940s to 1980s." *Business History* 42, no. 1: 85–86.

16

ECONOMIC FORECASTING

Laetitia Lenel and Werner Reichmann

This chapter explores the history and current state of economic forecasting and highlights the role of forecasting in the formation of economic expectations. When the field of economic forecasting emerged in the United States and in Europe at the beginning of the twentieth century (on forecasting in the Soviet Union, see Rindzevičiūtė 2016, 2023), economists hoped to use the new data generated by the expansion of economic statistics to identify stable patterns of the business cycle. However, a future that turned out differently than predicted soon cast doubt on the existence of timeless laws. When survey data generated in the 1950s revealed that economic agents continuously revise and update their expectations based on information about the expectations of other agents, a profound reassessment of forecasting's role for economic and political decision-making took place. From an instrument of representation, aimed at predicting as accurately as possible a future perceived to be independent from the forecast itself, forecasting turned into a tool of coordination used by economists as well as economic and political decision-makers to exchange and shape economic expectations. This had far-reaching consequences for policymaking, and, from the 1980s onward, prompted governments, central banks, and international organizations to use published forecasts to influence economic decision-making. Our chapter traces this shift in method and function and examines current approaches in forecasting. In doing so, our chapter highlights the importance of forecasting for economic expectation formation. By offering agents a shared horizon of expectations, forecasting allows them to anticipate other agents' expectations, gauge their probable behavior, and adjust their own expectations accordingly.

Economic forecasting has often been described as one of the most important fields of economic expertise. Similarly, critiques of economic forecasting are usually directed at the entire economic discipline. And yet, economists, historians, and sociologists have only recently started to investigate the history, making, and impact of economic forecasts (Evans 1997, 1999; Nützenadel 2010; Seefried 2010; Reichmann 2013; Friedman 2014; Seefried 2015, 313–324; Rindzevičiūtė 2016; Pietruska 2017; Andersson 2018; Lenel 2018; Reichmann 2018b; Fritsche, Köster, and Lenel 2020; Lenel 2021; Döpke, Fritsche, and Reichmann 2022; Lenel 2023a; Rindzevičiūtė 2023). This chapter presents some of the most important findings of this multidisciplinary research and points out the crucial importance of

economic forecasting for the formation and management of economic expectations. First, it traces the transformation of economic forecasting from an instrument of representation to a tool of coordination in the twentieth century. Subsequently, “The Inner Life of Economic Forecasting” explores the interactive dimension of economic forecasting by studying German forecaster networks in the twenty-first century. The final section, “Published Forecasts as a Tool of Monetary Policy,” describes how central banks began to use published forecasts to shape and manage expectations and thus ensure economic stability.

The History of Economic Forecasting

Economic forecasting saw a remarkable transformation over the twentieth century. Motivated by the experience of capitalism’s recurrent economic crises and their devastating economic, political, and social consequences, economic forecasting emerged after the panic of 1907 in the United States and, a little later, in Europe as a distinct field of economic research. An alliance of business representatives, policymakers, and economists hoped to use the new data generated by the expansion of economic statistics to identify stable patterns of the business cycle and by this means mitigate or prevent future crises. Forecasting tools such as the Index of General Business Conditions, developed by the Harvard Committee on Economic Research after the First World War, testified to this assumption. Here, data from the pre-war period were used to identify presumed stable statistical relationships between different time series and project them into the future (Armatte 2003, 63–65; Fayolle 2003, 12–17; Morgan [1990] 2003, 56–63; Friedman 2009, 2014, 128–165; Boumans 2016; Lenel 2018, 2021). The members of the Harvard Committee sorted a set of economic time series, which they had “corrected” for secular trend and seasonal variation, into three groups (A: speculation; B: business; C: banking) according to the similarity and simultaneity of their fluctuations. They believed that the cyclical fluctuations of the three groups showed a stable lag, so that the movements of one group could forecast conditions in the others. This idea was later incorporated in the leading indicator approach developed at the National Bureau of Economic Research in the late 1930s, which remains one of the most prominent forecasting tools worldwide (Lenel 2023b).

The Harvard “barometer,” as contemporaries called the index, rose to international fame and led to the foundation of numerous business cycle research institutes around the world in the 1920s (Lenel 2021). For the first time, economists seemed to have found a way to accurately predict the movements of the business cycle. In a period rife with economic crises, the new method raised hopes that future crises could be predicted and thus mitigated or even averted. American entrepreneurs and policymakers celebrated the new method as a means to silence voices calling for government intervention in the economy. Through the foreknowledge that the barometer was supposed to generate, they hoped to render government intervention superfluous. In Europe, at the instigation of the League of Nations, economists dreamed of turning the Harvard Index into a “world barometer” that could foster international cooperation and prevent future crises and conflicts (Lenel 2021).

But a future that turned out differently than predicted by the Harvard Index soon cast doubt on the Index’s predictive power (Lenel 2018, 2021). After numerous divergences between the Committee’s predictions and actual outcomes, the members of the Harvard Committee began to supplement and replace their official, statistical forecasting practice with an unofficial, second forecasting practice. Ironically, it was the great popularity of their seemingly “mechanical” method that had laid the basis for this change in method:

American business representatives, bankers, central bankers, as well as international economists had been in close contact with the members of the Harvard Committee since the early 1920s, exchanging ideas on methods of data analysis and processing as well as forecasts and expectations. Thus, the Index had laid the foundation for a new practice of informal exchange of expectations between international economists and political and economic decision-makers. From 1922 onward, the members of the Harvard Committee regularly consulted with members of the Federal Reserve banks and other economic and political decision-makers to inquire about their expectations and plans (Lenel 2021). The members of the Harvard Committee shared and circulated this information among their network partners and used it in their publications, turning the Committee into a center of expectation exchange. Increasingly, the Harvard forecasts were based on knowledge of the expectations and intentions of political and economic agents—rather than on supposedly stable statistical patterns.

Divergences between forecasts and actual future outcomes, as well as the increasingly proactive policy of the Federal Reserve after 1921, challenged the idea of the existence of unvarying patterns inscribed in forecasting tools such as the Harvard index. The Great Depression, which seemed unprecedented in scale and scope, further undermined contemporaries' faith in the predictive value of extrapolative forecasting techniques. In response, economists employed and developed two novel forecasting techniques: macroeconomic modeling and surveying. The first macroeconomic model of the business cycle was developed by the Dutch economist Jan Tinbergen at the *Centraal Bureau voor de Statistiek* in The Hague in 1936 at the request of the Dutch Association for Political Economy and Statistics (Tinbergen 1937; Dhaene and Barten 1989; Barten 1991, 155–168; Morgan [1990] 2003, 102–108; Dekker 2021, 141–150). Faced with the severe and long-lasting effects of the Great Depression, namely dramatically reduced exports, the Association asked Tinbergen to investigate whether a domestic economic recovery was possible without an improvement in the Dutch export position. Tinbergen's model captured the Dutch domestic economy as a set of equations that could be manipulated to simulate the likely impact of different policies. This, he hoped, would help identify the most suitable means to steer the country out of the depression. Shortly afterward, Tinbergen was invited to Geneva to pursue his work at the League of Nations. There, he set out to “test” different business cycle theories by devising models relating cause and effect of economic phenomena. Subjecting the available data to his equations, he evaluated the influence of each variable in regard to their respective economic effects as suggested by economic theory. Tinbergen did not only test his equations for different countries and time periods, but also performed prediction tests by extrapolating two years into the future from the respective period. He therefore tested and verified his equations on the basis of data and at the same time used them to predict future developments of economic phenomena based on estimated input data.

Fostered by a new demand for economic policy advice as well as two decades of relatively smooth economic growth, which seemed to suggest that the business cycle was administrable by economic foresight and planning, modeling soon became one of the most important forecasting approaches. Macroeconomic modeling allowed economists to simulate different policy interventions into the economy and on this basis to help policymakers choose the “optimal” version of the future—what Tinbergen later called the “element of task-setting” (on this term, see Dekker 2021, 234–243). As the economy was modeled as a set of equations that could be manipulated, and by this means used to compare and evaluate the effects of different policy measures, forecasting changed its character and role. Instead

of predicting the, at the time of the forecast, most likely future, forecasting became a tool to engineer the economic future. Here, business forecasting entered a new partnership with policymaking. As econometric modeling endowed policymakers with a new agency, it fundamentally extended both policymakers' and economists' responsibilities. Macroeconometric modeling, after all, did not only strengthen and legitimize governments' managerial mode toward economic processes, but was also vital in increasing economists' influence on political affairs and public debate in the twentieth century. As economists came to lay out the realm of possible futures and to outline the means to help prevent or materialize them, policymakers' dependence on economic experts increased significantly.

Not everyone welcomed this new partnership between economists and policymakers. In the attempt to curtail the expansion of state intervention and responsibility in the 1930s, American business leaders increasingly employed another forecasting technique—surveying—designed to empower business leaders to adapt their purchasing, production, sales, and pricing and marketing policies to the expectations and plans of consumers as well as other business executives (Logemann 2019). In the 1940s, this forecasting technique was adopted by American journals and credit reporting agencies, and, a little later, by economists at business cycle research institutes in Europe and Africa (Lenel 2023c). Faced with serious deficits in economic statistics after the Second World War, the survey technique was to provide economic and political decision-makers with up-to-date information on the latest market developments. At the German Institute for Economic Research (ifo), economists introduced a survey in 1949, the *Konjunkturtest*, to inquire about businesspeople's expectations, judgments, and anticipations. This *Konjunkturtest* provided response options in a multiple-choice format, asking company representatives about actual and expected directions of change of certain variables and their own evaluation. The aggregated and weighted results were visualized in a *Konjunkturspiegel* (literally meaning mirror, but here, a snapshot, of business conditions). Participants received the—confidential—results from their respective branches two or three weeks after the surveys had been sent out.

In the first years after the establishment of the *Konjunkturtest*, the members of the ifo were eager to stress the similarities between their results and economic statistics. As Hans Langelütke and Wilhelm Marquardt, who had helped create the survey, pointed out in 1951, their survey did not inquire about subjective views, opinions, or sentiments, but about “objective” entrepreneurial “knowledge” (Langelütke and Marquardt 1951, 197, 199). Repeated comparisons between the expectations suggested by the survey results and the actual future outcomes as indicated by official index numbers of the same period, however, challenged these initial assumptions. As the researchers found out, agents were not only wrong in their predictions of future demand and other variables beyond their control: even their predictions of their own behavior were of surprisingly low forecasting accuracy. As subsequent studies suggested, divergences between the respective survey results and actual future outcomes were not haphazard but could be explained by changes in businesspeople's market anticipations. Economic agents, from this perspective, continuously modified and updated their expectations in light of new information. The researchers concluded that company representatives sought “to overcome the uncertainty of the future by keeping their own programs and plans elastic enough to be able to adapt them to changing market conditions at short notice” (Marquardt 1958, 20). This finding, which most economists found difficult to believe in the late 1950s, was confirmed by subsequent studies on entrepreneurial behavior in Europe and the United States.

This was a new understanding of economic expectation formation and decision-making (Lenel 2023c). While it was formerly presumed that economic agents based their expectations solely on past experiences, economists came to realize that the behavior of economic agents depended not only on their own expectations, but also on their expectations regarding the expectations of others, and that expectations were continuously being updated on the basis of these “expectation expectations” (Luhmann 1984b)—a mutual dependence known to sociologists as “double contingency” (Parsons 1951; Luhmann 1984a; on this point, see also Köhler and Logemann, Chapter 17, and Mata, Chapter 18 in this volume). This gave surveys and the publication of survey results a new importance. Through exchanging plans and expectations, the circulated survey results could coordinate this learning process and even enable it in the first place. The *Konjunkturspiegel* and other visualization methods, from this perspective, presented judgments, plans, and expectations and by this means allowed business executives to assess the plans of their competitors, suppliers, and customers. As such, these visual representations of businesspeople’s expectations could help predict entrepreneurial behavior and company policies and form a basis for economic decision-making. The *Konjunkturtest*, researchers rejoiced, had helped create a “community of mutual information exchange” (*Informationsgemeinschaft auf Gegenseitigkeit*), which allowed executives to share, compare, and coordinate their expectations (Krumper, Batzer, and Strigel 1979, 47).

Since the early 1920, repeated disappointments about divergences between forecasts and actual future outcomes have transformed economic forecasting into a central technique for solving the problem of double contingency in economic decision-making. In the process, forecasting saw a shift from forecast-as-representation to forecast-as-process, becoming a tool for coordination used by economists as well as economic and political decision-makers to exchange and shape economic expectations and in so doing engineer the economy. By creating and circulating a shared horizon of expectations, forecasts can dissolve the potential paralysis that results from a situation in which agents made their decisions contingent on the expected future behavior of others.

The Inner Life of Economic Forecasting

But what does this coordination entail? This section analyzes the inner life of economic forecasting, that is, the place where the negotiation and coordination of economic expectations between economists and economic and political decision-makers take place. To this end, this section focusses on the practices at economic forecasting institutes in German-speaking countries in the twenty-first century.

How do humans imagine the future? What do they actually do when developing different stories of what will happen (on the role of economic narratives in expectation formation, see Tuckett, Chapter 5 in this volume)? Several authors with different scientific backgrounds argue that interaction is the main resource that enables humans to imagine possible futures, to produce forecasts, and thus to form expectations. In his book *The Gap*, evolutionary psychologist Thomas Suddendorf highlights that one of the main differences between humans and animals is that humans are able to do what he calls “mental time traveling” (Suddendorf 2013). As Suddendorf argues, no other being in the world is able to “imagine future events, including entirely fictional scenarios (such as the invention of an actual time machine)” (Suddendorf 2013, 89). Humans use past experiences to produce futures. However, they are also able to imagine situations they have never experienced

before. This mechanism, of course, is highly error-prone. And yet—and this is the sociological part of Suddendorf’s argument—humans have developed a specific way to increase the quality of their memory and their “mental time travels,” one that Suddendorf calls interaction: humans share their plans and predictions with others.

The sociologist David Gibson also emphasizes the interactional element of imagining the future (Gibson 2011a, 2011b). In his studies on the microsociological and conversational foundations of interaction, Gibson introduces the term “foretalk,” a combination of forecasting and talk, to describe actors’ exchange about possible futures (Gibson 2012). Foretalk brings to light possible futures that might otherwise not have been imagined. Thus, foretalk is an epistemic resource that enables humans to produce new imaginaries of the future. Moreover, foretalk helps actors to justify decisions and improve their legitimacy.

Both Suddendorf and Gibson thus emphasize the interactional foundations of producing knowledge about the future. They argue that the production of possible futures, such as ideas about future economic developments, does not take place in a social vacuum. What follows is the question: What are the social and interactional aspects of producing economic futures? This section looks more closely at the interactional processes of economic forecasting.¹

How do economic forecasters “foretalk” and how do they exchange ideas on the economic future? Economic textbooks describe different ways of producing economic forecasts (e.g., Tichy 1994; Döhrn 2014). These ways mainly differ depending on whether forecasters have more trust in numbers, quantitative data, mathematics, and econometric models or whether they rely more on qualitative data gathered from representatives of the economy (McNees 1990; Evans 1997, 1999). In practice, however, forecasters never rely purely on calculation. In the discipline of economic forecasting, econometric models are taking more and more of a back seat within the process of producing a forecast (Reichmann 2010, 181–183). Indeed, most forecasters interviewed agree with Evans’ claim that “macroeconomic models support forecasting activity, but do not actually produce forecasts” (Evans 1997, 426).

Various forms of interaction with different partners play a much more important role than econometrics. Interaction can be either informal or more institutionalized (see Reichmann 2013, 861–867), and the interaction includes both internal partners (i.e. colleagues from their institute) and external ones (i.e. academic economists and representatives of “the economy”). Forecasters have developed numerous formal and informal interaction channels and a permanent communication flow enabling them to contact those who represent, in one way or another, “the economy” (Reichmann 2013, 861–868). They build formal and informal platforms where they meet these representatives to gather data and information and thus jointly produce expectations of the economic future. In the words of Suddendorf and Gibson, economic forecasters enrich the human capacity for “mental time traveling” to imagine possible futures with the “trick” (Suddendorf 2013) of sharing their predictions with others to obtain information about their respective views of and alternative perspectives on the future. They “foretalk” (Gibson 2011b) with selected interaction partners in several ways, thereby ensuring that economic forecasting does not take place in a social vacuum.

Forecasters are nodes in intersecting networks that connect several groups of interacting parties such as other economists from universities, entrepreneurs, policymakers, and members of the government and the administration. This network is a constitutive part

of the epistemic process of economic forecasting. Being a node in this network raises an entity from an ordinary interaction partner to a co-producer of the economic forecasts. We call this network an “epistemic network” (Reichmann 2013, 863–867), since it is an important resource in the production of economic forecasts. The forecasters do not just interview, survey, or observe other actors in the network, but give them the opportunity to actively co-produce the forecasts—a form of “epistemic participation” (Reichmann 2013). The epistemic network includes a lively interaction between economic forecasters from different institutions.

While the forecasting institutes may follow conflicting scientific paradigms and compete for funding, they nevertheless frequently interact and cooperate, both formally and informally. Indeed, all forecasters rely on individually formed networks of “foretalkers”—other forecasters and economic researchers with whom they regularly interact and exchange opinions on current and future developments. Exchanging ideas with colleagues is something familiar to most scientists. But the forecasters’ epistemic networks include not just other economists. In particular, their external networks include policymakers and business representatives. The economic and political decision-makers with whom they interact (e.g., members of governmental units, federal banks, interest groups, lobby organizations, labor unions, social partners, etc.) have different perspectives and provide fresh views on economic developments. This part of the epistemic network enables forecasters to interact with a number of representatives of “the economy,” and when forecasters talk about this network, they rhetorically reify “the economy” and say things like: “It is really important to speak with the economy” (German business cycle researcher quoted in Reichmann 2013, 861). They are aware that they cannot really speak to “the economy” as such, but understand their interlocutors as its representatives.

Forecasters describe this part of their network as the most important one. Indeed, they consider it more important than using econometric models or attending academic conferences (Reichmann 2013, 863–865; 2018b, 87–100). It is a place where those who forecast economic developments meet and have the chance to “foretalk” with those who shape economic policy and make economic decisions. It is a place where two quite different groups of “mental time travelers” coordinate their expectations.

The business representatives in their networks (such as CEOs, businesspeople, and industrial lobbyists) consider forecasters to be scientific consultants, conducting studies to answer specific questions. But forecasters also give informal advice that helps business representatives to get an idea of other actors’ interpretations of recent economic developments and expectations. Forecasters allow them to take a “bird’s eye view” (Gilbert and Jaszi 1944) of the economy. For that purpose, several economic forecasting institutes conduct permanent panel studies. To obtain information about business representatives’ expectations, they gather data from certain groups (e.g., financial experts, CEOs, purchasing managers, port executives, etc.) at specific time intervals using standardized questionnaires. This process is also one part of an ongoing (standardized) interaction between various parts of the epistemic network.

The integration of the views of these external groups into the forecasting process works as an iterative process (Reichmann 2013, 870). In a first step, forecasting institutes produce what is called a “draft forecast” (field term) based on econometric models and without using the epistemic network. Subsequently, they enter formal and informal discussions with the groups mentioned above. With an eye to recent problems on the political agenda, forecasters contact selected economic and political decision-makers to discuss the draft forecast,

exchange views on current economic developments, and learn about the expectations of policymakers. This process is generally not standardized and is permanently ongoing.

Before the forecasts are presented to the public, several formal meetings take place. At these meetings, the final draft forecasts are discussed with a group of policymakers, most of whom have also been involved in prior talks. The complete preparation of a forecast takes about two to three weeks, but the interaction and “foretalk” take place continuously. The “mental time travelers” stay in permanent contact and ensure that information on economic policy plans, on the political climate, and even on shifts in ideological paradigms are continuously exchanged.

Why do forecasters invest this much time and energy into an activity not described in economic textbooks? And why is it so important to let different groups participate in the epistemic process of forecasting? There are at least four reasons why forecasters engage in foretalking: innovation, legitimacy, quality, and coordination (for an in-depth analysis of the functions of epistemic participation, see Reichmann 2018a). First, foretalking enables forecasters to envision possible futures and spot emerging developments they would have otherwise missed. They thus use interaction as a resource for novel imaginaries. Second, foretalk increases the social legitimacy of forecasts in the sense that they are more likely to be believed. Knowledge about the future is highly uncertain and the risk that it will be doubted is higher than with other types of knowledge, even if it is produced by academic experts. As those who base their economic and political decisions on forecasts have helped co-produce them, they are less likely to reject them. Foretalk improves, third, what could be called the forecasts’ epistemic quality. Foretalk provides (highly) unstandardized data that impact the economic future but cannot otherwise be accessed or captured in econometric models. The comprehensive interaction process may not make economic forecasts more accurate in a numerical sense. Still, it increases the range of knowledge about intentions and assumptions of economic and political actors. And fourth, foretalk allows economists as well as economic and political decision-makers to share and coordinate their economic expectations.

There is no evidence that policymakers can simply “order” politically suitable forecasts in this way (Döpke and Fritzsche 2009, 33–35). Instead, the interaction is an open process, and its very contingency is what makes the embeddedness in this process of epistemic networking and interaction with policymakers so advantageous for economic forecasters. Furthermore, the epistemic participation between forecasters and “the economy” should be understood as one part of an ongoing coordination of expectations that stabilizes markets and the economy as a whole (Reichmann 2018b, 217–249).

Published Forecasts as a Tool of Monetary Policy

As we have shown above, continuous divergences between forecasts and future outcomes changed economic ideas of expectation formation in the twentieth century. Divergences between the Harvard Committee’s forecasts and actual future outcomes had pointed to the future’s openness and the importance of “the human factor” in economic processes as early as the 1920s (Lenel 2021). Comparisons between survey results and future outcomes in the 1950s furthermore convinced economists of the importance of agents’ higher-order expectations: their expectations about other agents’ expectations, their expectations about other agents’ expectations about other agents’ expectations, and so on (Grunberg and Modigliani 1954; Anderson, Fürst, and Schulte 1956; Anderson et al. 1956; Anderson

and Strigel 1960). As Franco Modigliani and others summarized these findings in 1960 (Modigliani, Hart, and Orcutt 1960, 5):

[I]n a world where many decisions will have results that run through many future periods, and where people making such forward-looking decisions are well aware of the processes of change, it is often more appropriate to view decisions as depending on the expected future behavior of the environment.

Modigliani's student and colleague John Muth generalized this insight in his famous 1961 article on "Rational Expectations," arguing that economic agents base their decisions on all the available information at hand and adjust their expectations to the structural environment they inhabit (Muth 1961). In the early 1970s, Robert Lucas extended the hypothesis to macroeconomic models and to the analysis of economic policy (see also Duarte, Chapter 2 in this volume). Lucas argued that, since agents constantly update their expectations in response to economic policy changes, model parameters derived from prior economic policies and data were no longer applicable (Grunberg and Modigliani 1954, 478, fn. 45; Lucas 1976; on Modigliani as an antecedent, see Hartley 2004, 429). In Lucas' view, parameters therefore have to be reevaluated with each policy change. With this, Lucas presented a new view on how modelers could compare the effects of different economic policies, a perspective that also helped explain the stagflation of the 1970s which called into question the economic belief in a permanent trade-off between inflation and unemployment (Lenel 2023c).

Beginning in the late 1970s, Robert Lucas and his colleagues Thomas Sargent and Neil Wallace published numerous articles in Federal Reserve outlets, in which they laid out the implications of the rational expectations hypothesis for monetary policy, namely "to provide a stable, predictable environment for the private sector of the economy" (Lucas 1980, 210). This affected debates at central banks. Federal Reserve authorities began to discuss means to increase the transparency of their decisions. Rising inflation and fears of an immediate recession in summer 1979 put further emphasis on the topic, convincing Fed chairman Paul Volcker and his colleagues of the need to actively turn expectations and thus curb inflation. Prompted also by growing criticism of Federal Reserve secrecy, in July 1979 the Federal Reserve began to publish the Board members' projections for real gross national product (GNP) and inflation in their semi-annual *Monetary Policy Report*, which influenced the federal funds rate. After the stock market crash of 1987, other central banks around the world followed the Fed's example (for an overview, see Doyle, Kole, and Wood 2007, Table 1), turning the publication of their forecasts into an increasingly prominent part of their communications (see also Dräger, Chapter 12 in this volume)—a "shift from transactions to communication" or to an "economy of words" (Holmes 2009, 2014; Wansleben 2023, 110). Today, central banks continuously communicate their forecast for inflation and output as well as their long-run inflation target to manage and coordinate inflation expectations—based on the Fed's assumption under Paul Volcker that a transparent interest rate policy could anchor inflation expectations and thus longer-term interest rates and aggregate demand (Goodfriend 2007).

The extent of detail and the practices of communication differ widely. And yet, all central banks in advanced economies nowadays publish some sort of projection of economic growth and inflation. The publication of forecasts serves two goals (see also Woodford 2001; Blinder et al. 2008). It aims, first, to increase agents' understanding of the central

bank's outlooks and goals and thus enhance the predictability of monetary policy actions. The publication of forecasts seeks, second, to affect market expectations regarding financial variables and thus let markets "do the central bank's work for it" (Woodford 2001, 14). According to this view, central banks' published forecasts—and their communication more generally—guide markets' expectations and thus economic decision-making.

While some believe that this management of expectations through communication has become more influential than central banks' actual changes to their current policy rates (see also Smart 2006; Abolafia 2010; Braun 2015, 370), more recent developments have cast doubt on the effectiveness and performative power of these "politics of expectations" (see, e.g., Walter 2019; on the term "politics of expectations," see Beckert 2016). Despite ongoing debates about its effectiveness, however, the management of expectations remains a widely used practice, which is also employed in the business sector, by governments, and by international organizations. In the 1970s, for instance, the International Monetary Fund (IMF) began to publish economic outlooks to shape economic decision-making and policymaking in member countries. In a set of alternative economic scenarios, the staff compared and evaluated the assumed effects of different policy measures for global economic growth and the balance of payments. By circulating these scenarios, the IMF tried to bring about the future that their "desirable" or "recommended" scenario described (Lenel 2023a).

The entanglements of the evolution of these practices are worth highlighting. Forecasting practices repeatedly led to disappointments about the divergences between forecasts and actual future outcomes, prompting economists to revisit economic ideas on economic expectation formation (Lenel 2023c). This ultimately changed economic and political decision-making, turning the management and coordination of economic expectations into a crucial goal, with the publication of forecasts becoming an important policy tool.

Conclusion

This chapter traces the remarkable transformation of economic forecasting in the twentieth century. Starting with the Harvard Index, an early instrument based on the assumption of the existence of stable laws within the economic process, economists soon came to experiment with informal means of expectation exchange. The 1930s and 1940s then saw the introduction of econometric models to simulate different policy interventions and their effects as well as the use of surveys with business representatives to inquire about their expectations and allow them to share their expectations with competitors, suppliers, and consumers. This was an interactive process, foreshadowing what Reichmann (2013) calls "epistemic participation," an approach in which economic actors, their expectations, plans, and ideas play a constitutive role in the production of economic forecasts. The history of economic forecasting is thus also the history of an increasing cooperation between economists as well as economic and political decision-makers. Over the years they have built a "community of mutual information exchange" (*Informationsgemeinschaft auf Gegenseitigkeit*) to co-produce economic forecasts.

In the process, forecasting's role has changed decisively. From an attempt to accurately represent an economic future assumed to be independent of the economic forecast itself, forecasting transformed into a tool of coordination to share, compare, and adjust economic expectations. Since the 1990s, central banks around the world have begun to use published forecasts to anchor economic expectations and thus engineer the economic future. These

developments point to the coordinative dimension of economic expectation formation—a dimension which has, so far, only been considered in economic research on the effects of central bank communication.

While this line of literature focuses on the so-called “information effect” of monetary policy, historical and sociological research on economic forecasting suggests that we would do well to think about this dimension on a much broader scale. To further explore the interaction and coordination dimension of economic expectation formation and its effects, we also need more work on how economic and political actors process economic forecasts and translate them into actual decisions, and what role social variables (such as networks, norms, institutions, and interaction) play in the process.

Note

- 1 The results presented in this section are based on data gathered between 2004 and 2018 in 42 qualitative interviews with economic forecasters and economic and political decision-makers in German-speaking countries.

References

- Abolafia, Mitchel Y. 2010. “Narrative Construction as Sensemaking: How a Central Bank Thinks.” *Organization Studies* 31, no. 3: 349–367. DOI: 10.1177/0170840609357380.
- Anderson, Oskar, Rainald K. Bauer, Hellmuth Führer, and Jens-Peter Petersen. 1956. “Ursachen und Typen kurzfristiger Produktions- und Preisplanrevisionen der Unternehmer.” *ifo-Studien* 2: 1–26.
- Anderson, Oskar, Hildegard Fürst, and Willi Schulte. 1956. “Zur Analyse der Unternehmerischen Reaktionsweise.” *ifo-Studien* 2: 129–156.
- Anderson, Oskar, and Werner H. Strigel. 1960. “Empirische Untersuchungen des Unternehmerverhaltens an Hand von Konjunkturtest-Daten.” *ifo-Studien* 6: 143–156.
- Andersson, Jenny. 2018. *The Future of the World: Futurology, Futurists, and the Struggle for the Post Cold War Imagination*. New York: Oxford University Press.
- Armatte, Michel. 2003. “Cycles and Barometers: Historical Insights into the Relationship between an Object and Its Measurement.” In *Monographs of Official Statistics: Papers and Proceedings of the Colloquium on the History of Business-Cycle Analysis*, edited by European Commission and Dominique Ladiray, 45–74. Luxembourg: Office for Official Publications of the European Communities.
- Barten, Anton P. 1991. “The History of Dutch Macroeconometric Modelling 1936–1986.” In *A History of Macroeconometric Model-Building*, edited by Ronald G. Bodkin, Lawrence R. Klein, and Kanta Marwah, 153–194. Cheltenham Edward Elgar Publishing.
- Beckert, Jens. 2016. *Imagined Futures: Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Blinder, Alan S., Michael Ehrmann, Marcel Fratzscher, Jakob De Haan, and David-Jan Jansen. 2008. “Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence.” *Journal of Economic Literature* 46, no. 4: 910–945. DOI: 10.1257/jel.46.4.910.
- Boumans, Marcel. 2016. “Graph-Based Inductive Reasoning.” *Studies in History and Philosophy of Science, Part A* 59: 1–10. DOI: 10.1016/j.shpsa.2016.05.001.
- Braun, Benjamin. 2015. “Governing the Future: The European Central Bank’s Expectation Management during the Great Moderation.” *Economy and Society* 44, no. 3: 367–391. DOI: 10.1080/03085147.2015.1049447.
- Dekker, Erwin. 2021. *Jan Tinbergen (1903–1994) and the Rise of Economic Expertise*. Cambridge: Cambridge University Press.
- Dhaene, Geert, and Anton P. Barten. 1989. “When It All Began. The 1936 Tinbergen Model Revisited.” *Economic Modelling* 6, no. 2: 203–219. DOI: 10.1016/0264-9993(89)90005-9.
- Döhrn, Roland. 2014. *Konjunkturdiagnose und -prognose. Eine anwendungsorientierte Einführung*. Berlin and Heidelberg: Springer Gabler.

- Döpke, Jörg, and Ulrich Fritsche. 2009. "Zehn Gebote zum Umgang mit Konjunkturprognosen." *Zeitschrift für Politikberatung* 2, no. 1: 26–42. DOI: 10.1007/s12392-009-0074-x.
- Döpke, Jörg, Ulrich Fritsche, and Werner Reichmann, eds. 2022. *Im Maschinenraum der Wirtschaftssprognostik*. Berlin: Peter Lang Verlag.
- Doyle, Brian, Linda Kole, and Paul Wood. 2007. "Memo: The Experience of Foreign Central Banks with Published Forecasts." Federal Open Market Committee Meeting Minutes, Transcripts, and Other Documents. URL: <https://fraser.stlouisfed.org/title/677/item/22529/content/pdf/FOMC20070103memo01/toc/527887>.
- Evans, Robert. 1997. "Soothsaying or Science? Falsification, Uncertainty and Social Change in Macroeconomic Modeling." *Social Studies of Science* 27, no. 3: 395–438.
- Evans, Robert. 1999. *Macroeconomic Forecasting: A Sociological Appraisal*. London et al.: Routledge.
- Fayolle, Jacky. 2003. "The Study of Cycles and Business Analysis in the History of Economic Thought." In *Monographs of Official Statistics: Papers and Proceedings of the Colloquium on the History of Business-Cycle Analysis*, edited by the European Commission and Dominique Ladiray, 9–44. Luxembourg: Office for Official Publications of the European Communities.
- Friedman, Walter A. 2009. "The Harvard Economic Service and the Problems of Forecasting." *History of Political Economy* 41, no. 1: 57–88. DOI: 10.1215/00182702-2008-037.
- Friedman, Walter A. 2014. *Fortune Tellers: The Story of America's First Economic Forecasters*. Princeton, NJ: Princeton University Press.
- Fritsche, Ulrich, Roman Köster, and Laetitia Lenel, eds. 2020. *Futures Past. Economic Forecasting in the 20th and 21st Century*. Berlin: Peter Lang.
- Gibson, David R. 2011a. "Avoiding Catastrophe: The Interactional Production of Possibility during the Cuban Missile Crisis." *American Journal of Sociology* 117, no. 2: 361–419. DOI: 10.1086/661761.
- Gibson, David R. 2011b. "Speaking of the Future: Contentious Narration during the Cuban Missile Crisis." *Qualitative Sociology* 34, no. 4: 503–522. DOI: 10.1007/s11133-011-9206-0.
- Gibson, David R. 2012. *Talk at the Brink. Deliberation and Decision during the Cuban Missile Crisis*. Princeton, NJ: Princeton University Press.
- Gilbert, Milton, and George Jaszi. 1944. "National Product and Income Statistics as an Aid in Economic Problems." *Dun's Review* 52, no. 2: 7–17.
- Goodfriend, Marvin. 2007. "How the World Achieved Consensus on Monetary Policy." *Journal of Economic Perspectives* 21, no. 4: 47–68. DOI: 10.1257/jep.21.4.47.
- Grunberg, Emile, and Franco Modigliani. 1954. "The Predictability of Social Events." *Journal of Political Economy* 62, no. 6: 465–478. DOI: 10.1086/257604.
- Hartley, James E. 2004. "Modigliani's Expectations." *Eastern Economic Journal* 3, no. 3: 427–440.
- Holmes, Douglas R. 2009. "Economy of Words." *Cultural Anthropology* 24, no. 3: 381–419.
- Holmes, Douglas R. 2014. *Economy of Words: Communicative Imperatives in Central Banks*. Chicago, IL: The University of Chicago Press.
- Krumper, Arthur, Erich Batzer, and Werner H. Strigel. 1979. "Die Ifo-Forschungsschwerpunkte aus heutiger Sicht: Makroforschung, Branchenforschung, Konjunkturmfragen." In *Dreißig Jahre Wirtschaftsforschung am Ifo-Institut*, edited by Wilhelm Marquardt, 21–50. Munich: Institut für Wirtschaftsforschung e.V.
- Langelütke, Hans, and Wilhelm Marquardt. 1951. "Das Konjunkturtest-Verfahren." *Allgemeines Statistisches Archiv* 35: 189–208.
- Lenel, Laetitia. 2018. "Mapping the Future. Business Forecasting and the Dynamics of Capitalism in the Interwar Period." *Jahrbuch Für Wirtschaftsgeschichte/Economic History Yearbook* 59, no. 2: 377–413. DOI: 10.1515/jbwg-2018-0013.
- Lenel, Laetitia. 2021. "Searching for a Tide Table for Business: Interwar Conceptions of Statistical Inference in Business Forecasting." *History of Political Economy* 53, no. 6: 139–174. DOI: 10.1215/00182702-9414817.
- Lenel, Laetitia. 2023a. "Economists as Storytellers: Scenario Drafting at the International Monetary Fund." *History of Political Economy* 55, no. 3: 577–608. DOI: 10.1215/00182702-10438953.
- Lenel, Laetitia. 2023b. "The Introduction of the Electronic Computer and the End of Business Forecasting at the NBER." *Œconomia—History / Methodology / Philosophy* 13, no. 3: 657–680. DOI: 10.4000/oeconomia.14768.

- Lenel, Laetitia. 2023c. "Economic Narratives and Economic Crises." *Journal of Modern European History* 21, no. 3: 9–12.
- Logemann, Jan L. 2019. *Engineered to Sell: European Emigrés and the Making of Consumer Capitalism*. Chicago, IL: The University of Chicago Press.
- Lucas, Robert E. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 1 (January): 19–46. DOI: 10.1016/S0167-2231(76)80003-6.
- Lucas, Robert E. 1980. "Rules, Discretion, and the Role of the Economic Advisor." In *Rational Expectations and Economic Policy*, edited by Stanley Fischer, 199–210. Chicago IL: University of Chicago Press.
- Luhmann, Niklas. 1984a. *Soziale Systeme. Grundriß einer Allgemeinen Theorie*. Frankfurt/Main: Suhrkamp.
- Luhmann, Niklas. 1984b. "Soziologische Aspekte des Entscheidungsverhaltens." *Die Betriebswirtschaftslehre* 44: 591–603.
- Marquardt, Wilhelm. 1958. "Unternehmungsvoraussagen und Unternehmerverhalten im Spiegel des Konjunkturtests. Ausgangspunkt, Methode und bisherige Ergebnisse der Verhaltensforschung mit Konjunkturtest-Daten." *ifo-Studien* 4: 1–34.
- McNees, Stephen K. 1990. "Man vs. Model? The Role of Judgment in Forecasting." *New England Economic Review, Federal Reserve Bank for Boston* (July): 41–52. URL: <https://ideas.repec.org/a/fip/fedbne/y1990ijulp41-52.html>
- Modigliani, Franco, Albert Gailord Hart, and Guy Orcutt. 1960. "Introduction to 'The Quality and Economic Significance of Anticipations Data.'" In *The Quality and Economic Significance of Anticipations Data*, edited by Universities-National Bureau Committee for Economic Research, 3–8. Princeton, NJ: Princeton University Press.
- Morgan, Mary S. (1990) 2003. *The History of Econometric Ideas*. Cambridge: Cambridge University Press.
- Muth, John F. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica* 29, no. 3: 315–335.
- Nützenadel, Alexander. 2010. "Die Vermessung der Zukunft: Empirische Wirtschaftsforschung und ökonomische Prognostik nach 1945." In *Zukunftswissen. Prognosen in Wirtschaft, Politik und Gesellschaft seit 1900*, edited by Heinrich Hartmann, and Jakob Vogel, 55–75. Frankfurt/Main and New York: Campus Verlag.
- Parsons, Talcott. 1951. *The Social System*. Glencoe, IL: Free Press.
- Pietruska, Jamie L. 2017. *Looking Forward: Prediction and Uncertainty in Modern America*. Chicago, IL: University of Chicago Press.
- Reichmann, Werner. 2010. *Die Disziplinierung des ökonomischen Wandels. Soziologische Analysen der Konjunkturforschung in Österreich*. Marburg: metropolis-Verlag.
- Reichmann, Werner. 2013. "Epistemic Participation: How to Produce Knowledge about the Economic Future." *Social Studies of Science* 43, no. 6: 852–877. DOI: 10.1177/0306312713498641.
- Reichmann, Werner. 2018a. "The Interactional Foundations of Economic Forecasting." In *Uncertain Futures—Imaginations, Narratives, and Calculation in the Economy*, edited by Jens Beckert, and Richard Bronk, 105–123. Oxford and New York: Oxford University Press.
- Reichmann, Werner. 2018b. *Wirtschaftsprognosen: Eine Soziologie des Wissens über die ökonomische Zukunft*. Frankfurt/Main and New York: Campus Verlag.
- Rindzevičiūtė, Eglė. 2016. "A Struggle for the Soviet Future: The Birth of Scientific Forecasting in the Soviet Union." *Slavic Review* 75, no. 1: 52–76. DOI: 10.5612/slavicreview.75.1.52.
- Rindzevičiūtė, Eglė. 2023. *The Will to Predict: Orchestrating the Future through Science*. Ithaca, NY: Cornell University Press.
- Seefried, Elke. 2010. "Prognostik zwischen Boom und Krise: Die PrognosAG und ihre Zukunftsprognosen für die Entwicklung der Bundesrepublik in den 1960er und 1970er Jahren." In *Zukunftswissen. Prognosen in Wirtschaft, Politik und Gesellschaft seit 1900*, edited by Heinrich Hartmann, and Jakob Vogel, 76–106. Frankfurt/Main and New York: Campus Verlag.
- Seefried, Elke. 2015. *Zukünfte: Aufstieg und Krise der Zukunftsforschung 1945–1980*. Berlin et al.: De Gruyter Oldenbourg.
- Smart, Graham. 2006. *Writing the Economy: Activity, Genre, and Technology in the World of Banking*. Studies in Language and Communication. London and Oakville, CT: Equinox.

- Suddendorf, Thomas. 2013. *The Gap—The Science of What Separates Us from Other Animals*. New York: Basic Books.
- Tichy, Gunther. 1994. *Konjunktur: Stilisierte Fakten, Theorie, Prognose*. Berlin et al.: Springer Verlag.
- Tinbergen, Jan. 1937. *An Econometric Approach to Business Cycle Problems*. Paris: Hermann & Cie.
- Walter, Timo. 2019. “Formalizing the Future: How Central Banks Set out to Govern Expectations but Ended Up (En-) Trapped in Indicators.” *Historical Social Research / Historische Sozialforschung* 44, no. 2: 103–130.
- Wansleben, Leon. 2023. *The Rise of Central Banks. State Power and Financial Capitalism*. Cambridge, MA: Harvard University Press.
- Woodford, Michael. 2001. “Monetary Policy in the Information Economy.” *NBER Working Paper* no. 8674. Cambridge, MA: National Bureau of Economic Research. DOI: 10.3386/w8674.

MARKET RESEARCH AS A STRATEGY OF CORPORATE EXPECTATION MANAGEMENT

Ingo Köhler and Jan Logemann

Marketing research, according to prevailing definitions, entails a set of techniques and practices to gain and improve information about the state and future trends of the markets. It is a systematic and continuous process of monitoring quantitative market data and qualitative indications of consumer and competitor behavior. Regardless of whether market research is conducted internally by companies or provided by external experts, improving corporate decision-making is its central objective (Bagozzi 2000, 331; Kotler and Armstrong 2007, 12; Gajjar 2013). Making forecasts about the development of markets is a fundamental and indispensable foundation for economic action. It is intended to mitigate the uncertainties inherent in any strategic decision on the future deployment of resources and ultimately serves to legitimize entrepreneurial actions (on the “coordinating” function of public numbers in mitigating uncertainty, see also Mata, Chapter 18 in this volume).

From an historical perspective, the observation and evaluation of the market was initially closely linked to the figure of the entrepreneur. Following early economic theory, entrepreneurs were attributed with the task of reading the markets, finding opportunities for arbitrage, discovering products and production innovations, and taking the risk that their offer would be met with a corresponding demand (Cantillon 1931, 35; on different understandings of entrepreneurship, see also the discussion by Ochonu, Chapter 26 in this volume). Whether described as the “art” of gathering knowledge by Jean Baptiste Say (Say [1803] 2001, 329–334) or as a special talent based on a “different kind of rationalism” by Joseph A. Schumpeter (1926, 134), such market exploration appears as an intuitive, almost metaphysical skill. In practice, however, entrepreneurs have long used a broad set of tools to back up their supposed gut decisions. On the one hand, their production and sales data allow them to venture a glimpse into the future, at least in the short term (e.g., in order to plan the next production series). On the other, trusted commission agents and salespeople provide detailed feedback on consumer wishes and needs. Until the beginning of the twentieth century, however, these efforts remained relatively disparate and unstructured.

But beginning in the 1920s, we can trace a transition from such traditional practices to the more modern forms of systematic market research which are at the center of this article. Strategic corporate expectation management replaced more individual and intuitive forms of acquiring market information. Several drivers of this process can

be identified: (1) Increasing complexity—and thus greater uncertainty—acted as a pull factor. This includes the growing complexity of customer relations as consumer markets became more anonymous and national or even international in scale. (2) More competitive mass markets, furthermore, accelerated dynamics of new fashion trends and shifting consumer attitudes. Thus, past experience came to be seen as an increasingly imperfect guide to future consumer behavior. (3) Greater complexity also developed within the companies. The rise of functionally-structured large corporations meant that responsibilities in the organization had to be reassigned and decisions had to be given greater legitimacy, often also vis-à-vis investors and banks. (4) Finally, dynamic developments in advertising theory, psychology, and behavioral research served as additional drivers. As will be shown in detail, market research established itself as a hybrid that was both an application-oriented academic science and, at the same time, a commercial service sector in which external consultants offered their expertise in market prognosis (Köhler and Logemann 2016).

This chapter outlines the historical emergence of market research. Taking the United States and Germany as case studies, it shows how awareness about innovative models and methods of this “knowledge industry” (Kipping and Engwall 2002) was condensed and disseminated in transnational networks of scientists and consultants. While US firms often acted as pioneers in introducing market research measures, Germany exemplifies the more reluctant adoption of marketing management by many European industries. Still, we also observe a vibrant transatlantic exchange of ideas and practices, contradicting simplistic, linear models of “Americanization” in this field. Our objective, furthermore, is to provide the reader with analytical insights from the history of market research for a more fundamental examination of patterns of economic expectation formation.

As we trace the commodification of market information as a tradable information good, our emphasis will be both on the emergence of prognostic methods and on their practical application in company-level decision-making. We ask how, in practice, economic agents find an optimal choice of available information and whether they are able to partially override their individual cognitive limitations by learning to internalize experiences and expectations provided by new experts. We trace the transatlantic advance of market research theories and approaches provided by advertising agencies, independent consulting firms, and corporate marketing departments, from the 1920s to the 1980s. The first section covers the origins of systematic market research in business reporting and consumer psychology during the interwar years. The section will also reflect more generally on the relationship of experience and expectations in consumer markets from the perspective of contemporary experts. The second section focuses on the first “golden age” of market research in the wake of the Great Depression and the Second World War. As consultants, on Madison Avenue, and in a growing number of corporate MR departments, market researchers came to view themselves as “consumer engineers” with significant influence over expanding consumer demand. Emboldened by advances in psychological research, many market researchers embraced the idea of being able to control and even manipulate consumer expectations. The third and final section compares the eventual establishment of market research as an integral aspect of corporate marketing management in Germany and in the United States from the 1960s to the 1980s. This section pays special attention to the reconfiguration of knowledge and strategy formation on the company level.

Experiences and Expectations in Interwar Consumer Research

The simple fact that active “market exploration” is perceived as a necessity by economic actors, calls into question basic neoclassical assumptions about perfect information and the transparency of markets based on price signaling (on evidence against the full-information rational expectations (FIRE) assumption, see also Born, Enders, and Müller, Chapter 10 in this volume). Instead, the emergence of professional market research and the idea that one’s level of information can (and should) be continually improved implies an original state of limited information (Coase 1937, 386–405; Williamson 1998; Chassagnon and Vivel 2013). In his “bounded rationality” approach, Herbert Simon (1959) demonstrated the naivety of any assumption that entrepreneurs are always fully informed about all market processes and operate in completely transparent markets. They have only limited information, Simon argued, and equally limited capacities to process it. Entrepreneurial decisions are initially based on the existing resources of experience; these, in combination with accessible external market information, form the basis of expectations (Simon 1959; Köhler 2018, 159). Market research analysis thus touches on core questions regarding all economic practice. Based on what information do companies make decisions? What kind of information was available in different historical contexts, and how was it selected, interpreted, and operationalized?

The replacement of intuitive or implicit knowledge by structured forms of expectation formation characterizes modern market research. This has tempered the traditional focus on the entrepreneur in company decision-making. Now, specialized employees or external consultants provide a much broader spectrum of information and interpretations of future expectations. This gradual professionalization of marketing research has also entailed increasingly systematic engagement with both experiences and expectations by new experts. Especially during the interwar years, companies, advertising agencies, and social scientists on both sides of the Atlantic began to measure “experiences” through empirically observable past and present market behavior, and “expectations” in the form of business and consumer attitudes toward future developments. Whereas earlier forms of “market research” had mostly relied on practitioner insights, hunches, or anecdotal evidence about past, present, and future market performance, this section argues that a new, professional cohort of marketing researchers and consultants emerged who viewed market research both as a science and a business.¹

Measuring Experiences: Origins of Marketing Research

Around the beginning of the twentieth century, consumer markets in the United States and much of Western Europe became increasingly dynamic, national, or even transnational in scope. Large corporations introduced recognizable brands and—alongside big retailers and retail chains—competed for an anonymous and seemingly unpredictable “mass” of consumers (Strasser 1995). Yet, knowledge about consumer market developments remained haphazard and unsystematic, drawing on the sales experience of producers, retailers, and a few specialized experts. Historian Regina Blaszczyk (2000) points to the power of what she calls “fashion intermediaries” early in the century. These included department-store buyers and design specialists based in the furniture or household goods sector who related their experience with changing consumer tastes to corporate actors, and in turn helped shape the taste and fashion cycles of consumer markets at the time (Blaszczyk 2000). Leading US

advertising firms, too, such as N.W. Ayers, undertook early efforts in market analysis and “campaign planning” for new products (Hower 1939, 254–278). Yet any “exact” measuring of consumer demand ran into serious problems due to the fact that both the data on market developments and the methodological tools to interpret them were still largely lacking.

In the United States, in industries from automobiles to food processing and motion pictures, growing investment in mass production technologies and in economies of scale in production and distribution made a clearer understanding of market trends increasingly crucial. This opened up opportunities for the emergence of professionalized market research at the intersection of academic research and corporate practice, and for specialized research organizations. Corporate market research efforts during the interwar years were primarily concentrated among larger firms in the consumer sector. Food industry firms, for example, invited consumers to test their reactions to new products in household panels and test kitchens: Kraft, DuPont, and Proctor & Gamble employed the services of professional home economists to advance their consumer research (Goldstein 2012, Chapter 5). General Motors (GM) had pioneered the segmented marketing approach in the automobile market and began to institutionalize its customer research efforts. A new department under Henry Weaver recorded customer feedback through rudimentary questionnaires on consumer preferences and buying habits. The results were not only utilized by the sales department and for direct-mail advertising campaigns, but also used by Weaver to influence product planning and body styling. Market research activities were publicized, in order to paint GM as especially responsive to consumer concerns and desires (Marchand 1998a, 85–109). The film business represented another industry with systematic marketing research. Motion picture studios, like other producers of “fashion goods,” had for a long time informally tracked changes in audience taste and attempted to forecast the next big trend. As production costs soared and planning became more long-term by the 1930s, however, studios increasingly relied on more empirical surveys and audience research to tailor their products more closely to shifting consumer demand (Błaszcyk 2000; Bakker 2003).

Media and advertising companies developed yet another strand of systematic market research to bolster the growing field of magazine advertising. As early as the beginning of the twentieth century, Charles Parlin’s Division of Commercial Research at the Curtis Publishing Company (publisher of the *Saturday Evening Post* and *Ladies’ Home Journal*) introduced regular market studies for advertising customers. Parlin and other early proponents of marketing professionalization in the United States such as Hugh Agnew, Paul Converse, George Hotchkiss, Stanley Resor, Walter Dill Scott, and Arch Shaw had been trained academically in disciplines such as psychology or economics, and they straddled the line between academic research and commercial marketing work. Walter Dill Scott’s *Theory of Advertising* (1903) and the work of Arch W. Shaw—who in 1911 had established the Bureau for Business Research in connection with Harvard Business School—were especially influential in preparing the ground for a more scientific body of knowledge and methodology of market research (Kreshel 1993, 59–75; Ward 2009).

Advertising agencies were among the first actors to apply new academic concepts to practical marketing research, and large agencies routinely engaged in market analysis and consumer research. J. Walter Thompson (JWT) emerged after the First World War as the prototypical full-service agency offering various types of research services. Under Stanley Resor, JWT emphasized a “scientific” approach to advertising: “Advertising must be scientifically prepared. Nothing must be taken for granted” (cited in Kreshel 1993, 66, 199).

The agency employed the psychologist John Watson to research consumer behavior and responses to advertising. The portfolio of full-service ad agencies also included services in related fields such as public relations and commercial design (Marchand 1998b; Meikle 2001). “Modern” advertising increasingly entailed systematic research in the interwar years.

Most directly, finally, the development of professional market analysis was driven by a number of specialized research firms in the United States founded during the 1920s and 1930s. The A.C. Nielsen Company (established 1923) offered market analyses and consumer demand projections based on household studies that asked consumer panels about what they stocked in their pantries. Based on these methods, Nielsen introduced the concept of the “market share” to better quantify trends in market competition. Other firms such as Archibald Crossley (established 1926) or Elmo Roper (established 1937) specialized in public opinion surveys, which surveyed consumers with increasingly sophisticated quota and random sampling methodologies. The American Institute of Public Opinion, founded in 1935 by George Gallup in cooperation with advertising executive David Ogilvy, also conducted commercial consumer research. Finally, the Psychological Corporation, established in 1921 by James Cattell, offered the services of academic psychologists to corporate clients (Igo 2007; Robinson 2016, 15–18). Its “psychological sales barometer” employed 60 academic psychologists and their students to conduct nation-wide consumer surveys. Charting changing customer preferences regarding various brands in different markets from soaps to automobiles, the efforts of the Psychological Corporation are among early attempts at establishing market knowledge by tracking demand development and correlating various factors and variables (Link and Lorge 1935).

Such efforts in measuring past and present market developments were hardly limited to the United States; at this period, they were also emerging all over Europe. American agencies such as J. Walter Thompson and McCann had entered the European market and offered advertising pretests and market analyses (Schug 2003). In Germany, while some admen rejected systematic approaches to their “creative” profession, professional marketing and advertising research began to make its way into the business practices of retailers and consumer goods producers during the interwar years (Regnery 2003). One venue for the professionalization of sales practices in Germany was the trade journal *Verkaufspraxis* (“Sales Practice”) established in 1925. Editor Victor Vogt was interested in bringing American marketing innovations to a German-speaking audience, but the journal also demonstrates the widespread engagement with professional sales methods among German retailers and corporations at this time (Spiekermann 2019). A prominent advocate of systematic marketing in interwar Germany was Hans Domizlaff, whose consultancy work for cigarette manufacturer Reemtsma involved elaborate brand strategies and segmented marketing approaches (Jacobs 2008). In Nuremberg, Wilhelm Vershofen’s *Institut für Wirtschaftsbeobachtung der Fertigware* (Institute for the Observation of the Economics of Ready-Made Goods) made the city into a leading center for consumer research. The center was the precursor to the later *Gesellschaft für Konsumforschung* (Society for Consumer Research, GfK) which in 1934 began to conduct nationwide consumer surveys for marketing purposes (Bergler 1960; Feldenkirchen and Fuchs 2009).

Marketing knowledge, and its experts, quickly circulated transnationally. Around 1930, Vienna emerged as a transatlantic center for systematic marketing research. Inspired in part by the US research of Nielsen and other firms, sociologist Paul Lazarsfeld set up the *Wirtschaftspsychologische Forschungsstelle* (Research Unit for the Psychology of

Economics) in 1930 as a center for market studies and consumer motivation research, connected to the university (Fullerton 1994). The center soon began to conduct sophisticated market surveys for companies from various German-speaking countries, and its methodological innovations in consumer and audience research found their way back across the Atlantic as Lazarsfeld—along with other émigré academics fleeing Europe during the 1930s—set up influential centers for market and social research at the Princeton Radio Research Project and later at Columbia University. In other European countries such as the Scandinavian nations, France, the Netherlands, and especially Great Britain, market research efforts similarly took off during the 1920s and 1930s (Kapferer 1963; Schwartzkopf 2012). Thus, measuring the “experience” of past and current market developments increasingly seemed feasible and desirable to market actors during the interwar years. However, some contemporary experts felt that any attempt at “predicting” future consumer markets would require a more refined assessment of consumer motivations and expectations.

Measuring Expectations: The Development of Consumer Psychology

Market researchers had long been interested in understanding consumer desires and expectations. Especially in American capitalism, as Beckert (2020) notes, consumer expectations regarding the potential satisfaction derived from new goods are a powerful force in the economy (on the importance of “novelty” in expectation formation, see also Trentmann, Chapter 22 in this volume). Consumer imaginations of future desires and the satisfaction of these desires, he argues, are an important source of value as they determine the symbolic meaning of consumer goods and the social, economic, or cultural capital they come to represent. From the 1920s onward, consumer psychology began to be seen as key to measuring these consumer motivations, desires, and expectations. The field of psychology had by now developed a growing number of commercial applications both in the United States and in Europe. The study of “psychotechnics” was pioneered by German-American psychologist Hugo Münsterberg, and universities such as Mannheim and Cologne in Germany developed the inclusion of advertising psychology in teaching and research. In the United States, as noted above, the psychologist John Watson joined the advertising agency J. Walter Thompson to study consumer behavior (Ludy 2014).

During the interwar years, consumer expectations became a focal point for applied psychology. Watson and other early consumer psychologists mostly employed behaviorist stimulus-response models that understood consumer behavior as “conditioned” responses to various external stimuli (Bussemer 2003). To many advertisers, consumers still appeared as an irrational mass that could be easily manipulated by mass media messages, including magazine and radio advertisements (Gasteiger 2010). Newer scholarship in individual and social psychology, by contrast, began to complicate this picture as researchers started to ask about the complexity of consumer motivations and the socio-demographic contexts in which they arose.

In the United States, European émigré social scientists played an outsized role in advancing the study of consumer motivations and expectations (Logemann 2019). The Viennese scholars around Paul Lazarsfeld, for example, introduced insights from social and developmental psychology into the study of motivation formation through consumer surveys. Lazarsfeld (1935) set out to teach American marketing scholars qualitative approaches and the “art of asking why.” His fellow émigrés Herta Herzog and Ernest Dichter helped

introduce elements of Freudian psychology into new “motivation research” studies at leading New York advertising agencies (Samuel 2010). Such depth psychology approaches sought to uncover the conscious and unconscious motivations and desires that drove consumer spending. At the same time, social psychologist Kurt Lewin, who had come to the United States from Berlin, worked on understanding the social dynamics which shaped consumer decision-making. Social contexts and interactions as well as individual predispositions, these scholars argued, helped shape consumer motivations and expectations, which psychologically-informed consumer research could reveal.

The perhaps most significant contribution to studying consumer expectations as a key to predicting economic development came from yet another émigré, George Katona (Katona 1942; Horowitz 1998). Katona, who straddled the disciplines of psychology and economics, had first turned to the interplay of attitudes, expectations, and economic development in the context of studying inflation in interwar Berlin. Wartime research in the United States during the 1940s then provided an opportunity to further develop his insights about the possibility of controlling inflation through expectation management, as a form of large-scale social engineering through systematic attitude measurements. Building on this work, Katona established the “Survey of Consumer Attitudes” for the US Department of Commerce, which asked representative samples of households about their expectations regarding their finances, the state of business, and the economy as a whole. Katona’s team used this data to calculate an index to predict future consumer behavior, which has been published as the “Index of Consumer Sentiment” since 1952. By the middle of the twentieth century, the index represented the most clear-cut example of increasingly widespread attempts to forecast markets based on consumer expectations (Kassarjian 1994).

Prophets of Profits: Professional Market Research as Science and a Business

The measuring of experiences and expectations by market researchers and consumer psychologists had soon become so commonplace in the US that journalist Vance Packard (1957) wrote about the “hidden persuaders,” psychological and sociological “probers” who assisted corporate America to “manipulate” unsuspecting consumers. By contrast, most marketing scholars at the time welcomed the influx of scientific expertise into consumer research as a sign of progress and of the professionalization of marketing research. Indeed, “scientific marketing” had already become somewhat of a buzzword in the 1930s, in part to legitimize the steadily expanding reach of market research (Coutant 1937; Converse 1945; Hutchinson 1952). In the United States, the marketing sector became established with several new journals and academic programs, and with the consolidation of marketing associations.

References to efficiency and scientific rigor served to underscore the validity of the emerging discipline as American Marketing Association president Frank Coutant noted in 1936:

On bringing science into marketing, only a start has been made. On marketing research, about two or three millions of dollars a year are being spent [...]. It shows that we are on our way to greater efficiency and better profits in marketing.

(Coutant 1937)

Academics such as Coutant knew that claims to “scientific” expertise could open doors in the corporate world, as they offered their insights to firms struggling to recover from

the Depression or to anticipate wartime and postwar markets. Scientific credentials created high expectations among businessmen, according to marketing professor Edmund McGarry:

[businessmen] are prone to look upon a scientific expert as one who has remarkable and mysterious powers of foresight [...] He must be a prophet who can foretell, where profits are to come from. He is expected to know the unknown, to foresee the unforeseeable.

(McGarry 1936)

Most market researchers, of course, were well aware of the limitations of their ability to predict the future, yet they gladly fueled notions about the “prophetic” power of scientific approaches to business research (see also the discussion by Kipping and Schöttler, Chapter 15 in this volume).

Especially independent market research experts, who by the mid-1950s were fashioning themselves as “knowledge entrepreneurs,” quite consciously promoted their own image as “prophets of profits.” Again, two European émigrés stood out among American marketing experts at the time: Ernest Dichter and Alfred Politz. On the one hand, the quantitative survey statistician Politz and the qualitative psychologist Dichter were bitter professional and business rivals, both vying for market research contracts from ad agencies and corporate clients (Logemann 2019, Chapter 3). On the other, both built extremely successful market research consultancies which drew very effectively on “science” to sell their product. The ability to provide seemingly accurate figures, for example, provided Politz with a crucial competitive edge, and his firm proudly advertised what, in a promotional resumé in 1960, Politz called an “experimental marketing laboratory” which employed “people from the exact sciences.”² Dichter, by contrast, underscored his psychological expertise with frequent references to his Viennese background. He published on his motivation research techniques in academic journals, and in 1947 promised companies that these could elucidate “the real reasons” why people buy goods:

Like a medical practitioner systematically examining several hypotheses, the researcher translates the clinical picture into [...] a questionnaire and makes a quantitative check-up of the various buying reading and listening mechanisms [...] involved.

(Dichter 1947)

If market research was a science, it was also a business which dealt in information about consumer experiences and expectations nicely packaged as “scientific knowledge.” In his unpublished memoir of 1971, Alfred Politz scoffed at the proliferation of marketing research at the mid-century:

The word ‘research’ implies a sort of glamorous intellectual sophistication, and marketing research is a symbol of the modernity of the marketer. Marketing research has become a status symbol, and as such it need not perform; it need only exist.³

In some ways, Politz suggests, the function of scientific market research was less the effective manipulation of consumers as feared by critics like Packard, than the legitimization of business decisions made by advertisers and their corporate clients. As such, market research

increasingly became a marker of the “modernity” of a business and by the middle of the century, few large firms felt they could still afford to ignore it.

Consumer Engineering: Market Research as Corporate Practice, 1930s to 1950s

Whether as strategic knowledge or as a source of legitimation for management, systematic marketing research increasingly found its way into corporate practice between the 1920s and the 1950s. This process represented a transition from individual to group-collective patterns of expectation formation. The increased complexity of this set-up of actors and agents in turn complicates theoretical perspectives on expectation formation. We can distinguish two basic problems: on the one hand, the “politics of expectations” in the internal relationship between decision-makers and information providers, and on the other, the “reflexive expectation” inherent in firms’ attempts to estimate future consumer behavior.

The “politics of expectations” are based on the fundamental problem that no decision-makers or market researchers are really able to recognize the “future present” (Beckert 2020), which is marked by uncertainty and openness of outcome. Jens Beckert (2016) therefore speaks of “fictional expectations” which are formed by the actors and compete with each other in a communication contest. In the decision-making process, the expectations that ultimately prevail are those that are supposedly most plausible, methodologically sophisticated, and—above all—that gain the highest level of trust among the decision-makers based on their own experience and visions of future market developments. As market research knowledge disseminated into companies, new experts thus strove for recognition and legitimacy (stressing, for example, their scientific credentials, as seen above), while management sought to employ the former’s knowledge to legitimize their own strategic decision-making.

Market researchers also faced the challenge of *double contingency* in the formation of expectations on a practical level a good while before Luhmann (1984, 1984a; also Kruke 2007) theorized about reflexive expectations (*Erwartungserwartung*). The interpretations offered by experts were not only by definition second-hand, they were observations of a second order (on this point, see Lenel and Reichmann, Chapter 16, and Mata, Chapter 18 in this volume). Business historians need to address the methodological and practical problems of reflective expectations that arose from the attempt to anticipate the future expectations of consumers and to map target groups from an anonymous and heterogeneous mass of people. We need to distinguish between the (often grandiose) claims of new experts regarding their ability to predict and manage expectations and the empirical limitations of the tools at their disposal.

In the aftermath of the Great Depression, marketing knowledge did gain increasing significance, especially among large consumer goods companies and Madison Avenue advertising firms. At the time, the concept of “consumer engineering” promised new forms of control over markets and a potential antidote to future crises through systematic and professionalized techniques. In their 1932 study “Consumer Engineering,” marketing professionals Roy Sheldon and Egmont Arens identified a lack of consumer demand as a crucial contributing factor to the economic slump. One key to future prosperity, in their view, was the systematic identification and manipulation of consumer desires through market research and marketing to create a continuous and steady demand for new goods (Sheldon and Arens 1932). The authors advised companies to hire experts in “humaneering” to tackle sociological and

psychological challenges in engineering demand, and many corporations proceeded to do just that. Indeed, statisticians and psychologists soon ranked highly among the professionals sought after by US corporations to increase their marketing prowess (Heusner 1947b, 35–36; Jaffe and Lessler 1950).

Large US-American corporations increasingly began to build up marketing and market research departments. A 1937 survey of 550 American companies showed that a mere 73 had a market research department and only 15 percent paid for external market research. Consumer goods firms in sectors such as foodstuffs, personal hygiene, cosmetics, or automobiles, however, were much more likely to hire market research consultants, and 40 percent of these firms engaged at least in some research activities of their own, frequently with small market research departments (Moulton 1936). A subsequent larger study of nearly 5,000 firms not quite ten years later revealed that by now almost half of all firms in the consumer goods sector (46 percent) engaged in market research. Of the largest consumer goods corporations, nearly 75 percent used market research and about half of these had their own dedicated departments, according to the study (Heusner 1947a, 1947b). These new departments produced data to predict sales figures and market potential, but also to measure advertising effectiveness or to develop products and merchandising strategies.

By mid-century, marketing research had become integrated into strategic decision-making at larger US corporations. The heads of the new research departments now reported directly to senior management and a majority of firms with specialized research departments noted in the 1940s survey that their “head of marketing research” was part of regular executive meetings or otherwise actively involved in the strategic decision-making of the company (Heusner 1947a; NICB 1955; Crisp 1957, 9, 26–30). At the same time, interest in marketing knowledge provided by external consulting firms (such as those of Alfred Politz or Ernest Dichter, mentioned above) grew as well. While German suppliers were isolated under the Nazi regime, Dichter’s brand of motivational research succeeded in the USA. Leading companies such as Colgate, Mattel, Mars, and all the major US automotive groups drew on psychological market studies in the 1940s and early 1950s to optimize communication between companies and customers.

Corporations increasingly engaged in “make or buy” decisions when it came to procuring market research. Some opted for “lean” research departments with a small staff that contracted out research projects, while big firms such as Procter & Gamble, for example, had research departments with over 100 employees during the early 1950s, with the capacity to do the necessary interviewing and tabulation for large-scale surveys in-house (Crisp 1957, 31). At General Mills, an outside advertising agency was responsible for advertising-related research (copy testing etc.) while its own market analysis department with 24 full-time employees was responsible for evaluating the advertising campaigns with research projects regarding product development. For specific research tasks, finally, the firm turned to specialized market research consultants (Hughes 1950). Media organizations, large retailers, and—increasingly—large advertising agencies also both invested in their research capabilities and resorted to hiring marketing consultants (Barton 1955, 69–70).

By the mid-1950s, market research had turned into a complex field as well as into a substantial business for some of the more prominent “knowledge entrepreneurs.” Politz and Dichter, for example, headed firms with 220 and 50 employees respectively (Crisp 1953). While the reach of market researchers was still limited in some ways and their overall numbers small—in 1951 there were only about 8,000 full-time market research professionals employed in all of US industry (Longman 1951)—, at least in the United States,

consumer researchers had now securely ensconced themselves within the world of business. As employees of marketing departments and advertising agencies, or in the context of independent consulting firms, they produced data on consumer experiences and expectations that increasingly influenced company decision-making. At the same time, spectacular market research failures to anticipate consumer expectations, such as the infamous 1957 launch of the Ford Edsel, began to temper the more boisterous claims of mid-century “consumer engineers.” A new generation of market researchers would embrace more subtle and systematically refined approaches to strategic marketing management.

Market Research in Times of Boom and Crisis, 1960s to 1980s

In outlining the historicity of fictional expectations, Jens Beckert compresses the cause-and-effect relationship between structural market change and the increasing attractiveness of imagined futures in a simple thesis: “The higher the intensity of competition and the more basic needs are met in an economy, the greater the importance of evocative dream worlds of imagined futures” (Beckert 2017, 8). This mechanism can easily be transferred to the development of market research into a systematic instrument of corporate expectation management. The comparison between the USA and Germany verifies this process. As shown, both countries made significant contributions to the methodology development. The ideas spread in a transnational transfer process. However, an earlier practical implementation of market research in management toolboxes was evident in American companies.

Responding to Market Saturation

By the early 1950s, the USA had already developed into a mass consumer society. Accordingly, companies developed a greater interest in meeting the growing competition for customers and in identifying (and constructing) diverse consumer segments by conducting more intensive market research. The more completely a society is saturated with goods that cover the basic needs for food, shelter, hygiene, or mobility, the more decisive it becomes to convey additional emotional benefits to consumers. A car no longer had to offer only mobility, but comfort and performance; clothing had to serve fashionable self-expression, a skin cream emphasize personal ideals of beauty. In advanced mass-consumption societies, purchasing decisions are based to a lesser degree on the financial ability to consume and thus on social class structures graded by income. Instead, consumption differentiates and individualizes. This required manufacturers to form a vision of future needs and expectations that increasingly relied on emotional bonds between consumers and specific products or brands. With the differentiation of consumption, market research allowed companies to communicate more intensively with specific consumer segments and to gear marketing instruments toward new socio-psychological target groups, as J. Walter Thompson stated in its General Services Assessment (GSA) Annual Assessments for the 1970s (“Zielgruppen-suche: Modemasche Typenpuzzle” 1975; Hansen and Bode 1999).⁴

A transatlantic comparison of market research development needs to take several factors into account. First, it is important to consider the uneven temporal pace at which mass consumer societies developed. Undoubtedly, a country’s degree of prosperity determined when consumption patterns differentiated, which heightened uncertainty among the business community. A similar disparity is found between individual product segments, depending on the characteristics and also the exportability of a product. In sectors with

less complex and lower-priced goods, market saturation set in earlier than in sectors with high-value products. In the healthcare and hygiene industry, for example, consumption had already differentiated early, at the end of the 1950s. In the automotive industry, by contrast, it took longer—until the early 1970s—for a large proportion of consumers to be able to vary their product choices. Accordingly, West German companies in different industries turned their attention at different times to the market research tools already in common practice in the USA. Secondly, it was not only the change in demand that determined when new market research approaches were adapted. The implementation of market research tools also depended on the quality of supply, i.e. on the persuasive power of the research methods offered by consultants and marketing experts. As will be shown, it took further advances in data collection and presentation during the second half of the twentieth century to establish market research as an expectation-driven (as well as expectation-driving) management tool in many German firms. Third, it was not only such long-term processes of structural change that led to a change in corporate thinking. Since the present always forms the central starting point for looking to the future, situational crisis experiences were especially important in providing new stimuli for the use of market research. Crises fueled uncertainty among market players and increased their openness to actively seek out future customer expectations. In this respect, the oil price crisis of the 1970s played a particularly galvanizing role in many West German industries.

“Social Class is Breaking Down” was the title of an in-house study by J. Walther Thomson on market transformations of the 1970s in the USA and West Germany.⁵ The report responded to a concern that companies and their consultants were losing touch with society. In West Germany, levels of uncertainty now appeared to match the United States, the study suggested. At a congress of the European Society for Market and Opinion Research (ESOMAR) in 1975, Henkel’s CEO Helmut Sihler warned of a “loss of control by management.” Since the mid-1960s, he said, market researchers and marketing managers had “lost the ‘we-feeling’ with their market.”⁶ The company’s own expectations no longer corresponded to the behavior of consumers, resulting in devastating miscalculations of market development. “Everything that happens,” As early as 1963, the head of the Henkel advertising department summarized his impressions,

whether in the field of politics, fashion, architecture, medicine, or technology, is constantly working to reshape our customer, the human being. We have to take this into account, all the time. (...) If we are successful with an offer today, the same offer can be wrong tomorrow, because people have changed in the meantime.

(van Deun 1963)⁷

This situation analysis required market research to further improve methods of monitoring social and psychological trends. Neither the evaluation of the socio-demographic data of buyers, nor the often speculative motivational research seemed sufficient to solve the practical problem of forming reflexive expectations about the future behavior of consumers (Schröter 2004). German companies repeatedly warned of a lack of scientifically accurate measurement methods which could show why consumers exhibited specific behavior. This became their standard reproach to the consulting services offered by market researchers. Companies had acknowledged that merely analyzing present production figures (as had been long-standing industry practice) offered an insufficient guide to future consumer behavior (see also Heller 1981).⁸

By the mid-1960s, however, market research was beginning to appear more scientific and professional on the German market as well. Both in Europe and the United States, institutions had emerged at the intersection of academia, business, and public interests that collected growing amounts of data about markets, consumers, and business development. As discussed above, statistical sampling and the emergence of mass survey methods allowed for improvements in analyzing economic experiences as well as consumer attitudes and expectations. The decisive factor now was that the previous barriers between quantitative and qualitative market research were increasingly overcome in behavioral approaches. Drawing on such methodological innovations, market research experts again conveyed the impression that they could make hidden consumer expectations visible and measurable. Older forecasting approaches such as motivational research were now portrayed as based largely “on intuitive feel and lack systematic procedures” (Makridakis and Wheelwright 1977). New and more formalized forecasting methodologies claimed to overcome this weakness by systematically outlining the steps to be followed in a scientific way “so that they could be repeatedly applied to obtain suitable forecasts” (Makridakis and Wheelwright 1977). Much as with Dichter and Politz a generation earlier, new claims regarding “scientific” research again helped market research gain a stronger foothold in Germany and to reassert its position in the United States.

From Prophets to Scientists: Psychosocial Profiling and Visualized Markets

The inclusion of the behavioral sciences in its methodological toolkit further established the recognition of market research as a respected applied science in the eyes of corporate executives. By the mid-1960s the German independent market researcher Bernt Spiegel was mustering a great deal of attention with his psychological market models, which sought to map the brand image of BMW cars within a social field of consumer attitudes and perceptions (Köhler 2018, 226). By constructing the image of a brand as a reflection of the subjective perceptions and expectations of customers, such models combined Kurt Lewins’ behavioral insights regarding the role of the social field with in-depth psychological analyses. The aim of the image studies was to objectify subjective consumer perceptions using modern surveying techniques. The basic claim was that a product cannot be defined by its objective nature, but rather by consumers’ perceptions of quality and utility (Spiegel 1961, 29). This approach redefined the product as a pure reflection of consumer opinions and expectations. Moreover, scientific principles of cause and effect relationships were translated into psychological stimulus-response schemes. Methodologically, the image models semanticized expectations. For this purpose, the tangible and intangible characteristics of a product were circumscribed with affective terms. In surveys, participants were asked to indicate in scales how much they associated the brand with those specific attributes. The values were recorded in so-called semantic differentials, i.e. point-value systems. Expanding upon brand image studies pioneered in the United States since the 1950s, Spiegel’s method allowed for a spatial representation of the market position by comparing a brand with its competitors. It produced measurements of product images which could then be systematically repeated and mathematically evaluated (Osgood et al. 1957).

These “psychographics,” as they were called, combined statistical sampling and user-friendly visualization techniques. Thus, the mapping of market fields offered companies the possibility to make strength-weakness analyses and, in their communications, to move the products in the desired direction in terms of product perceptions. Eerily reminiscent of

Dichter's above-cited metaphor from the late 1940s likening market researchers to "medical professionals," in 1981 J. Walther Thompson once again enthusiastically described the advantages of the new method in medical terms:

Like a doctor examining a patient, the market researcher pokes and probes the consumer body, searching for a pulse, a murmur, a sign of sickness or health on which to base a prognosis. (...) Psychographics pursue the theory that by means of buyer profiles based on mental and emotional forces of individuals and groups, one can closely and continuously check the pulse of consumer multitude, and predict when and what kind of goods they will buy."⁹

The image studies projected a heightened degree of scientific certainty and bolstered the acceptance of both in-house market researchers and external consultants. The new tools played a decisive role in the politics of expectations. Especially during the period of growing uncertainties in the 1970s, market research boomed. The new methods spoke not only to the perceived need for systematic consumer expectation measurements. Consumers themselves now became the subject of semantic image analyses, and the "AIO" (attention, interests, opinions) approach, popular in behavioral and advertising research from the 1970s, provided the methodological framework for this (Wells and Tigert 1971; Plummer 1974; Drieseberg 1995, 145–221). In surveys, market research agencies collected information on everyday consumer activities, preferences, and values (interests), as well as attitudes (opinions) on political, social, and cultural issues. Based on this data, market researchers distilled lifestyle segments. Consumers were divided into new socio-psychological groups according to personality traits and psychographic dispositions. Combined with classic social stratification criteria such as age, occupation, and marital status, an increasingly differentiated picture of consumers emerged. Such consumer typologies were used by almost all major American and German companies in the late 1970s to adapt the constructed product personalities of image studies to the appropriate target groups. J. Walter Thompson, active in market research in both countries, listed over 30 clients for such studies in 1986, ranging from Bosch and Kodak, Ford and Carhartt, to Burger King, French's Mustard, and Twentieth Century Fox.¹⁰

From the mid-1960s, market research thus added yet another chapter to its narrative of increasing "scientization" and business success. Companies now undoubtedly made more frequent and systematic use of the recommendations of market analysts. Nevertheless, it would be too simple to attribute the spread of market research solely to more professional research methods or the greater uncertainty of clients in times of crisis. Image orientation represented a much deeper paradigm shift. Both sides, companies as well as the consulting market researchers, slowly distanced themselves from traditional advertising doctrines that assumed marketing could shape customer desires through smart (or manipulative) communication. The assertive stance of "consumer engineering" disappeared and instead morphed into a rhetoric asserting that the company now had to adapt itself to the expectations of the consumers.

As supply orientation shifted to demand orientation, the ability to forecast how and where products and brands should be placed in the market became centrally important. It was precisely on these issues that market research made an interpretive offer with the new image analyses (Blogger 1959). These reduced the complexity of the market to the perception of the products and helped to visualize market position. In doing so, they

continued to explore data on buying behavior in the present with regard to an uncertain future, but they expanded the scope of the data by generating a new variety of socio-psychological metrics. For corporate decision-makers, who like Henkel CEO Helmut Sihler had lost confidence in their intuitive assessments of the marketplace, market research now appeared to offer the possibility of adjusting their market strategies to reasonable expectations based on seemingly scientific data regarding consumer attitudes and behavior. Discursively captured consumption trends based on broad sets of preprocessed information promised to augment one's own experience with "secondary experience" derived as input from external experts.

We can observe that those market research experts prevailed who could most persuasively legitimize their work by communicating the scientific basis of their findings to corporate decision-makers—even if that information still remained limited in important ways. Bernt Spiegel, for example, was gradually hired by the rest of the German automotive industry to conduct image tests. BMW and Volkswagen based their new product concepts on his recommendations. Later, he worked closely with the pen manufacturer Lamy, among others. The Sinus Institute, founded by his colleague Paul Nowack at the Institut für Marktpsychologie (Institute for Market Psychology, IFM) in Mannheim, achieved a worldwide reputation with innovative milieu studies at the end of the 1970s (Wischmeyer 2016; Köhler 2018, 265). The fundamental problem of bounded rationality with regard to market developments was of course not really solved by hiring Spiegel or the Sinus Institute, but merely transferred to external experts. Still, the knowledge these market research experts provided, however imperfect, did ultimately help corporate decision-makers to legitimize their decisions. In that way, market research arguably did serve to reduce uncertainty, if only in appearance.

In Germany and elsewhere, market prognoses and market research were increasingly commercialized and market-driven. Much like management consultants, market researchers fashioned themselves as knowledge entrepreneurs who sought to commodify market knowledge. As they had begun to do in the United States during the interwar period, they continued to offer standardized models of expectation formation, which, they claimed, could be universally applied to market and image analyses for any given product. Research firms provided a standard prognostic tool kit—much like a construction set—with which experiential knowledge from a vast variety of areas could be assembled and reassembled in seemingly objective fashion. These standardized market analyses were part of the consultants' self-marketing model.

Similarly, market research reports were biased toward identifying problems. The evaluation of countless reports for companies produced not a single case in which a commercial consultant communicated to their client that the company's market position was suitable or that the product portfolio was fit for competition. It was part of the logic of the consulting business that analysts always found or generated deficits in order to legitimize their own employment. In cases where companies were primarily interested in a quick and effective solution to short-term sales problems, the research provider had a vital interest not only in pointing out current problems and risks, but in forecasting (and even constructing) new complications in order to keep the demand for consulting high. At the same time, they claimed the ability to solve every market problem through their survey techniques, even when the data could not really provide conclusive results. Research suppliers, critical voices noted, frequently over-promised or over-exaggerated risks, because they themselves faced intense competition from competing market research firms "springing up everywhere"

(Heller 1981, 4). This dynamic at once helps to explain the spread of market research and alerts us to an evaluation bias that casts doubt on the objectivity of the generated forecasts.

Organizational Embeddedness: A New Focal Point of Management

A significant increase in consulting capacities and assignments for research reports testified to the growing importance of market research in corporate decision-making processes. In West Germany, spending on commercial market research rose from \$110 million US dollars in 1960 to \$425 million in 1980, while in the USA the reference figures were \$430 million (1960) and \$1,275 million (1980). In Germany, only 29 independent market research agencies existed in 1960. By 1980, that number had increased by over 400 percent to more than 130. The sector was characterized by a fairly even distribution between smaller firms with up to ten employees and large agencies with up to 860 employees (including market leaders A.C. Nielsen and Batelle-Institut e.V. in Frankfurt/Main, Gesellschaft für Konsumforschung (GfK) in Nuremberg, Dataquest and Infratest in Munich, Sinus in Mannheim, Marplan in Offenbach, and the Institut für Demoskopie in Allensbach). While the smaller companies specialized in certain sectors or in survey techniques, the top companies presented themselves as universal providers of economic, political, and social research. Particularly impressive was the legion of over 43,000 interviewers who during the 1980s were constantly deployed by the German market research companies to conduct surveys on the street or by telephone (BVM 1986/1987). It was precisely this capacity to conduct large, representative surveys which was the strength of external agencies, recalling the make-or-buy decisions that had confronted American firms since the 1940s. It remained too costly even for larger companies to set up and maintain their own survey departments. Still, consumer goods producers in the USA and Germany continued to grow their own market research departments. In part, they acted as the operational contacts for the external service providers. They evaluated the survey results and image concepts, interpreted them and, in conjunction with management, translated them into strategic planning.

At the same time, marketing management continued to move to a more central position in the process of corporate decision-making. Market research departments established themselves increasingly as units of strategic planning to ensure consumer-oriented corporate management. Here, the boom in market research entered into a close relationship with new planning ideals that encompassed not only the economy, but also economic and social policy in general: “The guidelines for all of a company’s market research activity should follow from a planning framework” (Booth 1981, 8). The market research director of the Singer Company, for example, argued that to overcome “marketing myopia,” only intensified market research efforts were able to address business reality and solve market problems. Research data, whether from inside or outside the company, should deliver all necessary information to lay out the decisive points for tactical planning. At Henkel, the same patterns of organizational change can be found in the mid-1960s. Here, the market research department became an “integrated information system” in line with the new approach of marketing management. It established itself as the “crystallization point of market-oriented synchronized planning of the entire business activity.” From this viewpoint, market research should allow managers “to concentrate more on the decisions themselves than on preparing them.”¹¹

Renowned marketing expert Heribert Meffert identified the following basic functions of marketing research: to facilitate the preparation of decisions, to monitor the decision-making processes, and to procure all information in order to present the company management with market analyses ready for decision-making. Market monitoring was considered one of the permanent and systematic tasks of the company. It was on this basis that research and development (R&D), financial, and operational planning processes were to be carried out. Meffert et al. concluded that the systematic research of markets was an indispensable condition of any strategic planning (Meffert et al. 1982).

These examples underscore the increasing importance of market research in the second half of the twentieth century. Research-based forecasts provided companies with empirically grounded interpretations based on the research agencies' own experience and expectations. In the companies, this incoming information and interpretation then passed through several processing filters (Kapferer 1963). Analyses were checked by the in-house market research team and introduced into the operational decision-making processes via marketing. Under the Knowledge-Based-View approach of corporate management that emerged around the start of the twenty-first century, the external information was examined at several steps of a "staircase of management knowledge formation" (North 1999, 41) regarding its application possibilities. Moreover, information was contextualized with the company's own experiences and expectations (Linde 2008, 4). In order to actually become effective for strategic decisions, following Beckert the consultants' fictional interpretations required, above all, a high degree of acceptance and plausibility. For this reason, it was important that they should not be too far removed from existing expectations circulating in the company. It was beneficial if consultants found particularly catchy forms of illustration with which they could convincingly reduce the complexity of the market and consumer behavior. The simple semanticization and visualization of the predictions in image analyses served this purpose well and proved influential for the "politics" of expectations within corporations. They seemingly objectified the consultants' assessments (which ultimately, of course, still remained speculative and subjective).

The relationship between the companies and the consulting firms, finally, was not free of conflict. This is evidenced, for example, by the rapid changes in the choice of market research companies in the automotive industry. Unlike in the advertising sector, companies usually did not establish long-term relationships with external consultants that lasted for years. Instead, they selected consultants very specifically and according to the immediate issues to hand. Confidence in the usefulness of the information obtained was generated between the company executives and their new marketing management departments, which were responsible for the selection and initial evaluation of the interpretative analyses. Overall, the implementation of market research in corporate expectation formation furthered two broader trends: on the one hand, internal marketing positioned itself as a central coordination unit for demand-driven management. Marketing departments thus gained access to operational decision-making processes. At the same time, external experiences and expectations entered the companies. Both processes undermined the established routines of intuitive and individual decision-making. These were replaced by a group-collective formation of expectations, which were more widely negotiated within the companies and adjusted to strategic planning ideals. Here, management decisions were afforded greater legitimacy by this—at least apparently—more objectified and discursive embedding through market research.

Conclusion

We assess the emergence of (external) market research production as a major shift in the way economic expectations are conceptualized. Older, intuitive approaches to strategic planning were replaced by more systematic management concepts based on innovative statistical, psychological, and behavioral approaches to consumer monitoring. As such, market research can be regarded as a process in which the individual formation of adaptive expectations on the part of decision-makers became contextualized within broader systemic and collective patterns of information analysis. Especially in the postwar period, market research developed into a social technique that, under the heightened uncertainty of market change, gave companies a sense of regaining control by gathering information about consumers' increasingly diverse behavior. To this end, they drew on the external expertise of commercial agencies, which provided interpretations of market change based on scientific research methods. Companies themselves also began to expand or create specialized market research departments. In a series of often contested episodes of organizational restructuring, marketing and market research moved beyond their limited sales functions toward an element of integrated corporate strategic planning. Today, they fulfill a dual function as nodes of knowledge transmission and, at the same time, as a filter in the process of forming expectations. They have become the places in which secondary experiences are absorbed, operationalized, and transformed into active knowledge informing company decisions. Marketing departments, finally, have moderated the politics of expectations and the process of bargaining in which external information is assessed for strategic relevance.

At the same time, new ways of information processing were formalized under the precept of reflexive expectation formation. Market research departments regulated the inflow of external experience and expectations and balanced them with the company's priorities of strategic action. The agency of all actors shifted from adaptive to anticipatory approaches to expectation formation. Decision-making became embedded in the narratives of reflexive and consumer-driven management strategies. Yet, following Beckert, the expectation models offered by market researchers remained constrained and fictional. The decisive factor for external providers of information was the extent to which they were able to enforce their own predictions by means of semantically and visually convincing analyses of the market situation. Akin to the theory of information goods as advanced by information economics, the prognostic reports of the consultants can be interpreted as "credence goods." Such goods or services are characterized by significant information asymmetries between client and provider: much like the repeatedly cited medical professionals, market research consultants provide the diagnosis and sell the remedy at the same time (Darby and Karni 1973). In the information interchange between the consultants and the companies, this meant that clients often found it difficult to identify the actual utility of the information they received. In the end, firms have had to rely simply on an assumed utility, i.e. management's conviction that the information was capable of alleviating their uncertainty. Overall, the history of market research shows how quantitative approaches based on extrapolating future market developments from past or current sales data were flanked by psychological-qualitative methods focusing on human needs and desires. Advances in individual and social psychology as well early cognitive research were closely linked with the development of market research. Market research is thus deeply intertwined with the rise of more and more interdisciplinary and group-collective processes of economic knowledge production. At the

same time, corporate decision-making processes integrated external expertise to (re-)legitimize their strategic decisions, which continue to be made under conditions of uncertainty.

Notes

- 1 The following passages draw on Logemann (2019) and Logemann, Cross, and Köhler (2017).
- 2 Politz, Alfred. 1960. Promotional resumé “President of Alfred Politz Research Inc.” Politz Papers, Box 2, Folder 1, St. John University Archives, New York City, New York.
- 3 Politz, Alfred. 1971. 22 December 1971. Draft memoir “A.P. Book (Draft #1,” Politz Papers, Box 1, Folder 3, St. John University Archives, New York City, New York.
- 4 GSA Annual Assessment & Objectives. 1970/1980. German-Speaking Area. 4 January 1989, J. Walther Thompson Collections, Black Papers, Client Series, Box 2, 1979–1980: 44, Hartman Center for Sales, Advertising and Marketing History. Duke University, Durham, North Carolina.
- 5 JWT-Report. 1976. “Consumer Change in the 1970s.” J. Walther Thompson Collections, Publications: 33001, Hartman Center Duke University for Sales, Advertising and Marketing History. Duke University, Durham, North Carolina.
- 6 Helmut Sihler. 1975. Speech at the ESOMAR Congress, “Wertewandel ist eine Chance für die Marktforschung.” H 12, press documentation, Henkel Corporate Archives, Düsseldorf, Germany.
- 7 Horst van Deun, January 22, 1963. Speech at the Annual Christmas Conference 1962, H20, Hauptwerbeabteilung, Werbung, Folder 5–6, Henkel Corporate Archives, Düsseldorf, Germany.
- 8 Henkel-Report “Markenbild und Werbung.” 1962. Henkel Advertising Department fonds, H20, 3, Henkel Corporate Archives, Düsseldorf, Germany.
- 9 Fleming, Al. April 1981. “Psychographics: Poking into Buyers Personalities.” J. Walther Thompson Collections, Metter Papers, Box 7, Hartman Center Duke University for Sales, Advertising and Marketing History. Duke University, Durham, North Carolina.
- 10 J. Walther Thompson Index Case Histories. 1986. J. Walther Thompson Collections, Publications, 30003, 4, Hartman Center Duke University for Sales, Advertising and Marketing History. Duke University, Durham, North Carolina. See for German examples Köhler 2018, 281–296.
- 11 Henkel LUP-Stabsstelle. Report on “Die Marketing-Stabsstelle als Führungsinstrument der Geschäftsleitung des Chemisch-Technischen Bereiches.” H12, A 6103, Folder 3, Henkel Corporate Archives, Düsseldorf, Germany.

Archival Sources

Alfred Politz Papers, 1942–1983. St. John University Archives, New York City, NY, USA. <https://stjliblog.wordpress.com/2013/11/26/alfred-politz-papers/>.
Henkel Corporate Archives (Konzernarchiv der Henkel AG & Co.), Düsseldorf, Germany. <https://www.archive.nrw.de/en/konzernarchiv-der-henkel-ag-co-kgaa>.
J. Walther Thompson Collections, *Hartman Center Duke University for Sales, Advertising and Marketing History*. Durham, NC: Duke University. <https://archives.lib.duke.edu/>

References

- Bagozzi, Richard P. et al. 2000. *Marketing-Management*. Munich and Vienna: Oldenbourg.
- Bakker, Gerben. 2003. “Building Knowledge about the Consumer: The Emergence of Market Research in the Motion Picture Industry.” *Business History* 45: 101–127.
- Barton, Roger. 1955. *Advertising Agency Operations and Management*. New York: McGraw-Hill.
- Beckert, Jens. 2016. *Imagined Futures. Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Beckert, Jens. 2017. “Historizität fiktionaler Erwartungen.” MpIfG Discussion Paper 17/8: 8. URL: https://pure.mpg.de/rest/items/item_2441882/component/file_2441880/content.
- Beckert, Jens. 2020. “Capitalism: Anticipating the Future Present.” In *The Fictions of American Capitalism*, edited by Jean Henri Coste, and Violaine Dussol, 69–88. Palgrave Studies in Literature, Culture and Economics. Cham: Palgrave Macmillan. DOI: 10.1007/978-3-030-36564-6_3.

- Bergler Georg. 1960. *Die Entwicklung der Verbrauchsforschung in Deutschland und die GfK bis zum Jahre 1945*. Kallmünz: Lassleben.
- Berufsverband Deutscher Markt- und Sozialforscher e.V. (BVM). 1986/1987. *Handbuch der Marktforschungsunternehmen*. Stuttgart: Econ.
- Blaszczyk, Regina. 2000. *Imagining Consumers: Design and Innovation from Wedgewood to Corning*. Baltimore, MD: Johns Hopkins University Press.
- Blogger, John F. 1959. "How to Evaluate Your Company Image." *Journal of Marketing* 24: 7–10.
- Booth, Alfred S. 1981. "Include Marketing Research in Every Level of Corporate Strategic Planning." *Marketing News*, Sept. 18, 1981.
- Bussemer, Thymian. 2003 "Gesucht und gefunden: Das Stimulus-Response-Modell in der Wirkungsforschung." *Publizistik* 48: 176–189.
- Cantillon, Richard. 1931. *Abhandlung über die Natur des Handels im Allgemeinen (1755)*. Translated by Hella Hayek. Jena: Fischer.
- Chassagnon, Virgile, and Christel Vivel. 2013. "Frank H. Knight and Ronald H. Coase. On the Nature of the Capitalist Firm. An Analysis of their Seminal Contributions (1921–1937)." *History of Economic Ideas* 21, no. 2: 29–50.
- Coase, Ronald H. 1937. "The Nature of the Firm." *Economica* 4, no. 16: 386–405.
- Converse, Paul. 1945. "The Development of the Science of Marketing: An Exploratory Survey." *Journal of Marketing* 10, no. 1: 14–23.
- Coutant, Frank. 1937. "Scientific Marketing Makes Progress." *Journal of Marketing* 1, no. 3: 226–230.
- Crisp, Richard. 1953. *Company Practices in Marketing Research*. New York: McGraw-Hill.
- Crisp, Richard. 1957. *Marketing Research*. New York: McGraw-Hill.
- Daniel, Robinson. 2016. *The Measure of Democracy: Polling, Market Research and Public Life, 1930–1945*. Toronto: Toronto University Press.
- Darby, Michael, and Edi Karni. 1973. "Free Competition and the Optimal Amount of Fraud." *The Journal of Law & Economics* 16, no. 1: 67–88.
- Dichter, Ernest. 1947. "Psychology in Market Research." *Harvard Business Review* 25, no.4: 432–443.
- Drieseberg, Thomas J. 1995. *Lebensstil-Forschung. Theoretische Grundlagen und praktische Anwendungen*. Heidelberg: Physica.
- Feldenkirchen, Wilfried, and Daniela Fuchs. 2009. *Die Stimme des Verbrauchers zum Klingen bringen: 75 Jahre Geschichte der GfK Gruppe*. Munich: Piper.
- Fullerton, Ronald. 1994. "Tea and the Viennese: A Pioneering Episode in the Analysis of Consumer Behavior." In *Advances in Consumer Research*, edited by Chris Allen, and Deborah Johns, 418–421. Provo, UT: Association for Consumer Research.
- Gajjar, Nilesh B. 2013. "Basic Steps for Introducing Marketing Research." *Journal of Research in Humanities and Social Sciences* 1, no. 5: 1–5.
- Gasteiger, Nepomuk. 2010. *Der Konsument: Verbraucherbilder in Werbung, Konsumkritik und Verbraucherschutz 1945–1989*. Frankfurt/Main: Campus Verlag.
- Goldstein, Carolyn. 2012. *Creating Consumers: Home Economists in Twentieth-Century America*. Chapel Hill, NC: UNC Press.
- Hansen, Ursula and Matthias Bode. 1999. *Marketing & Konsum. Theorie und Praxis von der Industrialisierung bis ins 21. Jahrhundert*. Munich Vahlen.
- Heller, Harry. 1981. "Honesty, Better Quality needed from Research Suppliers." *Marketing News* 5: 4.
- Heusner, William W., Charles M. Dooley, Gordon A. Hughes, and Percival White. 1947a. "Marketing Research in American Industry: I." *Journal of Marketing* 11, no. 4: 338–354. DOI: 10.2307/1246273.
- Heusner, William W., Charles M. Dooley, Gordon A. Hughes, and Percival White. 1947b. "Marketing Research in American Industry: II." *Journal of Marketing* 12, no. 1: 25–37. DOI: 10.2307/1246296.
- Horowitz, Daniel. 1998. "The Émigré as Celebrant of American Consumer Culture." In *Getting and Spending. European and American Consumer Societies in the Twentieth Century*, edited by Susan Strasser, Charles McGovern, and Matthias Judt, 149–166. Cambridge: Cambridge University Press.

- Hower, Ralph. 1939. *The History of an Advertising Agency: N.W. Ayer & Son at Work 1869–1939*. Cambridge, MA: Harvard University Press.
- Hughes, Gordon. 1950. "The Relationship of Advertiser and Agency in Research." *Journal of Marketing* 14, no. 4: 579–580.
- Hutchinson, Kenneth. 1952. "Marketing as a Science. An Appraisal." *Journal of Marketing* 16, no. 3: 286–293.
- Igo, Sarah. 2007. *The Averaged American: Surveys, Citizens, and the Making of a Mass Public*. Cambridge, MA: Harvard University Press.
- Jacobs, Tino. 2008. *Rauch und Macht: das Unternehmen Reemtsma 1920 bis 1961*. Göttingen: Wallstein.
- Jaffe, Laurence, and Richard Lessler. 1950. "Finding a Job in Business Research." *Journal of Marketing* 15, no. 1: 33–40.
- Kapferer, Clodwig. 1963. *Marktforschung in Europa. Methoden Einzelner Länder*. Hamburg: Behr.
- Kassarjian, Harold. 1994. "Scholarly Traditions and the Roots of American Consumer Research." In *Research Traditions in Marketing*, edited by Gilles Laurent, Gary L. Lilien, and Bernard Pras, 265–279. International Series in Quantitative Marketing 5. Boston, MA: Kluwer.
- Katona, George. 1942. *War Without Inflation: The Psychological Approach to Problems of War Economy*. New York: Columbia University Press.
- Kipping, Matthias, and Lars Engwall. 2002. *Management Consulting. Emergence and Dynamics of a Knowledge Industry*. Oxford: Oxford University Press.
- Köhler, Ingo. 2018. *Auto-Identitäten. Marketing, Konsum und Produktbilder des Automobils nach dem Boom*. Göttingen: Vandenhoeck & Ruprecht.
- Köhler, Ingo, and Jan Logemann. 2016. "Towards Marketing Management: German Marketing in the Nineteenth and Twentieth Centuries." In *The Routledge Companion to Marketing History*, edited by D. G. Brian Jones, and Mark Tadajewski, 371–388. Abingdon and New York: Routledge.
- Kotler, Philip, and Gary Armstrong. 2007. *Principles of Marketing*. Hoboken, NJ: Prentice Hall.
- Kreshel, Peggy. 1993. "Advertising Research in the Pre-Depression Years: A Cultural History." *Journal of Current Issues and Research in Advertising* 15, no. 1: 59–75.
- Kruke, Anja. 2007. "Atomwaffe im Propagandakampf? Markt- und Meinungsforschung in Politik und Wirtschaft der frühen Bundesrepublik." In *Marketinggeschichte. Die Genese einer modernen Sozialtechnik*, edited by Hartmut Berghoff, 346–371. Frankfurt/Main and New York: Campus Verlag.
- Lazarsfeld, Paul. 1935. "The Art of Asking WHY in Marketing Research: Three Principles Underlying the Formulation of Questionnaires." *National Marketing Review* 1: 26–38.
- Linde, Frank. 2008. *Ökonomie der Information*. 2nd ed. Göttingen: University Press.
- Link, Henry, and Irving Lorge. 1935. "The Psychological Sales Barometer." *Harvard Business Review* 14: 193–204.
- Logemann, Jan. 2019. *Engineered to Sell: European Émigrés and the Making of Consumer Capitalism*. Chicago, IL: University of Chicago Press.
- Logemann, Jan, Gary Cross, and Ingo Köhler, eds. 2017. *Consumer Engineering, 1920s–1970s*. New York: Palgrave.
- Longman, Donald. 1951. "The Status of Marketing Research." *Journal of Marketing* 16: 197–201.
- Ludy, Benjamin. 2014. "Science for Sale: Psychology's Earliest Adventures in American Advertising." In *Diversity in Advertising*, edited by Jerome Williams, 21–39. New York: Psychology Press.
- Luhmann, Niklas. 1984. "Soziologische Aspekte des Entscheidungsverhaltens." *Die Betriebswirtschaft* 44: 591–603.
- Luhmann, Niklas. 1984a. *Soziale Systeme. Grundriß einer allgemeinen Theorie*. Frankfurt/Main: Suhrkamp.
- Makridakis, Spyris, and Steven C. Wheelwright. 1977. "Forecasting: Issues and Challenges for Marketing Management." *Journal of Marketing* 41: 24–27.
- Marchand, Roland. 1998a. "Customer Research as Public Relations: General Motors in the 1930s." In *Getting and Spending. European and American Consumer Societies in the Twentieth Century*, edited by Susan Strasser, Charles McGovern, and Matthias Judt Strasser, 85–109. Cambridge: Cambridge University Press.
- Marchand, Roland. 1998b. *Creating the Corporate Soul: The Rise of Public Relations and Corporate Imagery in American Big Business*. Berkeley, CA: University of California Press.

- McGarry, Edmund. 1936. "The Importance of Scientific Method in Advertising." *Journal of Marketing* 1: 82–86.
- Meffert, Heribert et al. 1982. "Erforschung der Märkte als Bedingung strategischer Planung." *Berufsverband Deutscher Sozialforscher (BVM). Vorträge zur Markt- und Sozialforschung* 4: 1–8.
- Meikle, Jeffrey. 2001. *Twentieth Century Limited, Industrial Design in America 1925–1939*. 2nd ed. Philadelphia, PA: Temple University Press.
- Moulton, Elma. 1936. *Marketing Research Activities of Manufacturers*. Washington, DC: American Marketing Association.
- National Industrial Conference Board (NICB). 1955. *Marketing, Business and Commercial Research in Industry*. New York: NICB.
- North, Klaus. 1999. *Wissensorientierte Unternehmensführung. Wertschöpfung durch Wissen*. Wiesbaden: Gabler.
- Osgood, Charles E., George E. Suci, and Percy H. Tannenbaum. 1957. *The Measurement of Meaning*. Urbana and Chicago, IL: University of Illinois Press.
- Packard, Vance. 1957. *The Hidden Persuaders*. New York: McKay.
- Plummer, Joseph T. 1974. "The Concept and Application of Life Style Segmentation." *Journal of Marketing* 38: 33–37.
- Regnery, Claudia. 2003. *Die Deutsche Werbeforschung 1900–1945*. Munster: Monsenstein.
- Samuel, Lawrence. 2010. *Freud on Madison Avenue: Motivation Research and Subliminal Advertising in America*. Philadelphia, PA: University of Philadelphia Press.
- Say, Jean-Baptiste. (1803) 2001. *A Treatise on the Political Economy*. New Brunswick, NJ: Transaction Publishers.
- Schröter, Harm G. 2004. "Zur Geschichte der Marktforschung in Europa im 20. Jahrhundert." In *Geschichte des Konsums*, edited by Rolf Walter, 319–336. Wiesbaden: Gabler.
- Schug, Alexander. 2003. "Wegbereiter der modernen Absatzwerbung in Deutschland: Advertising Agencies und die Amerikanisierung der deutschen Werbebranche in der Zwischenkriegszeit." *WerkstattGeschichte* 34: 29–52.
- Schumpeter, Joseph A. (1911) 1926. *Theorie der wirtschaftlichen Entwicklung. Eine Untersuchung über Unternehmergewinn, Kapital, Kredit, Zins und den Konjunkturzyklus*. 2nd ed. Berlin: Duncker & Humblot.
- Schwartzkopf, Stefan. 2012. "Managing the Unmanageable: the Professionalization of Market and Consumer Research in Post-war Europe." In *Transformations in Retailing*, edited by Ralph Jessen, and Lydia Nehmbach-Langer, 163–178. Farnham: Ashgate.
- Sheldon, Roy, and Egmont Arens. 1932. *Consumer Engineering: A New Technique for Prosperity*. New York: Harper.
- Simon, Herbert A. 1959. "Theories of Decision Making in Economics and Behavioral Science." *American Economic Review* 49: 253–283.
- Spiegel, Bernt. 1961. *Die Struktur der Meinungsverteilung im sozialen Feld: Das psychologische Marktmodell*. Bern et al.: Huber.
- Spiekermann, Uwe. 2019. "German Style Consumer Engineering: Victor Vogt's Verkaufspraxis, 1925–1950." In *Consumer Engineering 1920s–1970s: Marketing Between Expert Planning and Consumer Responsiveness*, edited by Jan Logemann, Gary Cross, and Ingo Köhler, 117–145. New York: Houndsmill.
- Strasser, Susan. 1995. *Satisfaction Guaranteed: The Making of the American Mass Market*. Washington, DC: Smithsonian Institution.
- Ward, Douglas. 2009. "Capitalism, Early Market Research, and the Creation of the American Consumer." *Journal of Historical Research in Marketing* 1, no. 2: 200–223.
- Wells, William, and Doug Tigert. 1971. "Activities, Interests and Opinions." *Journal of Advertising Research* 11: 27–35.
- Williamson, Oliver E. 1998. "Transaction Cost Economics. How It Works, Where It Is Headed." *De Economist* 146: 23–58.
- Wischmeyer, Nils. 2016. "Die Geschichte der Marktforschung rund um Mannheim und Heidelberg." August 9, 2017. URL: <https://www.marktforschung.de/marktforschung/a/ein-pionier-ein-vatermoerder-und-eine-gebaermaschine>.
- "Zielgruppensuche: Modemasche Typen-Puzzle." 1975. *Absatzwirtschaft* 4: 50–60.

PUBLIC NUMBERS

The Politics of Quantification and
Relational Expectations*Tiago Mata*

Numbers are everywhere. Statistics, indicators, indices, and scores govern public and private bureaucracies. We not only live with them, some of us live by them, with performance metrics as pacemakers of our working lives. Numbers have become compelling even beyond the domain of instrumental rationality, as today digital trackers keep watch over our fitness, metabolism, leisure habits, and exposure to viruses. For over 40 years, scholars in the social sciences and humanities have studied how numbers govern us and the consequences of their dominion (see Mennicken and Espeland 2019 for the latest review). This chapter answers the question: what is the relationship between public numbers and expectations?

Public numbers relate to expectations in at least three ways. Numbers can be data and *inform* our expectations about economic futures. In a reversal of the causal chain, expectations may condition the *credibility* of numbers as representations of economic reality. Finally, numbers also play a *coordinating* role, helping to hold together social relations in a competitive and antagonistic political economy. They accomplish this when actors commit themselves to behave in patterned ways toward numbers, which in turn allows other actors to make assumptions about their shared future. Actors can coordinate their future-oriented actions indirectly, through the mediation of a number.

The social sciences of quantification comprise a vast research field that includes economic sociology, the history of science, critical accounting, science studies, and valuation studies, to name only the most prominent. Some see this disciplinary constellation as a disunified field of inquiry (Popp Berman and Hirschman 2018) and yet across the various standpoints a few lessons have stood out. For instance, numbers empower weak elites whose authority rests on claims of technical expertise (Espeland and Stevens 2008). Numbers help regulate contentious polities, and seem most salient in litigious public spheres (Porter 2020). Both of these insights are illustrated in the history reviewed in this chapter; the cited body of literature frames the argument that numbers scaffold the formation of economic expectations.

Public Numbers

This chapter is concerned with a special class of numbers, qualified as *public*. And to focus the domain of my analysis further, I am concerned with economic public numbers.

To an economist familiar with the concept of “public good” all numbers are public: numbers are non-depletable, one person’s use does not diminish another’s ability to use a number; numbers might be excludable if they are behind a paywall. Non-depletable but excludable, numbers fit the analytical category of non-pure public goods. Counter to this analytical definition, the use of the term “public” in this chapter is historical and emic. A number is called public if it has in actuality been accessible to a multitude and has been recognized by historical actors as such. While this definition is not sharp enough to distinguish those instances that are at the margin of publicity, the numbers that commonly shape economic expectations are far from the region of ambiguity—price indices, national income estimates, and stock market indices, for example, are unambiguously in wide circulation.

Under this definition most numbers are not public. The flood of data generated by individuals seeking self-actualization is not public, because the digital inscriptions of wearable devices travel in opaque circuitries. Similarly, our lives online are tracked, processed, coded, packaged, and sold, but it takes significant effort to make any of this visible and accountable (Zuboff 2019). Also out of the frame of this analysis are the data infrastructures that promise algorithmic intelligence and optimality in today’s organizations. One should not underestimate these new forms of commensuration, inscription, and control, but this analysis is of limited insight regarding what is happening in more personal and organizational domains.

The numbers that are the focus of this chapter make headlines. A public number is a number that was deemed important enough for a polity to make it widely accessible. Why are certain numbers chosen to become the drivers of formidable expert systems of data collection, processing, review, and quality control, often at the taxpayer’s expense?¹ One recurring pattern is that these numbers are made public because they regulate important conflicts in the political economy. This essay illustrates this point with the history of price indices.

In the USA, one of the many price indices computed by the Department of Labor—the cost of living index—was elevated to national attention once it came to play a key role in wage arbitration. The salience of that statistic in 1910s America was tied to its usefulness for a new regime of industrial relations. But as I will also show, the uses of a public number are not fixed for all time. In the 1990s, price indices started a new life as a performance metric for central banks’ new mandates centered on price stability. In this setting, price indices came to regulate a different tension in the political economy, the mercurial movements of moneyed wealth that is indispensable to national prosperity but that can as easily endanger it by its flight.

As the chapter demonstrates, there are histories to how numbers became public. Their publicness was not pre-ordained or inevitable and was an accomplishment of disputes and negotiation. But how important is it that they are public? Numbers in the public domain are regularly challenged, and we have witnessed again and again campaigns to refashion or cancel official statistics. One prominent example of a statistic that has been repeatedly and forcefully challenged is Gross Domestic Product (GDP) as a measure of national prosperity (Sen, Stiglitz, and Fitoussi 2009; Coyle 2015). Rather than being a weakness, the contentiousness of statistics may promote their vitality and validity in democratic culture, since numbers earn their authority without privilege and in the full view of all (Deringer 2018). Not all tests on the validity of public numbers are epistemic; a crucial test is whether we can rely on numbers to play social roles, in particular to do the work of coordination.

On Coordination and Expectations

The modern economy is a curious contraption; while we are all part of it, we can occasionally stand outside to read the dials on the machine and adjust our pace to its rhythms. The periodical release of unemployment, inflation, or national income estimates are occasions for economic actors to update beliefs and correct their actions and plans. What those corrections might be depends on the actors' situation, needs, and aspirations, but we know it is rational for them to respond to new information. To put it succinctly, economic statistics *inform* economic expectations. This belief is as old as economic statistics themselves, since they emerged, especially in the 1910s and 1920s, tied to a movement of technocratic optimism that sought to coordinate the national economy through free information and corporate control (Hawley 1974; Barber 1985; Mata 2018).

Reading statistics should help individuals and organizations to make better decisions about their future, and although that is a complex subject in its own right, it is not what interests me (see in Döpke and Fritsche, Chapter 9, and Born, Enders, and Müller, Chapter 10 in this volume). A public number needs to be trusted and trust is awarded when the number aligns with actors' aspirations, confirming beliefs rather than correcting them. Labor unions in the USA lost trust in the cost of living index in the 1910s when it was used to lower their wages. That judgment would be reversed, as discussed below, only in the 1950s under a very different outlook for the American economy where the price index was chosen as an ally to cushion expected inflation arising from the Korean War. This chapter sketches the mutual binding of numbers and expectations: numbers inform expectations and the *credibility* of numbers hinges on whether they align with beliefs about the future.

Public numbers are also about more than measurement. They can be instrumental for the *establishment of social relations* and key to whether these relations will hold or unravel. Following the classic formulation of Talcott Parsons in *Toward a General Theory of Action* and *The Social System* (both 1951), it is useful to think of this problem as one of "double contingency," where the interaction of self and other (ego and alter) is formed based on the integration of the mutual expectations of both actors (on this point, see Lenel and Reichmann, Chapter 16, and Köhler and Logemann, Chapter 17 in this volume). Niklas Luhmann has helped us understand this problem as one requiring interaction and communication between the two actors (Vanderstraeten 2002), but for our purposes the interesting puzzle is how double contingency might be regulated by the introduction of a third entity, a public number. Price index numbers in the US in the 1910s must be understood as part and parcel of a process of institutionalizing a new relationship, labor arbitration. Decades later, cost of living adjustment clauses in collective wage agreements used price indices to signal the commitment of employers to maintaining the standard of living of their workers, and in return workers pledged industrial peace. The number anchored mutual obligations and as a result the narrowing of the field of future action as, for example, workers no longer needed to reopen wage negotiations with their employers. Move forward to present-day monetary policy, and price index numbers maintain a precarious coordination between monetary authorities and money markets, credit institutions, and investor funds, discouraging these from making impulsive changes to their capital positions.

Numbers are part of the scaffolding of fragile relationships of mutual control. Often, it does not matter if the numbers are or are not accurate. One can never be sure what true inflation is; it is only possible to check one measurement against alternatives ones. We know these numbers are never precise; they are built on approximations and compromises

on data collection and processing, and are regularly revised and recalculated. None of that matters if they are reliable and can hold actors to a de-escalation of their conflicts and to a more predictable pattern of action, thus making the future a little less uncertain.

Price Indices

This chapter illustrates the interdependence between quantification and expectations through a fragmentary history of price indices. Note that the object is the metric itself, not the phenomena it purported to capture. The chapter shows that what price indices were tracking, and how they are read, has changed over time.

This review of the history of price indices is most detailed when looking at their role in mid-century labor relations and in contemporary monetary policy. The scope is the long twentieth century in the United States, with a setting of the scene in nineteenth-century Great Britain.² Unexamined is the important record of price indices within post-Second World War macroeconomic policy (see Stapleford 2009 for a history that captures that dimension); this lacuna is a result of a decision to focus on those instances that best, and most succinctly, illustrate the pairing of public numbers to expectations.

The Purchasing Power of Money

Authors writing about the intellectual history of price index numbers generally adopt one of two genealogies based on two surveys written only a few years apart. One is sourced from Wesley Clark Mitchell's widely circulated contribution to the *Bulletin of the Bureau of Labor Statistics*, first published in 1915, updated in 1921, and reprinted by popular demand in 1938. The other can be found in Irving Fisher's celebrated *The Making of Index Numbers* of 1922, in an appendix on "Landmarks in the History of Index Numbers." These, in turn, start with two dates respectively (Fisher in 1707 with William Fleetwood, Bishop of Ely, and Mitchell in the 1750s with Count Gian Carli). Both genealogies intersect, however, at the moment when William Stanley Jevons sparked a productive controversy between British and German scholars (Kim 1997). In the 1860s, Jevons set out to critique studies of the impact of the inflow of precious metals on the purchasing power of money. At stake was the validity of the age-old Quantity Theory of Money, but Jevons's intervention moved discussion to the technical subject of comparing and evaluating index formulas. With Jevons joined by mathematician Étienne Laspeyres (1834–1913), who developed an index price formula in 1871, and the economist Hermann Paasche (1851–1925), the history of index numbers in the late nineteenth century looks like a methodological debate led by mathematically-minded academics. This narrative is quickly unsettled by paying close attention to the numbers and asking who was compiling the price index series and what their concerns were.

In England, the seminal figure was William Newmarch. Born in 1820 in Thirsk, Yorkshire, Newmarch was not a scholar. At an early age he left school to become a clerk and soon after a cashier at a banking firm. Newmarch found his way to London in 1846, where he joined the staff of the *Morning Chronicle* writing on economic affairs, and also took a managerial job at a City bank. In his second year in London, he became a member of the Statistical Society and joined the company of the nation's leading statisticians and economic commentators. Newmarch would go on to edit the Society's journal, act as secretary, president, member of its council, and later trustee. In addition, he was also elected member of

the Political Economy Club in 1852 and was at one point its treasurer. Newmarch's interests and career brought together the intellectual worlds of banking, journalism, economic theory, and statistical practice.

From the vantage point of the history of economic thought, Newmarch's writings fit into one of the major debates of British political economy, an argument between the so-called currency and banking schools triggered by the Bank Charter Act of 1844. Newmarch argued for the banking view that the level of currency in circulation was set by the level of prices and incomes, but to read his price studies solely as a contribution to this esoteric debate misses more pragmatic concerns.³ In 1860, Newmarch explained to the readers of the *Journal of the Statistical Society of London* the two reasons to keep a tedious watch on price movements: the numbers spoke of the "relative exchange value of commodities as compared with each other" and of "the relative exchange value of commodities and wages in different parts of the world" (Newmarch 1860, 479). Newmarch's price studies were therefore examinations of the trends in British trade, to pinpoint what commodities and what regions were of greater commercial worth. In 1869, *The Economist* took over from Newmarch the publication of tables with price indices for 22 commodities. These appeared initially as an appendix to the *Economist's* annual *Commercial History and Review* (*The Economist* 1871). The 60-page annuals were published in mid-March, and collated narratives by industry observers to tell the story of British enterprise of the preceding year. The price indices were unremarkable within these newsy reports, and were a baseline of price change functioning as a backdrop against which to set the big stories of the year.

Efforts to construct a more comprehensive database of price movements intensified in the mid-1880s, simultaneously in the United Kingdom and Germany. In the UK the lead compiler was a wool merchant, Augustus Sauerbeck. Starting in 1886 with a study of the causes of price decline in the UK in the preceding decade, Sauerbeck issued a yearly update of a price index series in the renamed *Journal of the Royal Statistical Society*, including a review of what Newmarch had done in 1859–1861. Like Newmarch's work, the Sauerbeck series were inherited by a mass periodical when in 1913 the series was taken over by the *Statist*. In Germany the key figure was Adolf Soetbeer. German scholars like Paasche relied on price and quantity data collected and published by the Chamber of Commerce at Hamburg, which Soetbeer had been instrumental in establishing. In 1886, the same year Sauerbeck published his study, Soetbeer compiled price index numbers for 114 commodities, and the following year Franz Kral published series for 265 commodities (Balk 2008, 1–39).

The history of index series has been written as a tale of scholars and their formulas, but a different narrative can be told where business and publishing interests intermingled with intellectual inquiry to create and promote the numbers. This history of publicity had as its leading characters the learned societies, clubs, business associations, and periodicals collaborating to calculate and publicize the indices. These interests were for many years indifferent to the comparative merits of index formulas that so animated the scholars,⁴ but, importantly for what comes next, they were also unconcerned with the wages of the working classes.

The price index was becoming more public by moving from the journals of the Statistical Society to the more mass, albeit still elitist, pages of the *Economist* and *Statist*. And yet it was not a public number; it remained unremarkable, a table of figures in small print rather than a single number, playing a subsidiary role in a mode of commercial and investment evaluation and judgment. The price index was not authoritative enough, and was meaningless until placed alongside stories and news. It was not the price index itself that

was interesting but the movement of prices set against the index change. The progeny of this kind of analysis—reading commercial and financial change against a baseline—was the field of business forecasting that blossomed in the early decades of the twentieth century, also in the United States of America (Friedman 2013; Lenel and Reichmann, Chapter 16 in this volume).

The Cost of Living

In the US, price indices were from very early on a matter for the state. The Bureau of Labor Statistics (BLS) was the first federal agency of the United States to publish regular statistics on prices. It started in 1902 with wholesale (unweighted) prices and the following year added two series for retail prices, one of which was weighted on a 1901 cost of living survey on working men. The “cost of living index” began nearly two decades later, weighted on 1917–1919 spending studies of wage-earners and low-salaried clerical workers. Price indices could have been incorporated into the Department of Commerce series, which over time came to issue extensive statistics on all sorts of industrial and commercial matters. The reason they were not was that price indices were a labor number: their salient political value in Progressive-era America was to cast a light on the plight of working families.

The availability of a cost of living index did not lead to its mass adoption. At the turn of the century, the workers in American (and German) mining and railroad industries chose to make the case for wage increases on grounds of personal experience and anecdotal evidence (Teupe 2021, and Teupe and Hesse, Chapter 29 in this volume). Cost of living arguments were regularly rejected in favor of calls to align pay with what was going on elsewhere in the country or in the industry, with the slogan of “fair and equitable” pay. But for unions to put forward a cost of living argument, measured by a national number, required that they accept the fiction of a commonality in the lives of workers, for example that a miner in West Virginia lived in much the same way as an assembly line worker in Michigan, which was clearly not the case (for a critical history of survey representation in America, see Igo 2008).

It took another world war for union leadership in the US to look past these difficulties, and they had to be pushed to do it. The key development was a move away from mediation to the federal arbitration of wage disputes. Arbitration hearings asserted impartiality by relying on statistics and economic theory and urged unions to justify their wage demands with “quantifiable principles” (Stapleford 2008, 6). The National War Labor Board championed this model of arbitration across industries.

In the US there was already an extensive precedent of unions negotiating long-term contracts. The sliding scale agreements negotiated by unions in the iron and steel (1865–1935) and anthracite coal (1869–1912) industries automatically adjusted wages by tracking the price of the product and were motivated by a logic of profit sharing (Jacoby 1987, 518). The ubiquity of the cost of living index in federal arbitration during the war recommended its postwar use, and among the first to adopt it in collective bargaining were the printing and publishing industries, which added to their contracts escalation clauses linked to the index. However, as inflation subsided postwar, the cost of living clause was used to lower wages in the sector and at the next negotiation round unions rejected automatic adjustments. The experience of the index wedging a wage decrease was a trauma that organized labor would not easily forget. The unions went on to reject stability of living standards as a bargaining goal since at best it promised to “perpetuat[e] the deplorable conditions which existed before the war” (Jacoby 1987, 524). In its place they called for a living wage.

Unions had been encouraged by the US federal state to see the cost of living index issued by the BLS as an ally in collective bargaining, only to find it to be treacherous in lowering their already depressed postwar wages. This not only undermined the index's reliability in collective bargaining, it also blemished its credibility. On the side of business, alternative indices proliferated, some of them weighted to reflect local conditions of an industry, or issued by pro-business organizations like the National Industrial Conference Board. While labor unions accepted the inadequacy of a single index to capture the variability of prices across a vast nation, they focused on how the budgets underpinning the calculation of the indices did not reflect the true cost of living (Stapleford 2009, 125–133).

It was only after the Second World War that wages indexed to cost of living metrics earned a second lease of life. In 1948 General Motors (GM) and the United Automobile Workers union (UAW) signed an era-defining two-year agreement that contained a Cost of Living Adjustment clause (COLA). At that time, there were only 13 other agreements containing such clauses. The wage settlement was described by *Fortune* magazine's Daniel Bell as "the treaty of Detroit," and the phrase was apt: it fixed a relationship between management and labor that was in flux postwar (Lichtenstein 1985). Decades later, this was still how GM management saw the matter. Alfred Sloan explained in his memoirs (eventually published in 1964, after an initial embargo by GM) that their wage formula

represented an effort to introduce an element of reason, and of predictability, into our wage program; especially it aimed to end at least in part the contests of strength in which our wages had often been set in the past.

(Sloan 1964, 461)

In the 119-day strike of 1945–1946, the UAW had demanded wage increases that matched the corporation's ability to pay and insisted that it did not raise the price of its cars to pay for the higher wage bill. To the GM management the workers were assuming managerial prerogatives: the setting of prices and the decision of how to distribute company profits. The 1948 agreement contributed to a new status quo of low industrial unrest and combativeness. It meant that GM's leadership had been "successful in combating these invasions of management rights," retaining "all the basic powers to manage" (Sloan 1964, 473). Each side felt they had tied the hands of the other. This alignment of parties with all of its unspoken dimensions was largely unenforceable, so its strength came from the commitment to a public number—the cost of living index—, one that neither of the parties could control. They had tied each other to a statistic.

The "treaty of Detroit" demonstrates how the price index, as a public number, regulated expectations along the three facets outlined in this chapter's introduction. The cost of living index gave a numerical form to contemporary inflation and *informed* projections of its trajectory. The cost of living was *credible* in 1948 as a result of a long record of attempts, starting in the 1910s, of using it mechanically in labor relations (although in the 1920s, the unions rejected it for reasons described above). Finally, authors were drawn to the index because it helped resolve their problem of double contingency: the explicit commitment to the number was an implicit commitment to a set of behaviors (a political settlement), that made actors predictable to one another.

The agreement between General Motors and the UAW has been seen as a model followed by many. However, despite generating "tremendous publicity, surveys taken at the time found that COLA clauses were opposed by most employers (83%) and union leaders

(92%)” (Jacoby 1987, 525). A compelling and overlapping influence toward the acceptance of COLAs was yet another war. With the Korean War in sight, management feared labor shortages and labor feared inflation, so they insured themselves against these risks with a price index premium (Jacoby 1987, 525, table 1). Trust in the price index was therefore conditional on beliefs about the future of prices and of the future of labor relations.

Labor relations in the second half of the twentieth century were suffused with numbers. And unions would have liked numbers other than price indices. Labor leaders asked for surveys that would draw a more fine-grained picture of wage patterns across America and tallies of the ongoing results of contract bargaining (Carey 1955; Meany 1955), but those figures were harder to come by. The BLS relied, and still does, on the cooperation of businesses to answer its surveys. The price index by contrast was easy to source, and its survey component called on the cooperation of working families not firms.⁵

The history before us is not the history of an optimal number that by its character and truth value satisfied all parties. This is a record of contingencies and compromises that elevated the BLS’s cost of living index as a scaffold for collective agreements. The price index as it became the basis of COLAs in the 1950s contributed to reducing uncertainty about the future, not because the index in the present revealed what the future of prices would be like, but because wage indexation promised to tame the future by making the behavior of actors predictable if faced with price volatility.

Price Stability

The uses of a public number never cease to change. During the Second World War, under a regime of price controls and frozen wages, the BLS index was a measure of the effectiveness of the government’s mastery over the war economy. The price index became a tool to evaluate administrative control. As a significant abridgment to the history, the chapter will not review the years of the development of macroeconomics when new price indices were engineered and integrated into systems of national income accounts and regimes of countercyclical policy. But we must pause to note that war, and the changes to economic government accelerated by war, led to an ontological shift: the general level of prices stopped being a fact of life and became a policy outcome.

Even as price index formulas began to change at mid-century,⁶ as a field of expertise price indices remained nested in labor research. Since 1925 labor statisticians had led the recording of best practices for creating price indices. There were conventions for labor statisticians in 1947, 1962, 1987, and 2003. In 1989, the director of the Labour Information and Statistics Department of the International Labour Organization (ILO), Ralph Turvey, a British economist with a career between academia, civil service, and public enterprise (Peston 2012), set out in 120 pages the theory and practice of creating a consumer price index, published as *Consumer Price Indices: An ILO Manual* (Turvey 1989). This was expanded in 2004 into a 500-page document, the *Consumer Price Index Manual: Theory and Practice*, authored and published by the ILO but co-authored by a consortium of agencies—the International Monetary Fund, Organisation for Economic Co-operation and Development, Statistical Office of the European Union (Eurostat), United Nations, The International Bank for Reconstruction and Development, and The World Bank (ILO et al. 2004).

This multi-agency interest in consumer price indices in the 1990s and early 2000s indicates that a change was underway. On the one hand there were renewed criticisms of consumer price indices. In the US, the key concern was that indices might have been

systematically overstating inflation. The US Senate's Finance Committee worried about social insurance adjustment clauses linked to the Consumer Price Index (CPI), and commissioned a report to study the problem. The report became known by the name of its lead researcher Michael J. Boskin, former head of the Council of Economic Advisers of George H. Bush and a Stanford professor. The 1996 Boskin Commission concluded that there was a significant upward bias (overestimation) of about 1.1 percent a year in the CPI, and detailed the extent of biases of various kinds: substitution, outlet, quality, and new products. In its wake, research projects were launched in other countries, including Australia, Canada, France, and the UK, in order to assess the accuracy of the national CPI statistics. The bias agenda was less salient within the European Union where the challenge was to design a formula that might represent the range of different economies that were about to make up the Eurozone. The European Union's statistical agency, Eurostat, was developing a Harmonised Index Number that ensured national comparability.

These technical puzzles were set against the backdrop of a changing financial regime. Since the early 1970s the rulebook written in the New Hampshire resort of Bretton Woods had been unravelling (see also Rischbieter, Chapter 28 in this volume). Over time, national governments had reluctantly accepted the floating of their currencies and removed capital controls. The end of the Cold War and the extraordinary rise of Asian economies in the last decades of the twentieth century were accompanied by an unprecedented surge in the flows of private and public capital around the world. Why did price indices become important in the newly financialized global economy?

In many nations the use of price indices in wage bargaining had been extended to indexation in social security allowances (such as benefits and pensions), financial instruments (index-linked bonds, including many government bonds), and fees and fines. So the CPI automatically propagates adjustments in value, and central banks take a dim view of its usefulness, seeing it as an amplifier of "upward shocks to inflation, such as those currently observed in energy and food prices" that would last "longer" and even lead "to a wage-price spiral" (ECB 2008). The Governing Council of the ECB in 2008 even meekly "called for such schemes to be avoided" (ECB 2008). As we have seen, this advice ignores the role played by indexation in holding in place key relationships in the political economy. When these numbers break down, so do the relationships they hold in place. But that is not why they are so salient in global finance. In a world regime of undeterred capital mobility, price indices have become a simple and readily available measure to score a nation's governance.

The IMF has been tracking statistical quality through its Dissemination Standards Bulletin Board since 1996, campaigning for national statistical offices to produce numbers that are "comprehensive, timely, accessible, and reliable" and (ideally) machine-readable. In the latest iteration of the *CPI Manual* of 2020, the IMF replaced the ILO as publisher and lead agency. The CPI symbolically stopped being a labor number to become a monetary one, faced by a new constituency and new criteria to evaluate its credibility. The new version of the manual was stripped of the theory and focuses on the practice of creating a reliable index. It clearly intends to set standards for practitioners and for those who look to evaluate the quality of those indices.

The IMF has not adopted this orientation on its own. Central banks have been involved in the movement to set standards. Among the fellowship of Central Bank statisticians, with the leadership of the Central Bank of Belgium, a committee named after Irving Fisher has met regularly since 1995, first operating under the auspices of the International Statistical

Institute, and from 2006 as part of the Bank of International Settlements (BIS). The first workshop of the Irving Fisher Committee under the new BIS mantle was on the Consumer Price Index, in April 2006. The 2017 meeting of the influential Ottawa Group, one of the UN Statistical Commission groups of specialists created in 1994 to study the problems of measuring price change, was for the first time hosted by a central bank, the Deutsche Bundesbank.

Despite the manuals and the push toward international standards, and despite widespread agreement on key values of “credibility, reliability and comparability” (Camba-Mendez 2003, 32), there is no agreement among central banks on what index to use to keep watch over price stability. Central banks, when considering their course of action, may look at various statistical measures. The Federal Reserve tracks 20 pages of price forecast tables every month, yet when it addresses Congress or speaks to the media it focuses on one number. The Federal Reserve’s Open Markets Committee (FOMC) preferred statistic to forecast inflation was for a long time the CPI published by the BLS. In February 2000, the FOMC replaced the CPI with the Personal Consumption Expenditure (PCE) deflator. The PCE is estimated by the Bureau of Economic Analysis for use in the national income accounts and its scope is broader than that of the CPI, aiming to capture the price for all consumption and relying on several imputed prices to achieve it.⁷ The PCE includes financial services, employer benefits, and goods and services co-funded by the government. In July 2004, the FOMC changed again and began reporting the “core PCE,” which excludes food and energy, items that rank highly on working-class budgets.

Others have chosen not to follow the Fed in its choice of index. For instance, the European Central Bank (ECB) uses a consumer price index, the Harmonised Consumer Price Index (HICP) created by Eurostat in 1993 (ECB 2005a, 2005b). The index, originally designed to assess price convergence in the run-up to the adoption of the common currency, has become the yardstick to assess price stability in the euro area. The ECB implicitly values the timeliness and reliability of price indices above the comprehensiveness of price deflators; as noted above, bias in the price index is a charged political issue in the US but not in Europe. Credibility is a politically loaded quality and it constrains and guides the choices of policy actors. Still, the choice of indices from a preexisting and extensive menu of formulas (CPI, deflators, core, superlative, harmonized, and more) demonstrates that when central banks address their publics they promote the metric that best aligns with their analysis of the future.

The central bank embrace of communication has been called a “quiet revolution” (Blinder 2004; see also Dräger, Chapter 12 in this volume). Only two decades ago, central bankers believed that their interventions would have maximal effect if they surprised markets and if policy actions were unanticipated. Contemporary central bankers style themselves, by contrast, as masters of transparency and “forward guidance.” They explain that if they can shape the expectations of the public, the public will do half of the work of price stability for them. One cannot dispute the difference between the recent past and the present day, between Alan Greenspan (Federal Reserve, 1987–2006) with his deliberately obfuscating “greenspeak” and Mark Carney (Bank of England, 2013–2020) leading didactic press events with a keenness to give reasons for his policies. Yet to claim that this “before and after” contrast is the outcome of a revolution would be hyperbole.

We have arrived at the current regime of central bank independence, with its singular focus on price stability, through a sequence of incremental changes that lacked an overall blueprint. If it was a revolution, it lacked a manifesto and a vanguard. The theory

that accompanies contemporary central banking is a patchwork of references to economic theorists (like Milton Friedman) and alleged lessons drawn from experience (such as the Asian Crisis, or the 2008 crisis). Earlier I have suggested that a large part of the story has its roots in tectonic shifts in the global economy that took place in the 1990s, through liberalized money markets, the end of the Cold War, and a new geography of global trade and production. These geoeconomic and geopolitical changes provide a seemingly reasonable backdrop for the reorientation of central banks, but once we look at the particulars of institutional change, what we see is the politics of quantification at work.

New Zealand is considered to be the nation that pioneered an independent central bank that was accountable solely to price stability as defined numerically. In some retrospective accounts, it was its success that recommended the new regime for widespread adoption. None of the big-picture causal stories seem to reach New Zealand, a small peripheral economy that has long been integrated into the world's system of trade and finance. The story of New Zealand Central Bank independence is one of a frictional battle with minister of finance Roger Douglas. Between 1986 and 1988, the Treasury and the Central Bank debated plans for legislating the bank's autonomy, with the stated aim of insulating it from the short-term demands of prevailing political power.

The New Zealand Central Bank gained its independence reluctantly, following the script written by the Treasury that adopted the so-called "New Public Management," loosely inspired by principal-agent models from economics. Previous legislation, the State Sector Act and the Public Finance Act, had given public sector managers the authority to manage, but held them "directly accountable for outputs—i.e. the measurable products or services that each agency was mandated or contracted to deliver" (Riddell 1999, 66). In the case of the Central Bank there was no agreement on what might count as outputs, only the final desired outcome was clear: zero or very low inflation. In the governor's new employment contract, performance was to be assessed by examining the governor's judgments in pursuing that ultimate goal. It took several more years before that final goal crystallized as inflation between 0 and 3 percent of annual CPI. At each stage the governor, Donald Brash, resisted the low targets set by successive ministers of finance. The governor and his staff feared that the goals might not be attainable or that the recessionary cost to pay (through high interest rates) might be too high. The New Zealand Central Bank only accepted the potentially hazardous mandate when it judged that price stability was probable.

Price stability in today's central banking policy is defined as a general level. Consideration of the quality of inflation, its distribution, or impacts are bracketed to pay attention to one number, typically around 2 percent of annual CPI (or equivalent). Above 2 percent is inflation, below it is deflation, and policy failure presumably is a figure that goes too far or for too long off that mark. Although central banks seem to have gotten a rough deal with the enormously difficult task of moving a nation's prices, in fact it is hard to imagine a central bank failing. Deviations from the target are regularly explained as "shocks" beyond anyone's control, patience can be pleaded with reference to policy lags, and political authority chastising central bankers for the failures would likely do more harm than good. So what looks like a hard arrangement turns out to be just the opposite.

Central banks do not produce the price statistics that are the measure of their performance but take a keen interest in prescribing standards for calculating those numbers. They enjoy the discretion to pick the exact measure they find most credible and great interpretative latitude to read it. The Fed speaks of the price deflator as data *informing*

its own expectation formation and tells stories with the number to encourage others to agree with its outlook. But as the New Zealand origin story of this regime demonstrates, the number is managing expectations in a more subtle sense, as an icon for monetary statesmanship. The central bank commitment to an unchanging CPI is a commitment to depoliticizing the value of the currency and granting private actors the prerogative to set that value in a liberalized global marketplace. It is a pledge to a particular form of government that is predictable. Markets and monetary policymakers are tied together by a number into a predictable pattern. Under this interpretation, central bankers are followers not leaders.

Conclusion

One puzzle that has occupied scholars of quantification (Desrosières 2015) is why people willingly join in projects of quantification that seem poised to limit their autonomy. This chapter argues that in a contentious and uncertain political economy, quantification is a resource to build relationships of reciprocal control. I have highlighted here a set of historical episodes and alliances that look less like vectors of domination and more like forms of coordinating stalemates. The salient problem affecting the political economy appears informational (how to peer into the future) but its resolution is relational (the future is made less uncertain by compelling actors to respond in predictable ways).

In the late 1940s, the CPI was not merely telling GM executives of possible trends in inflation which they could use to update their pricing policies and make appropriate financial provisions. The fuller economic impact of inflation extended beyond adjustments to costs and returns calculations; it also impacted the behavior of organized workers, who may raise wage demands and interrupt production to make their voices heard. Sociologists have called this problem *double contingency*, how actions by one actor are mutually contingent on actions by another. The cost of living index became a tool to regulate this interdependence through its grip on the future, and allowed GM to have the confidence that the UAW would not strike whatever might come in terms of price increases, remaining true to the corporation's maxim of "don't stop the line!"

Sixty years later, the CPI/PCE/HICP index does not merely tell financial actors of how inflation is developing, information which they may use to adjust their portfolios. The fuller impact of inflation in our current political economy is a necessary, predictable response by monetary authorities. In this situation the double contingency is between central banks and markets. The CPI, PCE, and HICP have become tools to make central bank behavior predictable, for instance excluding the possibility that central bankers allow inflation to increase to facilitate a nation's servicing of its debt. The current regime falls short of a guarantee to financial actors about the preservation of the value of their assets, but it surely simplifies their calculations about what central banks might do.

Public numbers resolve the deadlock of mutual dependency and contingency by shaping expectations. Actors coordinate by committing themselves to behave in predictable ways toward a third entity, a public number. By virtue of their visibility and their "careers," battling objections and corrections and competitors, a number like the price index earns a unique authority: it is able to mean different things to different people and to be everyone's ally. The social system scaffolded by public numbers is not explained by observing how actors came to an accommodation through rounds of interactions and communication, forming expectations of (others') expectations (or reflexive expectations in the language of

sociology and Luhmann 1996) or through iterative expectations (or public knowledge in the language of game theory, Samet 1998; Golub and Morris 2017). The binding of future actions to public numbers makes it less important to consider and understand how one's counterparty views the future—their expectations. What begins to matter instead is how the actor's relationship with the public numbers will develop and how long that relationship might hold. The uncertainty engendered by mutual interdependence, by the imperatives of coordination, is reduced by actors binding themselves to normative relations to public numbers and through them to each other.

Notes

- 1 Public numbers are a bit more and a bit less than official statistics. They do not have to be statistics and they do not have to be state-issued. Markets produce public numbers; stock market prices and indices are one example, various indicators issued by NGOs are another. They are public because they are widely accessible. Some official statistics, such as some public health figures, are not widely accessible and they don't circulate beyond the networks of policy experts. Not every public number relates to public policy or economic expectations; the Richter scale score of an earthquake, the minimum and maximum temperature on a given day are public numbers but of little interest to this inquiry.
- 2 In this chapter, the terms "Great Britain," "United Kingdom" or UK, and "England" are used respectively to denote the specific part of the country commonly referred to today as the UK, as different legal and social contexts apply depending on the territory in question.
- 3 In 1853 Newmarch published a pamphlet, *The New Supplies of Gold*, which drew on his writings for the *Morning Chronicle* and included an appendix on gold coinage written by a governor of the Bank of England. Newmarch convinced his Statistical Society peer, Thomas Tooke, of the need to update his four-volume *History of Prices* of 1848. In 1857 two volumes were added, and as the ageing Tooke acknowledged, these were Newmarch's achievements. Further research by Newmarch on prices was reported to the Statistical Society of London in 1859, 1860, and 1861 (Kim 1997).
- 4 At the same time as these metrological projects were blossoming, the British Association for the Advancement of Science appointed Francis Edgeworth as secretary of a committee to investigate the best methods of measuring variations in the value of money. He presented in the years 1887–1889 three extensive memoranda to the Association. Edgeworth's article in Palgrave's *Dictionary of Economics* can be considered an abridgement of this "voluminous disquisition" (Kendall 1969).
- 5 In Germany, as in Britain, the financial press led the publication of cost-of-living indices, notably Robert Kuczynski, at the *Finanzpolitische Korrespondenz*. The index was reproduced in different newspapers but was mistrusted by employers. The situation changed after the First World War: "cost-of-living arguments became more central, and index numbers became a pervasive tool" (Tooze 2001, 91–93, cited in Teupe 2021) issued by state and regional statistical agencies, and competition from private individuals each offering their own, more independent, index.
- 6 As early as 1945, at the recommendation of a committee led by Wesley Mitchell, the BLS's price index was renamed the consumer price index, or CPI. When CPI began to appear in collective wage agreements like the one between GM and the UAW, it was already moving away from being a working family number. Later revisions, in particular those in 1964 and 1978 aimed to make the CPI more representative of all the population, not just wage-earners.
- 7 To justify the preference given to deflators, the Fed commends the "superlative" index formula, which avoids the upward bias of the "fixed basket" CPI due to changes in the consumption pattern, its more comprehensive set of expenditure weights, and its more consistent time series, since PCE is revisable and changes to statistical methods are retrospectively introduced to the series. Central bankers declare an interest in separating "short-term movements or noise in CPI statistics" from what they call "underlying or core inflation" (Smets 2006, 10), but core inflation remains an ambiguous concept that can mean the inflation common to several price classes or the trend or persistent component of inflation.

References

- Balk, Bert M. 2008. *Price and Quantity Index Numbers: Models for Measuring Aggregate Change and Difference*. Cambridge: Cambridge University Press.
- Barber, William J. 1985. *From New Era to New Deal. Herbert Hoover, the Economists, and American Economic Policy, 1921–1933*. Cambridge: Cambridge University Press.
- Blinder, Alan S. 2004. *The Quiet Revolution. Central Banking Goes Modern*. New Haven, CT: Yale University Press.
- Camba-Mendez, Gonzalo 2003. “The definition of price stability: choosing a price measure.” In *Background Studies for the ECB’s Evaluation of its Monetary Policy Strategy*, edited by Otmar Issing, 31–41. Frankfurt/Main: European Central Bank.
- Carey, James B. 1955. “How the CIO Evaluates the Bureau’s Work and Program.” *Monthly Labor Review* 78, no. 1: 36–37.
- Collins, Harry. 1992. *Changing Order: Replication and Induction in Scientific Practice*. Chicago, IL: University of Chicago Press.
- Coyle, Diane. 2015. *GDP: A Brief but Affectionate History*. Revised and expanded edition. Princeton, NJ: Princeton University Press.
- Deringer, William. 2018. *Calculated Values: Finance, Politics, and the Quantitative Age*. Cambridge, MA: Harvard University Press.
- Desrosières, Alain. 2015. “Retroaction: How Indicators Feed Back onto Quantified Actors.” In *The World of Indicators: The Making of Governmental Knowledge through Quantification*, edited by Johanna Mugler, Richard Rottenburg, Sally E. Merry, and Sung-Joon Park, 329–353. Cambridge Studies in Law and Society. Cambridge: Cambridge University Press.
- Espeland, Wendy Nelson, and Mitchell L. Stevens. 2008. “A Sociology of Quantification.” *European Journal of Sociology / Archives Européennes de Sociologie / Europäisches Archiv für Soziologie* 49, no. 3: 401–436.
- European Central Bank. 2005a. “Comparability of Statistics for the Euro Area, the United States and Japan.” *Monthly Bulletin*, April. URL: <https://www.ecb.europa.eu/press/economic-bulletin/mb/html/index.en.html>.
- European Central Bank. 2005b. “The Harmonised Index of Consumer Prices: Concept, Properties and Experience to Date.” *Monthly Bulletin*, July. URL: <https://www.ecb.europa.eu/press/economic-bulletin/mb/html/index.en.html>.
- European Central Bank. 2008. “Wage Indexation Mechanisms in Euro Area Countries.” *Monthly Bulletin*, May: 51–52.
- Friedman, Walter A. 2013. *Fortune Tellers: The Story of America’s First Economic Forecasters*. Princeton, NJ: Princeton University Press.
- Golub, Benjamin, and Stephen Edward Morris. 2017. “Higher-Order Expectations.” August 31, 2017. DOI: 10.2139/ssrn.2979089.
- Hawley, Ellis W. 1974. “Herbert Hoover, the Commerce Secretariat, and the Vision of an ‘Associative State,’ 1921–1928.” *Journal of American History* 61, no. 1: 116–140.
- Igo, Sarah E. 2008. *The Averaged American: Surveys, Citizens, and the Making of a Mass Public*. Cambridge, MA: Harvard University Press.
- International Labour Organization (ILO), International Monetary Fund (IMF), Organisation for Economic Co-operation and Development (OECD), Statistical Office of the European Union (Eurostat), United Nations (UN), The International Bank for Reconstruction and Development, and The World Bank. 2004. *Consumer Price Index Manual: Theory and Practice*. Geneva: International Labour Office.
- International Monetary Fund (IMF), International Labour Organization (ILO), Statistical Office of the European Union (Eurostat), United Nations Economic Commission for Europe (UNECE), Organisation for Economic Co-operation and Development (OECD), and The World Bank. 2020. *Consumer Price Index Manual: Concepts and Methods*. Washington, DC: International Monetary Fund.
- Jacoby, Sanford M. 1987. “The Development of Cost-of-Living Escalators in the United States.” *Labor History* 28, no. 4: 515–533. DOI: 10.1080/00236568700890291.
- Kendall, Maurice G. 1969. “The Early History of Index Numbers.” *Studies in the History of Probability and Statistics* 21. *Revue de l’Institut International de Statistique / Review of the International Statistical Institute* 37, no. 1: 1–12.

- Kim, Jinbang. 1997. "Newmarch, Cairnes and Jevons on the Gold Question and Statistics." *Journal of the History of Economic Thought* 19, no. 1: 49–70.
- Lichtenstein, Nelson. 1985. "UAW Bargaining Strategy and Shop-Floor Conflict: 1946–1970." *Industrial Relations: A Journal of Economy and Society*, 24: 360–381.
- Luhmann, Niklas. 1996. *Social Systems*. Palo Alto, CA: Stanford University Press.
- Mata, Tiago. 2018. "The Managerial Ideal and Business Magazines in the Great Depression." *Enterprise & Society* 19, no. 3: 578–609.
- Meany, George. 1955. "A Labor Appraisal of BLS Functions in the Collective Bargaining." *Monthly Labor Review* 78, no. 1: 34–35.
- Mennicken, Andrea, and Wendy Nelson Espeland. 2019. "What's New with Numbers? Sociological Approaches to the Study of Quantification." *Annual Review of Sociology* 45: 223–245. <https://www.annualreviews.org/content/journals/10.1146/annurev-soc-073117-041343>
- Newmarch, William. 1860. "On Methods of Investigation as Regards Statistics of Prices, and of Wages in the Principal Trades. Being the Programme Prepared by Request for the Section (IX) Commercial Statistics, of the Fourth Session (1860), of the International Statistical Congress Held in London in July, 1860." *Journal of the Statistical Society of London* 23, no. 4: 479–497.
- Peston, Maurice. 2012. "Ralph Turvey, Obituary." *The Guardian*, April 22, 2012. URL: <https://www.theguardian.com/business/2012/apr/22/ralph-turvey>.
- Popp Berman, Elizabeth, and Daniel Hirschman. 2018. "The Sociology of Quantification: Where Are We Now?" *Contemporary Sociology: A Journal of Reviews* 47, no. 3: 257–266.
- Porter, Theodore. (1995) 2020. *Trust in Numbers. The Pursuit of Objectivity in Science and Public Life*. Princeton, NJ: Princeton University Press.
- Reddell, Michael. 1999. "Origins and Early Development of the Inflation Target." *Reserve Bank of New Zealand Bulletin* 62, no. 3: 63–71.
- Samet, Dov. 1998. "Iterated Expectations and Common Priors." *Games and Economic Behavior* 24, nos. 1–2: 131–141. DOI: 10.1006/game.1997.0616.
- Sen, Amartya, Joseph Stiglitz, and Jean-Paul Fitoussi. 2009. *Report by the Commission on the Measurement of Economic Performance and Social Progress (CMEPSP)*. URL: https://www.researchgate.net/publication/258260767_Report_of_the_Commission_on_the_Measurement_of_Economic_Performance_and_Social_Progress_CMEPSP.
- Sloan, Alfred P. 1964. *My Years with General Motors*. New York: Doubleday Books.
- Smets, Jan. 2006. "Overview of the Workshop." *Ifc Bulletin* no. 24: 9–11. <https://www.bis.org/ifc/publ/ifcb24.pdf>
- Stapleford, Thomas. 2008. "Defining a 'Living Wage' in America: Transformations in Union Wage Theories, 1870–1930." *Labour History* 49, no. 1: 1–22.
- Stapleford, Thomas. 2009. *The Cost of Living in America: A Political History of Economic Statistics, 1880–2000*. Cambridge: Cambridge University Press.
- Teupe, Sebastian. 2021. "Inflation and the Negotiation of Wages. Comparative Responses to Monetary Changes in Germany and the United States during the Gold Standard Era, 1876–1926." *Labour History* 62, no. 1: 1–22.
- The Economist*. 1871. *Commercial History and Review of 1870: Appendix, Note On the Tables Subjoined*. March 11, 1871.
- Turvey, Ralph. 1989. *Consumer Price Indices: An ILO Manual*. Geneva: International Labour Office.
- Vanderstraeten, Raf. 2002. "Parsons, Luhmann and the Theorem of Double Contingency." *Journal of Classical Sociology* 2, no. 1: 77–92.
- Zuboff, Shoshana. 2019. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. London: Profile Books.



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PART 3

Expectation Formation across Time and Space



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19

CULTURES OF UNCERTAINTY AND ECONOMIC EXPECTATIONS

Eelke de Jong

Almost all human decisions are made with a view on what might happen in the future. This can be the near future: one drives to the office and expects to arrive there within half an hour. It can also be the distant future, as in the case of employees who pay pension premiums during the decades that they work in order to collect a pension after their retirement. In all cases, the future is unknown, so that a decision-maker has to investigate how the future might look in order to make an informed decision. The difference between risk and uncertainty is crucial for the way an agent can investigate the future (see Nützenadel and Streb, Chapter 8, and Huang and Spoerer, Chapter 20 in this volume).

Under risk, the future is unknown but the distribution of the possible outcomes is known. For example, when throwing a die, one knows from its physical structure that the chance of throwing a three is equal to one in six. Frank Knight calls this *a priori risk*. In other instances, the likelihood of a certain outcome can be based on the distribution of outcomes in the past; this is known as *statistical risk* (Knight [1921] 1971, 216, 224, 225). Calculating such a distribution requires the phenomenon to have happened quite frequently, so that the probability can be calculated on the basis of multiple observations. The distribution of bond yields in normal times is an example of a frequently occurring event which can be used to derive a distribution. Under risk, the mean of the distribution is the expected value. Risk is focused on a particular event, such as a particular equity's return over the next year. This expected yield can be calculated, using one's cognitive abilities to calculate expectations.

Some events do not happen that frequently, are fundamentally new, or are so far in the future that a distribution function of the possible outcomes cannot be derived and thus no probability can be calculated. For example, when a financial crisis hits markets, the distribution of returns will change, so that the previously calculated distribution is no longer valid (see for example Dungey and Martin 2007). Whereas during normal times returns on different types of assets can have negative correlations, during a crisis these correlations very quickly become positive and may even approach 1.0. A distribution function is also not available when a phenomenon is new. For example, at the end of 2021 no reliable information was available about the Omicron variant of the Covid-19 virus. Health authorities could not make reliable estimates of the expected number of people who would end up

in hospital or in an intensive care bed. These are examples characterized by uncertainty instead of risk. Uncertainty refers to situations in which no distribution function is available (Knight [1921] 1971) so that one cannot argue in terms of probabilities (Kay and King 2020). The term “uncertainty” in a Knightian sense and as understood by economists is equal to the concept of ambiguity in psychology.¹ Uncertainty is emotionally related to anxiety and both are diffuse feelings. Uncertainty has no probability distribution attached to it and anxiety has no object (Hofstede 2001, 148).

The way humanity copes with uncertainty depends on the source of the uncertainty. Uncertainty arising from nature can be reduced by technology. From a social science perspective, religion is a strategy used by humanity to deal with an uncertainty that we are unable to defend ourselves against. The present chapter discusses research on the different ways people deal with uncertainty that arises from interactions with others, and how it can be reduced by means of culture and institutions.

This chapter initially notes that economic activities are characterized by uncertainty and then presents the definitions of culture and institutions and the relation between the two. This is followed by a discussion of how trust might reduce uncertainty. The extent to which people dislike uncertainty has been found to differ between various countries, and an overview is provided of the empirical literature on the relation between the national degree of acceptance of uncertainty, as developed by Hofstede, and the institutions that regulate an economy. The penultimate section presents some exploratory thoughts about the consequences of difference in the acceptance of uncertainty for expectation formation, before some concluding remarks.

Culture, Institutions, and Uncertainty Avoidance

Transactions between economic agents are an important source of uncertainty. Economic exchanges are full of unknown elements: what is the quality of the product? Who guarantees the product’s quality? Is the buyer credit-worthy? Does the means of payment have any value? These and many other questions arise when people enter into transactions. Despite all these forms of uncertainty, people complete various transactions on a daily basis. Culture and institutions make these transactions possible.

There are various definitions of culture. Anthropologists tend to use very broad definitions such as “(t)hat complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society” (Tylor [1871] 1958, 1). A disadvantage of these broad definitions is that they refer to almost all aspects of life, so that it is difficult to disentangle the influence of a specific aspect. Economists therefore use narrower definitions such as “(t)he collective programming of the mind that distinguishes the members of one group or category of people from another” (Hofstede 2001, 9). This frequently-used definition sees culture as referring to the dominant values of a group. Dominant values are preferences which are held for a long time. Often, these preferences are the result of a long shared history. In empirical research, the group is often defined as the inhabitants of a nation. This need not be the case; a group can also refer to members of a certain occupation, age (e.g., youth culture), or region. “Culture” is intangible and can refer to unwritten rules or constraints on people’s behavior, but can also refer to preferences as broad tendencies of preferred states held by members of a group.²

In the literature, institutions can be formal and informal, and range from habits, codes of conduct, and legislation, to constitutions (see North 1990; Williamson 2000 for discussions

on institutions and their effects; Hodgson 2006, 2015). In this chapter we use the term “institutions” in the sense of formal institutions. These institutions (for example bylaws, laws, and constitutions) are (in theory) binding. This represents a clear distinction between (formal) institutions and culture, although the two are closely related.³ The institutional structure of a country is intimately related to people’s beliefs and “reflects the accumulated beliefs of the society over time” (North 2005, 49). In a similar manner, “cultural dimensions,” as will be discussed below, are formed over a long period and reflect societies’ answers to basic problems (Hofstede 2001, 29). A well-functioning institutional system is thus embedded in a corresponding system of preferences and beliefs. Moreover, the institutions of various sectors of society are expected to have a similar structure, and are thus complementary (Hall and Soskice 2001, 17–21). As a consequence, certain aspects of culture may be expected to correlate with the institutional structure of many sectors.

Trust

A transaction with a counterpart can be entered into because of trust in the other person or organization. This is known as *particularized trust* or *interpersonal trust*, and refers to the expectation of a partner’s reliability with respect to their obligations, predictability of behavior, and fairness in actions and negotiations when faced with the possibility of behaving opportunistically (Zaheer et al. 1998). This type of trust is formed through repeated interactions between the persons and/or organizations concerned.⁴

After a while, this form of trust may extend to third parties who have characteristics in common with the person one trusts, such as members of the extended family, or people belonging to the same kinship group. The Maghribi traders in the eleventh century demonstrate the role of trust in the economic performance of an extended group (see Greif 1994). These Jewish traders were involved in long-distance trade throughout the Mediterranean region. Efficient and successful long-distance trade requires trustworthy agents in different places. The Maghribi were part of the Jewish community, in which it is important to take care of each and every member. Moreover, social ties remained intact when a member migrated to another city. In this manner a network of trustworthy partners was created: even if one did not know a trader personally, someone in the network would know them. The trader involved was trusted because he was part of the Maghribi community. This example illustrates that a common ethnicity and religion can be instrumental in transforming interpersonal trust into trust in members of a larger group.

During the last decades, the Internet has facilitated connections between people, which has resulted in many different Internet groups. In this way, the social circles to which an individual can belong are expanded, which may lead to an extension of their trust radius. In a recent study, Zeng et al. (2023) use answers from different waves of the World Values Survey and the European Values Survey respectively to investigate whether particularized (bilateral) trust leads to generalized trust, meaning trust in unknown others.⁵ Based on a sample of over 100,000 individuals from 73 countries, the findings of the study show that the particularized trust of individuals significantly and positively influences their generalized trust.

Generalized trust has also been found to be related to the fairness and effectiveness of state institutions, such as the judiciary, the police, and parliament (Sønderskov and Dinesen 2016, 181). It appears to be positively related to two measures of the separation of powers: constraints on the executive and an independent judiciary system (Knack and Keefer 1997).

Similarly, Zak and Knack (2001) find that trust is positively correlated with an index of investor rights, an index of property rights, and the Transparency International Index of perceptions of corruption. Beugelsdijk (2006) undertook a principal components analysis on trust and measures of formal and informal institutions. He found that trust correlates highly with measures of institutional functionality, such as contract enforceability and lack of corruption. From this he concluded that a country's score on generalized trust is an indicator for the quality of its institutions. We trust each other because we know that in case of conflicts we can rely on independent judges, according to Beugelsdijk.

To summarize, trust is an expectation in relation to the behavior of others. Particularized trust refers to an expectation of behavior in relation to a particular person one knows and has probably dealt with in the past. If one trusts a person then one expects the person to act in the way agreed upon. In the case of generalized trust, the expectation of a predictable behavior is extended to unknown others. Trust thus reduces uncertainty. Generalized trust is found to be related to the quality of institutions, so that indirectly, institutions of high quality may reduce uncertainty. As a consequence, institutions themselves can be uncertainty-reducing mechanisms. What, then, is the nature of the relationship between uncertainty and institutions?

Uncertainty Avoidance, Institutions, and Economic Outcomes

The aim of institutions is to reduce uncertainty resulting from human interaction by providing structure in everyday life (North 1990, 3 and 6). This section discusses empirical research examining how the extent to which institutions in a given nation reduce uncertainty is related to the extent to which the inhabitants of that nation want to avoid uncertainty.

A central theme in economics is the best way to coordinate the transactions between economic agents. The degree to which an individual is exposed to uncertainty depends on the way an economy is organized. Schematically, we can distinguish between liberal market economies, coordinated or network economies, and hierarchical economies. In a liberal market economy, a lot of uncertainty is transferred to the individual. In a coordinated market economy, agreements are often organized through representative organizations (employer and employee associations respectively, for example). In hierarchical economies, the state intervenes directly and thus reduces uncertainty.⁶ Of these three types of economies, the liberal market society exposes its inhabitants to the highest degree of uncertainty. For each society, the political and economic system will only be stable insofar as it is legitimized by the dominant beliefs in the country concerned.⁷ If this is the case, then societies that are dominated by market forces are likely to have less aversion to uncertainty than societies in which other coordination mechanisms, such as cooperation and control, are important.

Most empirical studies on economic institutions and attitudes toward uncertainty use Hofstede's cultural dimension theory, a framework used to understand the differences in cultures across countries. Specifically, they reference the cultural dimension of Uncertainty Avoidance (Hofstede 2001): the extent to which a country, society, or group is able to tolerate uncertainty. This measure is constructed from the national means on questions related to stress, rule orientation, and employment stability. The original scores of these dimensions were based on answers from an international survey of more than 100,000 IBM employees. At the national level, a higher level of stress was associated with a stronger likelihood of compliance with rules and a preference for remaining with the company.⁸ The

questions were: (a) Do you agree with the statement that company rules should not be broken, even if the employee thinks it is in the company's best interest?; (b) Do you intend to stay with the company (1) for two years at most, or (2) from two to five years?, and (c) How often do you feel nervous or tense at work? The national means of the answers to these questions were used for calculating an index—a "cultural dimension"—which Hofstede labelled "Uncertainty Avoidance" (Hofstede 2001, 150). Nowadays the equivalent scores are available for more countries and are based on answers to questions from the World Values Survey (Hofstede et al. 2010). A 2015 replication used data from the World Values Survey and the European Values Survey and found that national scores over time hardly change (Beugelsdijk et al. 2015).⁹ Hofstede's cultural dimension represents the concept of uncertainty better than the corresponding dimensions developed by the GLOBE team (see House et al. 2004). According to Venaik and Brewer (2010), GLOBE's measure refers to the extent to which members of a collective seek orderliness and formal procedures, whereas Hofstede's measure references the idea of uncertainty as ambiguity.¹⁰

Table 19.1 lists the Uncertainty Avoidance scores for certain countries. The list illustrates that within a group of Western countries, the Latin European countries have a high score for Uncertainty Avoidance, whereas the Anglosphere tends to score on the low side. The scores of the coordinated market economies are mostly in the middle. Latin American countries score mostly high on Uncertainty Avoidance, whereas Asian countries tend to have low scores.

In total, Hofstede identified six cultural dimensions. In order to obtain an idea of the content of the identified cultural dimensions, Hofstede studied the correlation of each of his dimensions with data from other studies. These investigations found that inhabitants of countries scoring low on Uncertainty Avoidance are tolerant of ambiguity in structures and procedures, and thus open toward new events, ideas, and people. They teach their children that the world is benevolent, and expose them to unknown situations (Hofstede 2001, exhibit 4.6). They prefer tasks with an uncertain outcome which require problem solving, and are open to change. Inhabitants of countries scoring high on Uncertainty Avoidance prefer structured and formalized environments. Anything different is considered dangerous, and the majority prefers solving problems with one certain outcome along with detailed instructions. In sum, in countries scoring low on Uncertainty Avoidance a majority prefers taking the initiative and participating in activities with an uncertain outcome. In countries scoring high on this dimension, a majority prefers to be guided by others and fears failure.

Table 19.1 National scores on uncertainty avoidance

<i>Country</i>	<i>Score</i>	<i>Country</i>	<i>Score</i>
Greece	112	Finland	59
Portugal	104	Switzerland	58
Guatemala	101	The Netherlands	53
Belgium	94	Canada	48
Japan	92	United States	46
Spain	86	Great Britain	35
France	86	Sweden	29
Italy	75	Denmark	23
Germany	65	Singapore	8
Mean of 53 countries	65	Standard deviation of 53 countries	24

In accordance with the institutional complementarity idea mentioned above, the differences in accepting uncertainty are found to correlate with institutions in various sectors. Below, results are shown for the financial system, labor markets, investments, and types of manufacturing. The results for each sector are exemplified through a comparison of the situation in Germany with that in the United States (US). Within the group of rich countries, Germany scores relatively high on Uncertainty Avoidance. Thus, a comparison between these two countries can provide insights into the difference in attitudes toward uncertainty both in national economic institutions and in attitudes and expectations.¹¹

Financial Systems

Differences in financial systems can be described by referring to two paradigms: the bank-based model, also known as network finance, and the market-based model. In reality, all systems are a mixture of both types. In a bank-based model, banks or other intermediaries play an important role. Banks obtain money from individuals who have savings or deposit accounts with them, and lend this money to companies and private individuals (for example, through mortgages) by means of loans. Both the interest rates on savings deposits and those on loans are fixed for a certain time. The banks will scrutinize the creditworthiness of the borrowers, creating a close relationship with their clients. In a market-based financial system, savers invest in bonds and equity, which are traded on a market. The investors do not have any relation with the borrower (the company in whose name the bond or equity has been issued). In order to guarantee fair play, the borrowing company is obliged to inform all investors at the same time about relevant information concerning the company's performance. Moreover, legally the rights of shareholders are emphasized more than in the bank-based system. Firms obtain finance by issuing bonds and equity. The banks' main function is to operate as the organizer of trade. The return on many investments is determined by markets, where prices can be very volatile, so that the return on investments is also volatile. The relation between banks and customers is an arm's length relationship.

An important distinction between the two types of financial systems concerns the fluctuation in returns and the closeness of the ties between partners. Consequently, we would expect that the institutional set-up of a market-based financial system, with a high level of protection of shareholder rights and of stock market capitalization, would correlate negatively with the corresponding country's score on Uncertainty Avoidance. This hypothesis is confirmed by all empirical studies in this field (e.g. de Jong and Semenov 2004; Kwok and Tadessa 2006; Aggarwal and Goodell 2010; Lavezolo et al. 2018). De Jong and Semenov's study ran regressions for two groups of countries, Western and non-Western. The Western countries were found to be more individualistic than the non-Western countries, but for both groups, Uncertainty Avoidance has a negative correlation with indices of a market-based financial system.

The German financial system is bank-based with many local banks, known as *Sparkassen* and *Volksbanken*. These banks have strong ties with the local population. The US system is market-based. The difference between the two can be found in aggregate numbers such as stock market capitalization and private credit offered by banks as a percentage of GDP (see the World Bank, Global Financial Development Database). Moreover, the conditions attached to German mortgage loans are stricter. In Germany it is forbidden to use mortgage loans for other investments than buying a house and

borrowers incur a fee in case of early repayment, whereas neither of these actions incurs any sanctions in the US.

Investments by Private Persons and Investment Funds

Since Uncertainty Avoidance is associated with a negative attitude toward all things foreign and unknown,¹² we would expect inhabitants of uncertainty-avoidant countries to invest less in foreign markets. The phenomenon of investors investing less in foreign markets than is optimal is known as home bias; we would expect home bias to be larger for countries scoring higher on Uncertainty Avoidance.

Several empirical studies confirm that Uncertainty Avoidance is positively correlated with the home bias in investments. Anderson et al. (2011) studied equity fund holdings at year-end 2006 for more than 37,000 investment institutions from over 60 countries that in turn held securities from more than 80 countries. They found that investment funds from countries characterized by high Uncertainty Avoidance scores had a greater home bias and were less diversified in their foreign holdings (Anderson et al. 2011, table 4). Tang and Zhou (2022) found similar results for investments from 51 countries over the period 2001–2018.¹³ Beugelsdijk and Frijns (2010) analyzed the investments of mutual funds for 26 countries investing in a broader sample of 48 countries. They found that countries scoring high on Uncertainty Avoidance invested less in foreign assets. The magnitude of the effect can be large. In the study by Anderson et al. (2011), a 10-point increase in Uncertainty Avoidance (measured as an index number between 0 and 120) corresponded to a 1.3–5.4 percent increase in the observed home bias for the entire sample. It was even greater for countries not belonging to the largest ten investor countries and in emerging markets.

Investments in foreign debt securities are also lower for investors from countries with high Uncertainty Avoidance scores (Pradkhan 2016). The magnitude of the bias against foreign investments is similar to that found by Beugelsdijk and Frijns (2010).¹⁴ Erdogan (2014) finds that the discouraging effect of distance as a perception of unfamiliarity increases with Uncertainty Avoidance.

Venture capital is one of the riskiest forms of investment. It concerns providing money for startup companies and small businesses with a high potential for growth. Due to the high level of risk involved with this type of capital, we would expect venture capital to be less available in countries scoring high on Uncertainty Avoidance. Tran et al. (2016) confirm this hypothesis for a sample of eleven Asian countries over the period 2003–2012.

If Uncertainty Avoidance influences investor behavior, we would expect the attitude toward uncertainty to affect the prices of assets. The equity premium (the difference between the average return on stocks and bonds) is a good measure of the extra reward for uncertainty. Rieger and Wang (2012) found that the equity premium is higher in high uncertainty-avoiding countries. They used laboratory experiments to arrive at a measure of ambiguity aversion (we may recall that ambiguity is the term used by psychologists for uncertainty). The coefficient of Uncertainty Avoidance becomes insignificant when this measure of ambiguity aversion is added to the regression (see Rieger and Wang 2012, table 3). Apparently, the two variables measure similar concepts; thus Rieger and Wang conclude that “uncertainty avoidance as a cultural dimension appears to affect the size of the equity premium through ambiguity aversion attitude” (Rieger and Wang 2012, 70).

German investors are known for preferring fixed-term investments, whereas the Americans tend to be prepared to gamble on risky, and hence hopefully more profitable investments. Data collected by the Organisation for Economic Cooperation and Development (OECD) confirm this difference. Relative to American households, German households hold a larger part of their financial assets in safe assets such as currency and deposits and less in risky ones, such as securities, shares, and equity.¹⁵

Labor Markets

The characteristics of labor markets are separated into three groups: regulation, governance, and type of contracts. Regulation governs labor contracts on areas such as fixed versus flexible contracts, minimum wages, the number of months' notice required before termination of employment, and the number of months of salary given to workers as severance pay upon dismissal. These regulations provide certainty for the individual employee, constrain market forces, and aim at protecting the rights of the weaker party. As a result, we would expect labor market regulation to be more restrictive in countries that score high on Uncertainty Avoidance. Empirical research for the 1980s confirms a positive relation between Uncertainty Avoidance and the strictness of labor market regulation, such as employment protection, the number of months' notice before termination of an employment contract, and the number of months' salary offered to workers as severance pay upon dismissal (see de Jong 2009, table 5.2).

Labor market governance has two aspects: the degree of centralization of wage bargaining and the degree of corporatism. Bargaining can be at the level of the firm, the industry, or the nation. Corporatism is a form of coordination across occupations and industries that involves the government and organizations representing economic activities, mostly labor federations and employers' associations. Corporatism includes a high degree of centralization and adds interaction and coordination with and through the government. This tripartite cooperation is more likely if the parties (a) trust each other, (b) appreciate predictability and certainty, (c) seek to avoid competition and conflict, and (d) discount the future less. In high uncertainty-avoidant societies, it is difficult to generate trust, as Uncertainty Avoidance is associated with an aversion to ambiguity. Trust implies the acknowledgment of ambiguity, in that some decisions are given over to another party, and it requires an acceptance of potential loss of control. On the other hand, these societies value predictability and certainty, so that in sum the association between the degree of corporatism and Uncertainty Avoidance is ambiguous. Regression analyses reveal a positive correlation between Uncertainty Avoidance and the degree of centralization of wage bargaining and cooperation between trade unions and employees' associations (de Jong 2009, table 5.3). Apparently, in countries scoring high on Uncertainty Avoidance the wish to reduce uncertainty outweighs the potential lack of trust.

The German labor market is known for its long-term relationships between employers and employees. Apprenticeships and vocational training form important elements of the educational system, and employees are relatively well protected. In the US, people acquire a lot of general skills but fewer specific skills for a particular job or industry. There tends to be a high turnover of employees, based both on employee decisions and on the fact that employers can easily and quickly fire staff. The difference between Germany and the US is illustrated by their scores on the strictness of employment protection. Germany has one of the highest scores of the OECD countries, whereas the score for the US is almost zero,

indicating that employment protection is practically lacking.¹⁶ This difference still holds, although since 2000 the German labor market has been reformed and employment protection weakened (Delsen 2022).

Types of Product Produced

Capital and labor are used for producing goods and services. As a consequence, one may expect that the structure of the financial system and of the labor market will have an influence on the structure of the production sector of the economy. In the previous sections, we have argued that the attitude toward uncertainty is important for the systems of production factors: capital and labor. Uncertainty is high where production concerns the creation of an entirely new product (whereby this product can be a good or a service). Based on this reasoning, we would expect that countries in which uncertainty is accepted relatively easily would have a larger proportion of innovation. Two types of innovation can be distinguished: incremental innovation and radical innovation. Incremental innovation consists of the improvement of existing products. Since many aspects of the product and production process are known, incremental innovation is not associated with a lot of uncertainty. Radical innovation is the design of an entirely new product, such as the Internet, Internet-related products, and artificial intelligence. Radical innovation is associated with a high level of uncertainty. Consequently, we would expect the importance of radical innovation to be higher in countries scoring low on Uncertainty Avoidance. All studies (e.g. Shane 1995; Efrat 2014; Strychalska-Rudzewicz 2016; and those listed in Table 19.1 of Andrijauskienė and Dumčiuvienė 2017) except for Rinne et al. (2012), find a negative correlation between Uncertainty Avoidance and innovation.¹⁷

The level and type of innovation will influence the production process and what is produced. One may expect that countries with a high level of innovation and in particular a high level of radical innovation, will produce and export a relatively high number of goods with a high innovative content. A previous section showed that the financial means for investing in innovative processes, such as venture capital, are widely available in countries scoring low on Uncertainty Avoidance. These countries have financial systems dominated by markets. Svaleryd and Vlachos (2005) confirm the relation between national financial systems that are market-based and a high innovative content of the products made.

The previous sections nicely illustrate the institutional complementarity hypothesis of the “varieties of capitalism” literature. Countries scoring low on Uncertainty Avoidance have well-developed capital markets, relatively high amounts of venture capital available, flexible labor markets, high levels of radical innovation, and create products with a high level of innovative content.

Germany is well known for its *Mittelstand*, which develops many incremental innovations in the products of their various specialization. Its car industry is well known for its high quality. However, it missed the turn toward the production of electric cars and the workers are still very resistant toward changing course because of the fear of losing their jobs (see Volkswagen). In the US, one individual (Elon Musk) can mobilize money and talent to successfully develop and produce electric cars (Tesla).

Inflation

Inflation has various aspects that are related to uncertainty (Bernanke and Mishkin 1997, 106). It is this uncertainty which distorts the economic process in several ways (see

D'Acunto and Weber, Chapter 7, and Hesse, Knake, and Lehmann-Hasemeyer, Chapter 23 in this volume). First, long-term investments are hindered because the time horizon of economic agents is shortened (see, for example, Tommasi 1999, 403), and a risk premium is demanded which increases the real cost of funds. Secondly, uncertainty about future inflation may increase the attractiveness of real as opposed to nominal assets because the former provide a hedge against inflation. As a consequence, inflation hurts those groups most who are not able to hedge themselves against the risk of rising prices. In general, these groups are the poor, so that inflation leads to a more unequal distribution of income in a country (Bulir and Gulde 1995; Romer and Romer 1998). Finally, inflation is likely to distort the relative price signals, especially when inflation is high and variable. Since inflation creates uncertainty, one would expect that countries scoring high on Uncertainty Avoidance would strive for low inflation rates. De Jong (2002) finds this negative correlation between Uncertainty Avoidance and inflation for a group of 17 OECD countries.

The difference in inflation rates between Germany and the United States and the different mandates of their central banks reflect the difference in uncertainty acceptance. The average inflation rate over the period 1960–1999 was 3.17 percent in Germany and 4.50 percent in the United States.¹⁸ During this period the Bundesbank set its monetary policy independently. From 2000 onward, it was a partner in the European Central Bank (the euro system) and has therefore had to establish a joint policy with the other members, but at time of writing the inflation rate in Germany is still lower than in the United States, 1.39 percent versus 2.12 percent. The primary mandate of the Bundesbank was to control inflation. Due to German pressure, the European Central Bank (ECB)'s primary mandate is also to safeguard "stable prices." Inflation control is only one of the aims of the US Federal Reserve System. Since 1977 it has also been required to aim for maximum employment and moderate long-term interest rates (Binder and Spindel 2017, 174).

Uncertainty Avoidance and Expectations

The previous sections discussed the relation between the degree of accepting uncertainty, economic institutions, and economic outcomes. What does this mean for expectations? In what sense are expectations different in countries with a high versus a low level of Uncertainty Avoidance? As far as this author is aware, no systematic research exists which in a rigorous way examines the relation between uncertainty and expectation formation. Here, I consider some exploratory thoughts.

Expectations refer to the way agents see the future. Their view on the future will depend on the context in which they live. We have seen that a high level of uncertainty acceptance is associated with an important role for financial markets. In high uncertainty-accepting societies, bonds and equities are intensively traded. The actors' attention will be directed to these financial products and they are inclined to consider investing in them. During this process they will make a judgment as to the attractiveness of investing in these products instead of holding a deposit with a bank. Since many people in such societies invest in financial products, the barrier to following a similar strategy is low. Moreover, chances are high that some of these investors will claim that they have made large profits in the past, so that not investing in equities is presented as equivalent to robbing yourself of income. These types of arguments are especially frequently heard during boom periods. But even during busts, people may be encouraged to invest in risky assets, on the basis that the latter are now so cheap that buying them now will bring a high return in the future.

In countries scoring high on Uncertainty Avoidance and thus with less developed financial markets, the arguments are inverted. During a boom, people will tend to stress that the profits of investing in equity are high now, but beware: in the future a bust will come and then chances are high that the investor will lose some or all of their money. In high uncertainty-avoidant countries, the emphasis tends to be on past negative experiences. During busts, the same people will claim that they were right; investors in equity should be prepared to lose on their investment. Better to invest in deposits with a bank in order to protect your wealth.

With respect to innovation, it is likely that in high uncertainty-avoidant countries people will see the improvements that can be made to existing products (for example, traditional combustion-engine cars). However, they tend to dislike the uncertainty associated with radically different products such as the Internet and electric cars. Since this aversion is common to most people in the country, finance for investments in radical innovation is scarce and thus the barriers to developing radical innovations are high. In uncertainty-accepting countries, people are more likely to see radically new products as opportunities to improve their situation, often in the sense of making high profits.

The discussion above illustrates that people in all categories form their expectations in accordance to their view of the world, irrespective of whether they are laypeople, politicians, or social scientists (see de Jong (ed.) 2022). If they are uncertainty-avoiding, they will be inclined to stress the possible negative consequences of a decision. In practice, this means that in high uncertainty-avoidant countries, there will be a negative expectation in relation to risky investments such as equities and radical innovations.

Concluding Remarks

Expectations are based on the assumption that reality has a certain structure and that this structure is known to a reasonable extent. However, in some situations this assumption breaks down. Frank Knight introduced the term uncertainty for situations in which the distribution of possible outcomes is unknown and it is thus impossible to calculate an expected outcome. Institutions and cultures can reduce uncertainty.

This chapter has reviewed research on the role of culture and institutions for regulating uncertainty. Trust is an important mechanism for reducing uncertainty in respect to the behavior of others. Particularized trust—trust in people one knows personally—is found in almost all countries. Generalized trust, that is, trust in unknown others, is high in countries with a high quality of institutions. The extent to which institutions reduce uncertainty, however, also depends on the acceptance of uncertainty by the majority of people in a country. Expectations are often projections of a perceived present and the past into the future. Consequently, the dominant expectations in a country will reflect the institutional structure and the underlying attitude toward uncertainty. We would expect that in countries scoring high on Uncertainty Avoidance, people will expect difficulties when encountering the unknown, such as very innovative ideas, foreigners, foreign countries, and foreign products. Inhabitants of countries scoring low on Uncertainty Avoidance will emphasize the new possibilities and opportunities offered by unknown avenues.

Under uncertainty, forming expectations, in the sense of calculated guesses about the future, is impossible. In this situation it may be better to rely on scenarios potentially covering different future trajectories, as Shell did in the 1960s and 1980s (Kay and King 2020, 222–223). These scenarios can be used to construct narratives, which in turn can

help in decision making. Except for group decisions during crises, little is known about decision-making under uncertainty and about the role Uncertainty Avoidance plays in this respect. Future research is recommended in this area, possibly using large datasets if the latter contain questions related to both uncertainty and expectations. Another route could be the collection of economic actors' narratives about the future that form a basis for their decision-making. The anthropological approach followed by Beuving (2023) might be considered an example of this kind of research.

Notes

- 1 Recently, Kay and King (2020) add the adjective “radical” to uncertainty. In essence their definition of radical uncertainty is the same as that of uncertainty and thus the adjective is in my view superfluous.
- 2 Examples of definitions of culture as preferences are: culture as “the systematic variation in preferences or beliefs as across either socially or geographically differentiated groups” (Fernández and Fogli 2009, 147) and “a system of attitudes, values, and knowledge that is widely shared within a society and transmitted from generation to generation” (Inglehart 1997, 15). Inspired by these definitions, de Jong (2009) distinguishes between culture as preferences and culture as constraints.
- 3 For an extensive overview see Alesina and Giuliano (2015).
- 4 Close relationships can also lead to malfeasance (Granovetter 1985).
- 5 In empirical studies, trust in unknown others is measured by the percentage of respondents who positively answer the question “Generally speaking, would you say most people can be trusted, or that you cannot be too careful in dealing with other people?” This question is from the World Values Survey and has been widely used and criticized. An important element of criticism is the ambiguous content of “most people can be trusted” versus “you cannot be too careful in dealing with other people.” For more discussion on this issue see Beugelsdijk (2006), notes 1 and 2.
- 6 This distinction originates from the “varieties of capitalism” literature, see Hall and Soskice (2001) and Schneider and Soskice (2009), and is applied in de Jong (2022).
- 7 See Inglehart (1997, 15): “Any stable economic or political system has a compatible and supportive cultural system which legitimates that system.”
- 8 Note that these relations are found for the *means* at the national level, not for the answers of individuals. It thus indicates a society-wide phenomenon and implies that in a society where one of these issues is important the other two are also important; it is a score for the group. High Uncertainty Avoidance at the national level does not imply that at the individual level a person who wants to stay with the firm faces a high stress level and wants rules to be followed. See Hofstede (2001, 150).
- 9 See Beugelsdijk et al. (2015, table 2, 232) for the questions used.
- 10 The rule orientation is also part of Hofstede's index but less so. His index distinguishes itself from GLOBE's in that it emphasizes stress (Venaik and Brewer, 2010, 1306). Another disadvantage of the GLOBE study is that it delivers two versions of each cultural dimension, namely the “as is” and the “should be” index, which they label as practices and values. The correlation between Hofstede's Uncertainty Avoidance index and the “as is” respectively “should be” index of GLOBE is -0.69 respectively 0.28 (Venaik and Brewer, 2010, table 3). See *Journal of International Business Studies* 37, no. 6 for a discussion about the pros and cons of Hofstede's and GLOBE's studies.
- 11 Of course, an example can only provide a rough sketch of the differences and other factors also play a role. Hofstede (2001, 153) finds that within Europe the attitude toward uncertainty and that toward hierarchy are closely related. The Latin European countries have inherited from the centralized, structured Roman Empire an acceptance of both strong hierarchy and Uncertainty Avoidance (see Hofstede 2001, 150). Consequently, for these countries the effects of one of these two can hardly be disentangled from the effect of the other. This is an additional reason to choose Germany as a representative of a rich country with a relatively high level of Uncertainty Avoidance. De Jong et al. (2006) argue that circumstances (destroyed infrastructure after the Second World War, for example) or a dominant view can trump the effect of culture.

- 12 Hofstede et al. (2010), entitle the chapter on Uncertainty Avoidance as “What is Different is Dangerous.”
- 13 They use data from the International Monetary Fund’s Coordinated Portfolio Investment Survey.
- 14 See Pradkhan (2016, 298).
- 15 <https://data.oecd.org/hha/household-financial-assets.htm>, accessed July 31, 2023.
- 16 See OECD https://stats.oecd.org/Index.aspx?DataSetCode=EPL_OV.
- 17 The study by Rinne et al. uses the Global Innovation Index as a proxy for countries’ degree of innovativeness. This index is very broad as it contains measures for input as well as output into innovative activities, so that it might be too broad a measure to find meaningful results.
- 18 The inflation rates are from OECD (2023), “Prices: Consumer Prices,” Main Economic Indicators (database), DOI: 10.1787/0f2e8000-en (accessed on August 12, 2023).

References

- Aggarwal, Raj, and John W. Goodell. 2010. “Financial Markets versus Institutions in European Countries: Influence of Culture and Other National Characteristics.” *International Business Review* 19: 502–520.
- Alesina, Alberto, and Paola Giuliano. 2015. “Culture and Institutions.” *Journal of Economic Literature* 53, no. 4: 898–944.
- Anderson, Christopher W., Mark Fedenia, Mark Hirschey, and Hilla Skiba. 2011. “Cultural Influences on Home Bias and International Diversification by Institutional Investors.” *Journal of Banking and Finance* 35: 916–934.
- Andrijauskienė, Meda, and Daiva Dumčiuvienė. 2017. “Hofstede’s Cultural Dimensions and National Innovation Level.” *DIEM: Dubrovnik International Economic Meeting* 3, no. 1: 189–205.
- Bernanke, Ben S., and Frederic S. Mishkin. 1997. “Inflation Targeting: A New Framework for Monetary Policy?” *Journal of Economic Perspectives* 11, no. 2: 97–116.
- Beugelsdijk, Sjoerd. 2006. “A Note on the Theory and Measurement of Trust in Explaining Differences in Economic Growth.” *Cambridge Journal of Economics* 30: 371–387.
- Beugelsdijk, Sjoerd, and Bart Frijns. 2010. “A Cultural Explanation of the Foreign Bias in International Asset Allocation.” *Journal of Banking and Finance* 34: 2121–2131.
- Beugelsdijk, Sjoerd, André van Hoorn, and Robbert Maseland. 2015. “Are Scores on Hofstede’s Dimensions of National Culture Stable Over Time? A Cohort Analysis.” *Global Strategy Journal* 5: 223–240.
- Beuving, Joost. 2023. *Theorizing Entrepreneurship*. New York: Berghahn Books.
- Binder, Sarah, and Mark Spindel. 2017. *The Myth of Independence: How Congress Governs the Federal Reserve*. Princeton, NJ and Oxford: Princeton University Press.
- Bulir, Ales, and Anne-Marie Gulde. 1995. “Inflation and Income Distribution: Further Evidence on Empirical Links.” IMF Working Paper 95/86, International Monetary Fund, Washington, DC. DOI: 10.5089/9781451850826.001.
- de Jong, Eelke. 2002. “Why Are Price Stability and Statutory Independence of Central Banks Negatively Correlated? The Role of Culture.” *European Journal of Political Economy* 18, no. 4: 675–694.
- de Jong, Eelke. 2009. *Culture and Economics: On Values, Economics and International Business*. London: Routledge.
- de Jong, Eelke, ed. 2022. *Economic Ideas, Policy and National Culture: A Comparison of Three Market Economies*. London: Routledge.
- de Jong, Eelke, and Radislav Semenov. 2004. “A Theory on the Cultural Determinants of Stock Market Development: Its Strength and Limits.” Unpublished manuscript, Radboud University, Nijmegen.
- de Jong, Eelke, Roger Smeets, and Jeroen Smits. 2006. “Culture and Openness.” *Social Indicators Research* 78: 111–136.
- Delsen, Lei. 2022. “Three Varieties of Labour Markets: Three Varieties of Human Flourishing.” In *Economic Ideas, Policy and National Culture: A Comparison of Three Market Economies*, edited by Eelke de Jong, 97–121. London: Routledge.
- Dungey, Mardi, and Vance L. Martin. 2007. “Unraveling Financial Market Linkages during Crises.” *Journal of Applied Econometrics* 22, no. 1: 89–119.

- Efrat, Kalanit. 2014. "The Direct and Indirect Impact of Culture on Innovation." *Technovation* 34: 12–20.
- Erdogan, Burcu. 2014. "The Role of Uncertainty Avoidance in Foreign Investment Bias." Research Papers in Economics 2014–15. Trier: University of Trier. URL: <https://ideas.repec.org/p/trr/wpaper/201415.html>.
- Fernández, Raquel, and Alessandra Fogli. 2009. "Culture: An Empirical Investigation of Beliefs, Work and Fertility." *American Economic Journal: Macroeconomics* 1, no. 1: 146–177.
- Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 19, no. 3: 481–510.
- Greif, Avner. 1994. "Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies." *The Journal of Political Economy* 102, no. 5: 912–950.
- Hall, Peter A., and David Soskice, eds. 2001. *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford: Oxford University Press.
- Hodgson, Geoffrey M. 2006. "What are Institutions?" *Journal of Economic Issues* 15, no. 1: 1–25.
- Hodgson, Geoffrey M. 2015. "On Defining Institutions: Rules Versus Equilibria." *Journal of Institutional Economics* 11, no. 3: 497–505.
- Hofstede, Geert. 2001. *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations*. 2nd ed. Beverly Hills, CA: Sage Publications.
- Hofstede, Geert, Gert Jan Hofstede, and Michael Minkov. 2010. *Cultures and Organizations: Software of the Mind*. New York: McGraw-Hill USA.
- House, Robert J., Paul J. Hanges, Mansour Javidan, Peter W. Dorfman, and Gupta Vipin, eds. 2004. *Culture, Leadership and Organizations: The Globe Study of 62 Societies*. London: Sage Publications.
- Inglehart, Ronald. 1997. *Modernization and Postmodernization: Cultural, Economic and Political Change in 43 Societies*. Princeton, NJ: Princeton University Press.
- Kay, John, and Mervin King. 2020. *Radical Uncertainty: Decision-Making for an Unknowable Future*. London: The Bridge Street Press.
- Knight, Frank H. (1921) 1971. *Risk, Uncertainty and Profit*. Boston, MA and New York: Houghton Mifflin Company.
- Kwok, Chuck C.Y., and Solomon Tadesse. 2006. "National Culture and Financial Systems." *Journal of International Business Studies* 37: 227–247.
- Lavezzolo, Sebastián, Carlos Rodríguez-Lluesma, and Marta M. Elvira. 2018. "National Culture and Financial Systems: The Conditioning Role of Political Context." *Journal of Business Research* 85: 60–72.
- North, Douglass C. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.
- North, Douglass C. 2005. *Understanding the Process of Economic Change*. Princeton, NJ: Princeton University Press.
- Pradkhan, Elina. 2016. "Impact of Culture and Patriotism on Home Bias in Bond Portfolios." *Review of Management Science* 10: 265–301.
- Rieger, Marc O., and Mei Wang. 2012. "Can Ambiguity Aversion Solve the Equity Premium Puzzle? Survey Evidence from International Data." *Finance Research Letters* 9: 63–72.
- Rinne, Tiffany, Daniel G. Steel, and John Fairweather. 2012. "Hofstede and Shane Revisited: The Role of Power, Distance and Individualism in National-Level Innovation Success." *Cross-cultural Research* 46, no. 2: 91–108.
- Romer, Christine D., and David H. Romer. 1998. "Monetary Policy and the Well-Being of the Poor." Working Paper no. 6793, National Bureau of Economic Research, Cambridge, MA.
- Schneider, Ben R., and David Soskice. 2009. "Inequality in Developed Countries and Latin America: Coordinated, Liberal and Hierarchical Systems." *Economy and Society* 38, no. 1: 17–52.
- Shane, Scott. 1995. "Uncertainty Avoidance and the Preference of Innovation Championing Roles." *Journal of International Business Studies* 26, no. 1: 47–68.
- Sønderskov, Kim Mannemar, and Peter Thisted Dinesen. 2016. "Trusting the State, Trusting Each Other? The Effect of Institutional Trust on Social Trust." *Political Behavior* 38: 179–202.
- Strychalska-Rudzewicz, Anna. 2016. "The Impact of National Culture on the Level of Innovation." *Journal of Intercultural Management* 8, no. 1: 121–145.

- Svaleryd, Helena, and Jonas Vlachos. 2005. "Financial Markets, the Pattern of Industrial Specialization and Comparative Advantage: Evidence from OECD Countries." *European Economic Review* 49, no. 1: 113–144.
- Tang, Ximmeng, and Xiaoguang Zhou. 2022. "Uncertainty Avoidance and Investment Underdiversification." *PLoS One* 17, no. 8: e0272222. DOI: 10.1371/journal.pone.0272222.
- Tommasi, Mariano. 1999. "On High Inflation and the Allocation of Resources." *Journal of Monetary Economics* 44: 401–421.
- Tran, Thi X.A., Thi L.A. Nguyen, and Thi H.L. Nguyen. 2016. "Affect of Uncertainty Avoidance on Venture Capital Investing Activities in Asian Countries." *Asian Social Science* 12, no. 12: 152–172.
- Tylor, Edward B. (1871) 1958. *Primitive Culture: Researches into the Development of Mythology, Philosophy, Religion, Art, and Custom*, vol. 1. New York: Harper.
- Venaik, Sunil, and Paul Brewer. 2010. "Avoiding Uncertainty in Hofstede and GLOBE." *Journal of International Business Studies* 41: 1294–1315.
- Williamson, Oliver E. 2000. "The New Institutional Economics: Taking Stock, Looking Ahead." *Journal of Economic Literature* 38, no. 3: 595–613.
- Zaheer, Aks, Bill McEvily, and Vincenzo Perrone. 1998. "Does Trust Matter? Exploring the Effects of Interorganisational and Interpersonal Trust on Performance." *Organisation Science* 9: 141–159.
- Zak, Paul. J., Stephen Knac. 2001. "Trust and Growth." *Economic Journal* 111: 295–321.
- Zheng, Jiansong, Tulips Yiwen Wang, and Tao Zhang. 2023. "The Extension of Particularized Trust to Generalized Trust: The Moderating Role of Long Term Versus Short Term Orientation." *Social Indicators Research* 166: 269–298.

EXPECTATION FORMATION IN PRE-MODERN EUROPE

Angela Huang and Mark Spoerer

The study of economic expectation formation is a modern endeavor. Thinking about the economy through economic theory became established in the late eighteenth and nineteenth centuries, whereas Muth's rational expectation theory dates to 1961. If we look back to pre-modern times, the question arises to what extent we can apply such theories—specifically, rational expectations theory—to past societies. If “rational expectations” are defined as model-consistent expectations (see Duarte, Chapter 2 in this volume), the question arises whether pre-modern economic actors (1) at least implicitly formed economic models for their individual actions and (2) acted in a model-consistent manner given the availability of comparable information for all economic agents involved. Are there, then, typical “rational,” that is, model-consistent patterns of action for certain scenarios that we can expect from pre-modern economic actors? Can we observe model-consistent expectation formation in pre-modern societies? If so, what are the major differences between pre-modern and modern societies in terms of expectation formation? This chapter explores these questions.

Before we turn to an analysis of expectation formation in pre-modern times, it is important to point out some particularities of the (study of the) pre-modern economy compared to today. Probably the most important limitation to our understanding of pre-modern expectation formation is that our insights into pre-modern action preferences are always contingent and incomplete. Thus, studying expectation formation in pre-modern economic actors is a methodological challenge (Bruch, Kypta, and Skambraks 2019). Because of the lack of (systematic) records, the functioning of the economy in the pre-modern period and especially in the medieval period can only be reconstructed to a limited extent (Huning and Wahl 2020). Especially the almost complete lack and limited use of private records means that we can hardly gain comprehensive insights into the motives, calculations, and “rationality(ies)” of pre-modern economic actors. This implies that statements about the expectation formation of economic actors are indirectly derived and generalized from the source material and are thus mere approximations.

Nevertheless, we think that the research of the past decades on major economic challenges and the institutions created to resolve them provides us with sufficient examples to hypothesize that many pre-modern economic actors behaved in a way that we can

term model-consistent, within their substantially different technological and institutional framework. The broad geographical framework of our essay will be Europe, the temporal one the period from ca. 1300 to 1800; that is, from the late medieval period, when urbanization created the basis for the emergence of a European market economy, to the end of the early modern period when technological change fundamentally altered transportation and communication and thus the economic sphere. Of course, this essay cannot discuss expectation formation in space and time comprehensively, not least because of the uneven state of research. We rather discuss a number of major institutional settings that governed the expectation formation of larger groups of economic actors. Our focus is on the economic everyday practices of peasants, traders, and urban policy makers and on the institutional framework that they created and in which they acted. We are interested in longer-term developments of the expectation model(s) within which economic agents performed.¹

In the following, we will first briefly present a few overall characteristics of the pre-modern economy and introduce some basic considerations regarding “rationality” in a pre-modern setting. We will explore experience and expectation formation in agriculture as the largest sector in the pre-modern economy. A second section addresses mechanisms for reducing risks in the commercial sector and especially in long-distance trade. Thirdly, we briefly address provision strategies especially of commercialized urban societies that had access to the means to develop such strategies.

Prelude: What Made the Pre-Modern Economy?

The predominance of agriculture is a hallmark of the pre-modern economy. The agricultural economy of the pre-modern era was shaped to a much greater extent than is the case today by natural and climatic conditions, not least the (non-)availability of mineral resources. These production conditions, which were not subject to human influence, led to different comparative advantages and disadvantages in the production of agricultural goods, manufactured goods, and services. The initial conditions for production beyond one’s own needs and trade had been structurally in place since at least the Neolithic Revolution more than 10,000 years ago, when people began farming and raising livestock, settling down, and building up stockpiles.

Although agriculture has, of course, been of central importance to human societies for millennia, demographic and urban developments in the period under discussion here (tenth to eighteenth centuries) differed starkly from those in earlier times. For one, it began and ended with a (relatively) rapid increase in population (Persson 2010, 67). Medieval demographic growth brought with it a dynamic urban and market development (Clark 2010; Blockmans 2012; Boone 2013; Blondé et al. 2013; Bosker, Buringh, and Van Zanden 2013). The wave of urbanization from the tenth to the thirteenth century led to economic specialization (labor division) and, in consequence, to local production in excess of one’s own needs and to an expansion of trade. Although the plague waves from the mid-fourteenth century onward can be considered a major crisis in Europe, they did contribute to a commercialization of society. The declining, and then until the late fifteenth century stagnating, population led to the desolation of entire landscapes and a severe disruption of trade; the other side of the coin, however, was a longer-term rise in real wages especially of the urban middle class (Allen 2001, 413, 427–430, 434–435; Persson 2010, 68; Pindl 2019, 247, graph 7.1). The combination of growing populations and increasing specialization with a growing number of urban centers meant that both peasants and artisans could

expect to be able to profitably exchange surplus and crafts production through trade in exchange for goods that were not available in one's own region or could only have been produced there at much higher cost.

In consequence, the socioeconomic fabric of Europe changed permanently, promoting a broader participation in the market economy (Bolton 1996). Economic institutions supporting an expanding market economy were mainly shaped by merchant organizations and urban governments (with considerable overlaps between both). This "age of towns," however, ended in the seventeenth century, not least as a political-economic consequence of the Reformation and the 30 Years' War (1618–1648) (Federico, Schulze, and Volckart 2021). At the end of that conflict, many towns were over-indebted due to high defense expenditures, and thus inhibited in their market and infrastructure development. Economic crisis and sovereignty claims in many places put an end to urban independence and ushered in a period of statehood. By the late seventeenth century, the shaping of the economic framework was largely in the hands of the state.

Uncertainty and Rationality in the Pre-Modern Era

The fundamental difference between the pre-modern and the "modern" economy was that the former was characterized by much higher relative transaction costs² compared to the intrinsic value of goods. Time was a much more crucial factor before the introduction of steamships, railroads, telegraphs, and telephones, and transportation was very costly and slow. Especially the limitations in access to information (slowness, availability, reliability) increased risk and hindered the formation of reliable expectations. In the pre-modern world, information was to a large part stored and transmitted orally. Peasants had almost no means of collecting and systematically exchanging information; merchants mainly relied on their limited private information systems. For most of the period, inter-urban information systems were the most efficient yet still expensive way to transmit information reliably. In any case, information travelled slowly. If a long-distance trader heard from his partners or his network in February that there was a threat of food shortages in a particular region, by the time the ship he sent out in response arrived in April, the shortages might have long since been remedied by supplies from competitors. Local changes in market regulations that had been enacted in the meantime could also seriously upset his profit calculations. Other than changes in prices, supply, and demand, further factors that increased risks were effects of weather conditions on trade, the security of trade routes due to robbery or political conflicts, and not least frequent changes of rulers affecting the legal foundation of exchange. In extreme cases, pre-modern long-distance trade meant a large share of non-calculable uncertainties. In the quest for East Asian spices like pepper, cinnamon, and cloves, toward the end of the fifteenth century Vasco da Gama lost two vessels out of four, and Magellan, some 20 years later, four of five (and his life). Those who returned with the spices were able to sell them at a price that made the survivors rich, including the ordinary sailors, seemingly justifying (in economic terms) the high existential risk.

In other words, pre-modern economic actors faced not only (calculable) risks, but much more (fundamental) uncertainty in the sense of Knight (1921, 197–232), both economically and existentially (see de Jong, Chapter 19 in this volume). In the iconography of the fifteenth century, the image of the goddess Fortuna, often depicted balancing on a globe, stands for instability and the power of chance. Contemporaries were acutely aware that it was to some degree up to luck whether business was crowned with success. The word risk

(*risico*, *risco*) in twelfth-century sources on maritime trade means—in line with today’s notion of “uncertainty”—“to dare something” or “to take a chance” (Asmussen 2016, 30–31; Scheller 2016, 189–190). As model-consistent expectation formation hinges on sufficient information to be able to assess future outcomes, this meant that risks were hard to assess, and expectation formation had a large margin of uncertainty. Economic agents accepted such high risks and a share of incalculable uncertainties where they could anticipate extremely high profit margins. The spice trade example might illustrate that there are limitations in the pre-modern application of modern expectation concepts, which necessarily assume that agents seek to transform (non-calculable) uncertainty into (calculable) risk.

Another important precondition to dealing with expectation formation in the pre-modern period concerns our assumptions about the rationality of past societies. Was past behavior fundamentally different from ours? A number of scholars have made such a case for describing medieval or early modern actors by concepts of supposed “alterity” (Tocqueville 1856, 153–171; for the medieval period Rösener 1992, 122–123; Le Goff 2010). Alterity essentially means a fundamental difference between the medieval world and our own. For example, medieval actors might have responded to hazards by accepting their suffering according to God’s will instead of developing strategies to protect themselves better (Scheller 2016, 186; Collet 2020, 80). If this were the case, it would mean that our current concepts of economic behavior in general, and model-consistent behavior in particular, would not be transferable to the pre-modern or at least the medieval period. This would not necessarily mean that pre-modern actors did not act model-consistent within their own worldview. However, in order for us to be able to assess their economic behavior as rational in pre-modern terms, we must first learn to understand their prevailing model not only in terms of economics, but also anthropologically.

Our following discussion argues that uncertainty should be treated as the dominant factor in judging the rationality of pre-modern economic actors. The research presented shows there are good reasons to assume that many pre-modern actors coped with the risks, factoring in a higher risk premium and thus higher expected profits. While this chapter therefore does not support the hypothesis of a pre-modern alterity, the extreme amount of uncertainty in pre-modern times means that modern rationality concepts are hard to apply. The degree of uncertainty severely restricts the formation of useful models for economic expectation formation. Nonetheless, pre-modern economic actors shared a common mindset that informed their economic decision-making and led them to make sensible choices where “rational” ones, hinging on minimal uncertainty, were not an option. These limits of pre-modern expectation formation must be kept in mind when in the following we speak of model-consistent or rational behavior. Pre-modern economic agents in Europe—from peasant to merchant—were able and willing to create and improve risk management strategies and frameworks over centuries of dynamic economic development, even if these do not always conform to our theoretical expectations. Their economic behavior followed a sensible purpose-means ratio which one might name model-consistent in today’s sense.

Dealing with Risk in Pre-Modern Agriculture: Risk-Sharing in Rural Communities

By far the largest share of pre-modern value-added was provided by arable farming and livestock breeding (Malanima 2009, 95–96). In arable farming in particular, the production cycle lasted several months, often a year from ploughing to sowing to harvest. Whether the

harvest would be good depended not only on the careful work of the individual farmer, but also on the weather and thus a completely exogenous factor. Farming traditions reflected the experience of generations, and following them may have reduced the risk, but a storm with heavy hail could still destroy the grain until just before the harvest. The answer to this challenge was the creation of institutions that collectively reduced risks, but that also led to lower individual gains.

The market orientation of pre-modern peasants was limited, as were their incentives to focus on increasing surplus production, not least due to property rights on agricultural land. In a seminal paper, McCloskey (1976) pointed out that the historically evolved fragmentation of agricultural plots, which appears inefficient at first glance, served to spread risk, especially against hail, and that it therefore made sense not to readjust the plots. Relying on McCloskey's data, Kimball (1988) used basic game-theoretic reasoning to show that in the absence of insurance, simple informal institutions could also have provided viable and profitable risk-sharing, which Richardson (2005) has confirmed empirically. Richardson showed that late medieval and early modern peasants in England did create informal institutions, in the form of fraternities and poor laws that allowed them to support members in need through no fault of their own (the "deserving poor"). Since peasants were risk-averse—they simply did not want to risk starvation—these institutions created positive incentives to contribute to their functioning. In other words, because everyone ran some risk of being dependent on the support of others at some point, they had an incentive to participate and pool risk.

In a similar way, De Keyser (2018) has shown for the late medieval and early modern Campine (today part of northern Belgium) that the "tragedy of the commons"—in this case, the potential overexploitation of common land because of the lack of exclusive property rights—could be (and indeed was) avoided by sensible institutions set up by the villagers that worked successfully for centuries. The long-term sustainability of the ecosystem was maintained, the benefits from the commons were distributed equitably, and privatization attempts as well as enclosures were fended off. In this context, Volckart (2004) has emphasized that the village community functioned like a cartel, generating monopoly rents that benefited farmers by restricting competition among them and creating incentives for members to conform through appropriately designed positive and negative sanctions. The long-term disadvantage, however, was that these institutions, which were structurally conservative and hindered competition, were hostile to innovation.

Within their socio-economic setting, peasants did deal with common risks using—mostly informal—instruments they could implement themselves. Only the introduction of hail insurance—in Germany at the end of the eighteenth century, and shortly thereafter in France and the United Kingdom (Baker 2012, 36; Oberholzner 2015, 175–176; Randalls and Kneale 2021, 744–745)—created formal institutional security and enabled farmers to pool risk even more and to be prepared for land readjustments.

Before Harvest Insurance: Rational vs. Sensible Behavior in Grain Storage

However, regardless of the question of the distribution of benefits and risks, the specific risk of a failed harvest remained. According to Persson (1999, 67–68), there are two alternative ways to insure oneself against bad harvests: trade (inter-spatial arbitrage) and storage (inter-temporal arbitrage). The former strategy presupposes continuous access to markets, which was not the case for many peasants, especially in remote areas. Even if peasants did

have access to markets, they had to withhold grain for, first, their own consumption over the next 12 months and, second, for sowing (intra-year storage). Third, given the uncertainty regarding the next harvest, they had to think about building up reserves (inter-year storage or carry-over). Thus, storage was a vital issue for pre-modern peasants (Fenoaltea 1976).

What enabled or prevented farmers from building up and expanding their stocks, on the one hand to reduce their existential risk and on the other to increase their prosperity through market participation? The sizing of storage quantities required experience, including an estimate of expected losses from moisture or hungry rodents, and was not itself free of risk. McCloskey and Nash (1984) have estimated indirectly, based on price observations for thirteenth- and fourteenth-century England, that storage must have been extremely expensive in the medieval period and was rarely extended for more than a year. This approach implicitly presupposes not only that credit markets were efficient, but also that they were accessible to farmers in the first place. This was certainly not the case at the time (Komlos and Landes 1991; Bauernfeind, Reutter, and Woitek 2001). Thus, McCloskey and Nash may have overestimated the storage costs. However, interest rates declined during the early modern period and thus storage became cheaper. This was an incentive to increase reserves, all the more so where this involved large agricultural production units (manors, monasteries) that did not have to worry about sheer subsistence.

Among the large landowners were monasteries and hospitals, whose property was often expanded through donations. Although their agricultural production served primarily to cover their own consumption needs, there were usually surpluses that could be sold on the market. For example, the ownership of Saint Catherine's hospital in Regensburg was divided equally between the city and the church. Especially after Regensburg became Protestant, these two shareholders did not always get along well. The hospital's administration therefore felt compelled to document its administrative actions in comparative detail, which is a stroke of luck from a historiographical perspective. Pindl (2018) has examined these protocols for the period around the famine crises of the early 1770s. She concludes that, regardless of the market price, self-sufficiency was always the top priority for the hospital management. Moreover, the hospital had to decide whether to dispose of its surpluses early on the market or to store them first in the granary (with the risk of spoilage). The correspondence between the acting agents and their principals shows that the former behaved in a modern sense economically-pragmatically, i.e., model-consistent, and the latter, which included church superiors, apparently expected precisely this kind of decision-making. The perception of the concrete market situation coagulated into a long-term experience that guided the assessment of the expected gains and risks of alternative courses of action.

Similar results for intra- and inter-year storage are reported by Scholten (2019), who analyzed two manorial estates in the Rhineland in northwestern Germany between the mid-seventeenth and the mid-nineteenth centuries. She finds that rye was usually carried over, but that selling it was quite unsystematic and only became the norm around the mid-eighteenth century. Surprisingly, the most important customer group came from the manor's immediate surroundings, only then followed by urban merchants. Brunt and Cannon (2022) also analyze direct archival evidence of inter-year storage for large British farms from the mid-eighteenth to the mid-nineteenth century. These farms' carry-over was quite small, consistent with the conjectures McCloskey and Nash derived from their approach for the thirteenth and fourteenth centuries. In other words, the opportunity costs of storage were comparably high.

The quintessence of the research on storage is that for the economic actors of the pre-modern era, the postulate of “alterity” should not be generalized. Given the threat of bad harvests, misery, and even famine, many economic actors behaved in a sensible way. This was not necessarily “rational” in the sense of rational expectation models that are bound to exclude uncertainty. Bauernfeind, Reutter, and Woitek (2001) analyzed the observed carry-over policy of Nuremberg’s granary from 1490 to 1855 and found that it was not compatible with any of today’s models of rational investment behavior. One may accuse the granary managers *ex post* of having made suboptimal decisions, but one might also argue that they faced not only risks, but also many uncertainties, so that the application of models that are valid today becomes pointless.

To summarize this section, even supposedly backward and conservative agricultural producers with irregular market access transformed their economic experiences into expectations that, in turn, led to observable economic actions or institutions that we can interpret as an expression of model-consistent behavior. This holds true for (many) peasants, and, we argue, is even truer for traders and merchants.

Reducing Uncertainty in Pre-Modern Commerce: Trust and the Rationalization of Law

The design of certain institutional arrangements to promote long-distance trade suggests that by the late medieval period, people were able and willing to recognize risks, to counter them, and to price them in. The institutional developments shaping the pre-modern period, presented below, were initiated in the period of the so-called Commercial Revolution in the tenth to thirteenth centuries (Lopez 1976; Spufford 1988), characterized by urbanization, specialization, and growing trade, above all an increase in long-distance trade activities. With the Commercial Revolution, the sedentary merchant emerged, who no longer travelled with his goods himself. Information, goods, and money moved in a network of trading partnerships, and from the sixteenth century also through large trading companies; north of the Alps, the Nuremberg and Augsburg companies of the Fugger and Welser dynasties, and the Danzig Loitz, are well-known examples. Thus, time and space now separated the merchant from his goods, while the volume of exchange continuously increased over the centuries under discussion. The risks and uncertainties in economic exchange within this period were addressed by various informal and formal institutional arrangements that reduced them both generally, and specifically to certain areas of trade. These institutional arrangements were the cornerstones for a common mindset shared by pre-modern economic actors.

Trust, as an informal institution, is considered a fundamental principle of expectation formation in pre-modern commercial exchange. In a less formalized and decentralized social order than today with close-knit social networks—a pre-state era—trust served as an effective means to decisively reduce enforcement costs. It mitigated the principal-agent problem, and thus the incentive to cheat on one’s business partner (Ewert and Selzer 2016, 40–45, 51; Skambraks 2019; Wubs-Mrozewicz 2020, 94–97). Wubs-Mrozewicz has stressed that trust was considered useful by pre-modern merchants as they lived in a world “in which there was more uncertainty than certainty” and trust was “a strategy for reducing complexity and risk” (2020, 92).

However, this trust system was not based on (unconditional) interpersonal trust in other actors, but on a reputation system (Greif 1989, 866–882) in a world of dense social networks (see de Jong, Chapter 19 and Ochonu, Chapter 26 in this volume). The reputation

system makes economic actors trustworthy (or their behavior expectable/predictable), since in a system of social control they have little incentive to fail to honor contracts. This reduces the risk in the search for business partners and regarding contract compliance. Trust and reputation are at the heart of a model of pre-modern expectation formation amongst merchants: the communication and information system provided by social networks led to the rational expectation that (despite the absence or limited availability of coercive means) agreements would be honored, because reputation networks made it unlikely that opportunistic behavior would go unpunished (Greif 2006, 58–90; Ewert and Selzer 2016, 49–50). Through social control, economic agents could reduce their uncertainty in trade over longer distances without the protection of coercive state power. At a time when there were few if any broadly effective public institutions to secure economic activity, the informal hedging system created by merchants offered a cost-effective way to minimize risks.

Beyond safeguarding against breaches of contract, informal institutions also operated in other areas of trade practice. Reciprocal trade in particular underlines the effectiveness of an economic system based on informal norms. Within the late medieval Hanse trade network, merchants sent goods to each other in excess of (or alongside) their contractual obligations and sold these goods under their own name for the benefit of the trading partner (Cordes 1998; Selzer and Ewert 2001, 141–144; Ewert and Selzer 2016, 31–57). This network not only of trade but also of social capital provided access to information on the trustworthiness of economic actors. Economic agents used the market knowledge of other economic actors at low cost. The social context is thus a central factor for the functioning of pre-modern economic exchange. Trust was a rational way to turn uncertainty into risk—especially given that there were few alternatives, especially at the beginning of the Commercial Revolution.

However, very few case studies have analyzed the specific effects of trust on the system of exchange. Recent studies have highlighted that from the later medieval period at the latest, next to interpersonal trust it was institutional trust that supported pre-modern exchange. Public institutions, namely urban authorities as service providers of letters of attorney and conflict management institutions, provided a means for economic agents to deal with the risk of default of contract (Wubs-Mrozewicz 2015; Kypta 2020; Weber 2021). Mercantile conflict management was therefore not only based on interpersonal trust, but from the fourteenth century (in northern Europe) was also increasingly built on institutional trust in urban administrations and courts.

Institutional trust in the legal system, however, emerged only as a consequence of a medieval rationalization of the legal culture in favor of the mobility of people, goods, and money. In principle, law in the medieval view was not newly created, but given; a largely oral legal culture built on local, perhaps regional, legal customs that required experiential knowledge. This meant serious uncertainties for merchants and limited their legal mobility. In reaction to this issue, urbanization in northern and central Europe was accompanied by the spread of the Lübeck and Magdeburg municipal laws, two systems of law that allowed for a change in legal traditions in step with the changes brought about by the Commercial Revolution. From the twelfth and thirteenth centuries onward, a gradual urban “rationalization of law” (Nehlsen-von Stryk 2000) was driven by larger cities, shaped by trade and commerce. Most importantly, the law of evidence changed: judicial duel and trial by ordeal disappeared from the court process, as did the local wording of oaths, in favor of a more formalized court process. Urban codices, such as the Bardewik Codex of Lübeck Law, provided the “economic-civil legal foundation” for most of the new towns on the

Baltic coast in the thirteenth and fourteenth centuries (Cordes 2022). In this text—as in other legal manuscripts of the time—new legal principles were included that today are assigned to the law of obligations, such as warranty in sales (especially in the purchase of land and in the textile trade), the repayment of wages in the case of premature termination of an employment contract, and official control of the sale of wine and bread. The codex also covered trading companies and maritime law. In the following centuries, so-called *Willküren* (“arbitrary acts,” newly-created law in contrast to legal tradition) extended or replaced the applicable customary law, especially in commercial matters.

Writing increasingly penetrated into everyday administrative and legal life. It became widespread in public and private use from the fourteenth century, as shown, for example, by the Lübeck *Societates* registers, in which company contracts were notarized (Cordes, Friedland, and Sprandel 2003; Aerts 2023). From this period onward, entries in city and merchants’ books served as evidence in court cases and limited the role of sworn witnesses.

Both procedurally and substantively, the rationalization of jurisprudence and inter-town communication in legal matters in the medieval period thus changed the basis of action for economic actors, especially merchants. Merchants, as the urban elite, turned the initially unpredictable legal sphere into a calculable risk; plurality in commercial law, a consequence of the fragmented political sphere (Höhn 2021), was factored in and even exploited in a form of legal “shopping around.”

Negotiating a Fundamental Framework of Exchange: Pre-Modern Market Institutions

When speaking about uncertainty and risk in pre-modern trade, it is important to remember that there was little to build on when long-distance trade increased during the Commercial Revolution. The ongoing development of reliable market institutions must therefore be appreciated as an important part of reducing risk in pre-modern trade, providing security and a degree of predictability.

Commercial associations, especially guilds, but also brotherhoods, greatly influenced the organization of the economy. On the one hand, they served to protect their members, to exchange information, and as a building block in the reputation system; on the other hand, they were externally oriented and served to protect property rights vis-à-vis rulers (Greif 2006, 91–123; Ogilvie 2011, 2019). Only collectively could merchants credibly assert and achieve bargaining power against the latter. Most importantly, umbrella merchant interest groups secured trading privileges (with or without the support of their sovereigns) that guaranteed their legal status in foreign territories in the long term. The history of the German Hanse is a prominent example of the collective acquisition of such trading rights, which ranged from *Strandrecht* (law of shipwreck, *ius naufragii*), safe conduct, general assurances of protection, and questions of the judiciary and their own jurisdiction (Cordes 2013), to the fixing and exemption of customs duties and special rights when trading in foreign markets (e.g., loading and unloading ships on feast days, Dollinger 1998, 245–251). The common privileges of Low German merchants and citizens of cities between today’s Netherlands and Russia in the thirteenth century were to remain valid until the seventeenth century and partly beyond (on the beginnings Hammel-Kiesow 2015; Huang 2022). This is an extreme example of trade privileges as the central institutions negotiated between merchant associations and rulers to minimize risk.

Beyond group- and location-specific trade agreements, the institutional framework for a European-wide system of exchange was provided primarily by two specific types of markets. Fairs and staple markets (“staples”) reduced risk remarkably through their concentration of commercial institutions beneficial especially to large-scale trade (Holterman and Huang 2023). Especially fairs (which were also called “free markets”) are celebrated as central institutions to economic development because of their openness to outsiders in an economic landscape otherwise shaped by protectionist measures and restrictions on the economic activity of foreign merchants. As recurring periodic events, fairs brought the advantage of reducing coordination costs and the costs of matching supply and demand. They provided a special legal regime protecting property rights and facilitating contract enforcement, specifically swift administration of justice via special fair courts. Furthermore, security was provided both at the fair and through seigniorial letters of safe conduct for all travelling to and from the fairs. Other services could entail a well-established commercial infrastructure (fortifications, roads, canals) and acting as a money market and “clearing house” for international payment and exchange services. This meant (by the fifteenth century transferrable) bills of exchange that allowed for the mobility of capital between international trade hubs regardless of the solvency of the individual actors (Rothmann 1998, 44, 197–479; Jenks 2005, 73–76; Edwards and Ogilvie 2012, 4–13, 27–30; Dijkman 2015, 37–42). Although no comprehensive studies exist to date, in the Holy Roman Empire alone at least 5,000 regular markets in about 1,500 places existed before 1500 (Rothmann 1998, 29–32; Pauly 2007).

Staple markets, some in existence until the early nineteenth century, are often seen as the opposite of fairs or “free markets.” Staple rights were mostly based on seigniorial privileges that required traders to bring certain goods to the market in question, either for transshipment or for sale. Beyond that, there were numerous other regulations connected to staples (e.g., compulsion to use certain roads and urban warehouses). Staple markets, like fairs, were omnipresent in pre-modern exchange. Their total number went far beyond the few prominent examples like Bruges, Dordrecht, or Cologne (Gönnenwein 1939; Dijkman 2015, 159–160). As restrictive and mandatory markets, staples are mostly judged to have been harmful for economic development, especially as traders could not opt out if visiting the staple was disadvantageous for them, and they facilitated surplus extraction by local interest groups (Rothmann 1998, 44; Dijkman 2015, 173–179). However, “staple” in a broader contemporary meaning just meant “an important marketplace” (Nedkvitne 2013, 96). Furthermore, even if mandatory, staples included a range of services, some quite similar to those of fairs. As fixed meeting points, they not only reduced the costs of matching supply and demand, but also made it easier to control trade and thus reduced problems in contract enforcement. Staples also promoted investment in infrastructure, guaranteed safeguards for visiting merchants, and provided services needed for the regular, larger-scale exchange of commodities and money (Dijkman 2015, 162, 171–179). Staple markets also often specialized in trade in certain goods; the Bergen market, for example, specialized in stockfish (the main Norwegian export product), Bruges in Flemish woolen cloth, and Calais in English wool, to name a few examples. This also meant a stronger development of institutions related to such goods, such as product-specific quality control. Not least, staple privileges were often accompanied by privileges granted to foreign merchants (Dijkman 2015, 164).

In the expectation formation of contemporary economic actors—here above all long-distance traders—trade agreements, fairs, and staple markets served important functions in

the organization and control of commodity trade. They guided and concentrated traffic in a predictable way, so that merchants could make sensible assumptions about trade outcomes. The market system provided a common framework for individual merchants consistent to which they could collectively form expectations.

Information is Key: From Private Information Acquisition to Public Market Information

As stated at the beginning of this article, it is precisely the availability of comparable information for the economic agents involved that is important for rational expectation formation. Specific, up-to-date market knowledge was required in order to form reasonable expectations and thus trade with comparatively low risk. In addition to information about potential trading partners, information about prices, the availability of goods, the development of demand, the security of trade routes, and other external factors was needed to form expectations regarding specific transactions.

However, there were distinct limitations to information-based expectation formation, especially in long distance trade. The private information system of the medieval period was predominant up until the sixteenth century. All trade partners brought knowledge of a few markets to their trade network by exchanging private letters. Guilds and brotherhoods acted as local information hubs amongst traders with similar interests, such as the *Lübeck Bergenfahrer* (those trading with Bergen in Norway). Individual private information systems were also often linked to the urban information and messenger system (Jenks 2005, 32–35; Neitzert 2019, 25; Kirchner Vives 2021). Pre-modern “rationality” was clearly limited by the availability of comparable information to all actors involved.

A specialized form of risk management, heavily reliant on information to be efficient (enough) for all parties involved, was maritime insurance. This had existed since the medieval period, though for a long time only in southern Europe. Preliminary forms date back to twelfth-century Italy. First, traders tried to meet the demand for maritime insurances through adaptations of established forms of contracts. From the fourteenth century onward, such contracts were referred to as *securitas*, and at the end of the century, a new form of contract had developed, a premium-based insurance against loss or damage. In Genoa, for example, insurance was standardized by the authorities as early as the second half of the fourteenth century, particularly in order to secure the obligation to pay in the event of damage. Through Italian merchants, it spread to France, Spain, England, the Netherlands, and, by the sixteenth century, Germany. In addition to maritime insurance, insurance for land and river transport also emerged, as well as for slave transport, along with the introduction of life insurance, especially for merchants’ travelling activities (Nehlsen-von Stryk 1986; Scheller 2016, 196–201; Scheller 2017, 56–59).

For risk assessment, it was essential to have a form of information management that was as comprehensive as possible: a ship’s voyage was closely tracked through the mercantile network and messenger connections, and shipwrecks and risk factors such as wars and sea robbery were communicated in order to set premiums (Scheller 2016, 201–202; 2017, 62–64, 66). However, the risk expertise of those involved was based not only on current information, but also on experience gained from past events. Brokers regularly involved in insurance transactions aggregated longer-term information on insured amounts, premiums, and claims in their records to provide to insurers and the insured. Commercial accounting also collected and processed information that benefited future

expectation formation. General strategies were also formed, as in Benedetto Cotrugli's manual of 1458, which recommended that merchants take out broad and basic insurance cover (Scheller 2017, 67–72).

The sixteenth century brought about a fundamental change, especially in the field of information. Besides improved urban messenger systems, territorial postal systems emerged which improved information transfer but, as a result of political fragmentation, also hindered communication. *Avvisi* were initially handwritten newsletters about political and economic events, available only in small circulation to exclusive circles such as the Fugger dynasty. Commodity price currents and (often somewhat later) exchange rate currents became increasingly established in leading trading centers, especially from the end of the sixteenth century and in the seventeenth century (McCusker and Gravesteyn 1991). While book production increased after the introduction of printing in c. 1460, such newsletters were only printed from the early seventeenth century. In Strasbourg, they were printed weekly from 1605, in alignment with the postal rhythm. Until 1620, Amsterdam, Frankfurt, Hamburg, Gdańsk/Danzig, and Cologne had a similar system. These early newspapers created broad access to market information and disseminated it at greater speed (North 2005, 119–122). These gradual developments in the course of the sixteenth and seventeenth centuries created new bases for the formation of expectations of individual actors.

Securing the Future and Provision Strategies of Urban Societies

As mentioned at the beginning, the period under study here saw the emergence and growth of cities. The specialized urban population was necessarily more oriented toward exchange and the market. But what mechanisms did the urban population and urban authorities use to cope with pre-modern uncertainties?

In the urban sphere, the guild system was a fundamental institution for dealing with individual risk. Guilds were corporations for all groups of tradespeople, with local and regional crafts accounting for the majority. Their role in European economic development is the subject of an ongoing research debate (Epstein 2008; Prak et al. 2018; Ogilvie 2019): did guilds promote or inhibit progress over the centuries? From a macroeconomic viewpoint, Ogilvie has argued that guilds were inefficient and harmful to economic development as they adversely affected quality, skills, and innovation (Ogilvie 2004, 2019). Today, the question whether guilds were harmful or beneficial to economic development has still not been answered conclusively, and probably never will be. In our context, it is more important to highlight that guilds had a variety of functions, from quality control and a social security system to a sort of trade union negotiating wages, and not least as a repository for storing and transferring knowledge between generations. The general usefulness of guilds can hardly be assessed in a meaningful way due to their variety and broad effectiveness. However, although guilds might have supported individual or lobby interests at the expense of society at large, especially long-term, in the short term beneficiaries of the prevailing conditions sensibly regarded guilds as a means of securing their individual social and economic welfare.

For the increasingly specialized and non-self-sufficient urban population, the short- and medium-term security of food supply and old-age provision were key challenges. Until well into the nineteenth century, private households spent more than half their income on food. In pre-modern towns, harvest failures quickly led to shortages, which were worsened by the export of foodstuffs, especially grain.

Individual risk was dealt with collectively; municipal laws and measures sought to safeguard the individual. The trade in grain as a particularly important commodity for daily supply was therefore always regulated by urban law and under the control of the authorities. Securing the food supply was seen as a central element of public order. Consequently, urban authorities and territorial rulers used a variety of instruments to this end (Jörg 2008, 182–318). Local pre-emption (*Vorkaufsrecht*) was commonplace in towns in Europe to secure the urban food supply. Pre-emption law restricted merchants trying to exploit inter-spatial arbitrage in times of shortage by prohibiting the purchase of grain outside the municipal market and before the harvest (Jörg 2008, 223–234; Hitz 2017; Camenisch 2017). In times of crisis, export bans were another instrument for securing supply (Jörg 2008, 182–197). In territories where grain was exported on a larger scale, sovereigns such as the Teutonic Order also reacted to shortages with regional temporary export bans (Link 2014, 56–58).

Urban authorities were also concerned with inflation, against which individual precautions could only be taken to a very limited extent. Inflation itself was seen as unavoidable; however, contemporaries were well aware of the additional problem of speculation (Hitz 2017, 18–19). Urban discussions on the problem of inflation echoed medieval debates about the “just [good] price” and usury. The council often set maximum prices for grain and other foodstuffs (Camenisch 2017, 42–43; Hitz 2017, 22). In guaranteeing basic supplies, the council relied primarily on the publicity of the market and control by municipal officials.

In times of shortages, city councils also bought grain on their own account in the fifteenth century to ensure a sufficient supply. In 1439, after a period of price increases (*Teuerungskrise*), the city of Basel built its own granary, which was expanded over the century. Private individuals could also use the granary, which thus presumably also represented an opportunity for private provisioning. Urban authorities issued regulations on private provision, namely the obligation to store supplies for a term of either one or two years (Jörg 2008, 206–208, 212–222, 286–315; Hitz 2017, 21–23).

In addition to food supply, instruments to ensure solvency and private old-age provision were central to the risk hedging of pre-modern urban dwellers. By the fifteenth century, at the latest, all areas of urban life were dominated by the use of money (Steinbach 2019). The fluctuating availability of cash was countered by a comprehensive and multifaceted debt system (borrowing, money lending, annuities, rent debts, etc.), in which most if not all of the urban population participated (Baum 1985; Sturm 2009; Zijderdijn and de Moor 2013; Weber 2021). Recent research has highlighted the importance of small loans to keep citizens of all social groups solvent (Weber 2021, 162–171). Debt relationships were deliberately open and negotiable; according to the requirements of the time, much room was left for unforeseen events and necessary, comparatively costly exchanges of information (Weber 2021, 138). Thus, individual economic activity was secured against the likely risk of short-term bottlenecks.

A widespread instrument in Europe for short- and long-term financial security was annuity purchase. Annuities were annual pay-outs against the payment of an initial corresponding capital sum. For long-term provision, annuity purchases by corporations, especially cities, may have been of particular importance. Urban annuity sales in particular are said to have explicitly served to provide for the population in addition to financing urban projects (Zijderdijn 2009; Zijderdijn 2018; Huang and Sapoznik 2019). In addition, wills and

retirement contracts were used as legal instruments of provision beyond protection through family networks (Zuijderduijn and Overlaet 2021). These instruments allowed a growing share of the urban population to guarantee their everyday consumption and their monetary needs to a certain extent, and to strategically provide for their future.

Concluding Remarks: Expectation Formation in a Commercializing Society

Studying the pre-modern period often leaves us with more questions than answers, as archival records only very rarely allow us to trace concrete cases of individual or collective expectation formation in detail. Nevertheless, we can reconstruct some overall systems and strategies that created to some degree predictability in an uncertain world. Many institutions that emerged in the medieval period—rural and urban associations (agrarian fraternities, cooperatives, guilds), trust-based social networks, trade privileges, and a range of urban public institutions—organized the production of and trade in goods over centuries and allowed individuals to protect themselves to a certain degree against common risks. The instruments presented in this chapter reduced transaction costs and created relative security in an economy characterized by manifold risks and uncertainties. It is remarkable that, in this respect, both in agrarian and urban settings similar institutions and behavioral patterns evolved throughout Europe.

Research on the economic areas discussed here—agriculture, (long-distance) trade, and urban private and public provisioning—suggests that the economic actors in these different spheres indeed shared a common understanding (or model) of the prevailing economic system and acted in accordance with it. Stable institutions such as fairs and staple markets created the foundation for economic model-building. The research presented shows that from at least the late medieval period, the economic behavior of many actors was guided by economic-pragmatic thinking, just as it is in modern times.

At the same time, it is important to give credit to the degree of uncertainty in the pre-modern economy. We want to emphasize that there are clear limitations to “rational” behavior in the strict sense of rational expectations theory. This concept necessarily presumes that (incalculable) uncertainty may be largely transformed into (calculable) risks. Pre-modern people could establish model-consistent expectations based on a common mindset and general system knowledge. However, considering the multitude of challenges pre-modern actors faced and the limited access to relevant information on the current economic situation, for individual transactions the predictability of economic outcomes had its clear limitations, to a point where the line between risk and uncertainty became blurred (see Nützenadel and Streb, Chapter 8 in this volume). We therefore submit that—in contrast to economic theory that leaves only limited room for uncertainty—even though pre-modern economic actors strived for rational behavior and acted model-consistent, pre-modern conditions at best allowed them to behave what we call sensibly.

Notes

- 1 Spectacular financial crises of the pre-modern era such as the Tulip Mania (1637) or the South Sea and Mississippi Bubbles (both 1720) challenge “rational behavior” due to their epistemic instability (Deringer 2015). Such special cases of expectation formation are therefore analyzed in other chapters of this handbook.
- 2 We subsume transportation costs under transaction costs.

References

- Aerts, Erik. 2023. "Single and Double-Entry Bookkeeping in Public and Private Accounts of the Southern Low Countries (1300–1800)." *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* 110, no. 1: 4–29.
- Allen, Robert C. 2001. "The Great Divergence in European Wages and Prices from the Middle Ages to the First World War." *Explorations in Economic History* 38: 411–447.
- Asmussen, Tina. 2016. "Glück auf! Fortuna und Risiko im frühneuzeitlichen Bergbau." *FKW. Zeitschrift für Geschlechterforschung und visuelle Kultur* 60: 30–41.
- Baker, Alan R. H. 2012. "Hail as Hazard: Changing Attitudes to Crop Protection against Hail Damage in France, 1815–1914." *Agricultural History Review* 60, no. 1: 19–36.
- Bauernfeind, Walter, Michael Reutter, and Ulrich Woitek. 2001. "Rational Investment Behaviour and Seasonality in Early Modern Grain Prices." *European Review of Economic History* 5, no. 2: 281–298.
- Baum, Hans-Peter. 1985. "Annuities in Late Medieval Hanse Towns." *The Business History Review* 59, no. 1: 24–48.
- Blockmans, Wim. 2012. "Urbanisation in the European Middle Ages. Phases of Openness and Occlusion." In *Living in the City: Urban Institutions in the Low Countries, 1200–2010*, edited by Leo Lucassen, and Wim Willem, 16–31. New York: Routledge.
- Blondé, Bruno, and Ilja Van Damme. 2013. "Early Modern Europe: 1500–1800." In *The Oxford Handbook of Cities in World History*, edited by Peter Clark, 240–257. Oxford: Oxford University Press.
- Bolton, Jim. 1996. "'The World Upside Down.' Plague as an Agent of Economic and Social Change." In *The Black Death in England*, edited by Mark Ormrod, and Phillip Lindley, 17–78. Stamford: Paul Watkins Publishing.
- Boone, Marc. 2013. "Medieval Europe." In *The Oxford Handbook of Cities in World History*, edited by Peter Clark, 221–239. Oxford: Oxford University Press.
- Bosker, Maarten, Eltjo Buringh, and Jan Luiten Van Zanden. 2013. "From Baghdad to London: Unraveling Urban Development in Europe, the Middle East, and North Africa, 800–1800." *The Review of Economics and Statistics* 95, no. 4: 1418–1437.
- Brunt, Liam, and Edmund Cannon. 2022. "English Farmers' Wheat Storage and Sales in the Late Eighteenth and Early Nineteenth Centuries." *Economic History Review* 75, no. 3: 932–959. DOI: 10.1111/ehr.13133.
- Camenisch, Chantal. 2017. "Wider den verderblichen Fürkauf. Spekulation auf Getreidepreise und obrigkeitliche Massnahmen gegen diese Praxis in der Stadt und Republik Bern, 1480–1750." In *Alles wird teuer! Wucher! Brot! = Les prix s'envolent! C'est du vol! Du pain!*, edited by Michael Jucker et al., 35–48. Zurich: Chronos.
- Clark, Gregory. 2010. "The macroeconomic aggregates for England, 1209–2008." *Research in Economic History* 27: 51–140. DOI: 10.1108/S0363-3268(2010)0000027004.
- Collet, Dominik. 2020. "Risk and Resilience." In *Concepts of Urban-Environmental History*, edited by Detlev Mares, Martin Knoll, and Sebastian Haumann, 79–94. Bielefeld: Transcript.
- Cordes, Albrecht. 1998. *Spätmittelalterlicher Gesellschaftshandel im Hanseraum*. Cologne et al.: Böhlau.
- Cordes, Albrecht. 2013. "Litigating Abroad—Merchants' Expectations Regarding Procedure before Foreign Courts According to the Hanseatic Privileges (12th–16th c.)." In *Law and Disputing in the Middle Ages. Proceeding of the Ninth Carlsberg Academy Conference on Medieval Legal History 2012*, edited by Per Andersen et al., 281–299. Copenhagen: DJØF Publishing.
- Cordes, Albrecht. 2022. "Pragmatische Innovation. Die Neuerungen im lübischen Recht von 1263 bis 1294." *Hansische Geschichtsblätter* 140: 1–29.
- Cordes, Albrecht, Klaus Friedland, and Rolf Sprandel, eds. 2003. *Societates: Das Verzeichnis der Handelsgesellschaften im Lübecker Niederstadtbuch 1311–1361*. Cologne et al.: Böhlau.
- De Keyser, Maïka. 2018. *Inclusive Commons and the Sustainability of Peasant Communities in the Medieval Low Countries*. London: Taylor and Francis.
- Dijkman, Jessica. 2015. *Shaping Medieval Markets. The Organisation of Commodity Markets in Holland, c. 1200–c. 1450*. Leiden, Boston: Brill.
- Dollinger, Philippe. 1998. *Die Hanse*. 5th ed. Stuttgart: Kröner.

- Edwards, Jeremy, and Sheilagh Ogilvie. 2012. "What Lessons for Economic Development Can We Draw from the Champagne Fairs?" *Explorations in Economic History* 49, no. 2: 131–148.
- Epstein, S. R. 2008. "Craft Guilds in the Pre-Modern Economy: A Discussion." *Economic History Review* 61, no. 1: 155–174. DOI: 10.1111/j.1468-0289.2007.00411.x.
- Ewert, Ulf Christian, and Stephan Selzer. 2016. *Institutions of Hanseatic Trade. Studies on the Political Economy of a Medieval Network Organisation*. Frankfurt/Main: Peter Lang International Academic Publishers. DOI: 10.3726/978-3-653-05851-2.
- Federico, Giovanni, Max-Stephan Schulze, and Oliver Volckart. 2021. "European Goods Market Integration in the Very Long Run: From the Black Death to the First World War." *Journal of Economic History* 81, no. 1: 276–308. DOI: 10.1017/S0022050720000637.
- Fenoaltea, Stefano. 1976. "Risk, Transaction Costs, and the Organization of Medieval Agriculture." *Explorations in Economic History* 13, no. 2: 129–151.
- Gönnenwein, Otto. 1939. *Das Stapel- und Niederlagsrecht*. Weimar: Böhlau.
- Greif, Avner. 2006. *Institutions and the Path to the Modern Economy. Lessons from Medieval Trade*. Cambridge and New York: Cambridge University Press.
- Greif, Avner. 1989. "Reputation and Coalitions in Medieval Trade: Evidence on the Maghribi Traders." *The Journal of Economic History* 49, no. 4: 857–882.
- Hitz, Benjamin. 2017. "Mit 'Erkenntnissen' gegen Teuerung ankämpfen. Fürkauf und Versorgungssicherheit als praktische Probleme des Basler Rats im späten 15. Jahrhundert." In *Alles wird teurer! Wucher! Brot! = Les prix s'envolent! C'est du vol! Du pain!*, edited by Michael Jucker et al., 17–31. Zurich: Chronos.
- Höhn, Philipp. 2021. *Kaufleute in Konflikt. Rechtspluralismus, Kredit und Gewalt im spätmittelalterlichen Lübeck*. Frankfurt/Main and New York: Campus Verlag.
- Holterman, Bart, and Angela Huang. 2023. "Geospatial Methods and the Premodern Economy. Mapping the Institutional Landscapes of Northern Europe, 1350–1650." *Jahrbuch für Wirtschaftsge-schichte | Economic History Yearbook* 64, no. 1: 179–212.
- Huang, Angela. 2022. "Privilegiert. Lübecks Handelspolitik und -netzwerk im 13. Jahrhundert." In *Archäoparasitologie, Handelsgeschichte, Paläopathologie und Anthropologie (= Die Ausgrabungen im Lübecker Gründungsviertel II)*, edited by Dirk Rieger, 165–173. Lübeck: Schmidt-Römhildt.
- Huang, Angela, and Alexandra Sapoznik. 2019. "Fremdes Geld. Auswärtige Kapitalbeziehungen des Braunschweiger Rentenmarktes im 15. und 16. Jahrhundert." *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* 106, no. 1: 29–66.
- Huning, Thilo R., and Fabian Wahl. 2020. "Early and Medieval Periods in German Economic History." In *Oxford Research Encyclopedia of Economics and Finance*, edited by Jonathan H. Hamilton (online only). Oxford: Oxford University Press. DOI: 10.1093/acrefore/9780190625979.013.486.
- Jenks, Stuart. 2005. "Von den archaischen Grundlagen bis zur Schwelle der Moderne (ca. 1000–1450)." In *Deutsche Wirtschaftsgeschichte. Ein Jahrtausend im Überblick*, edited by Michael North, 15–111. Munich: Beck.
- Jörg, Christian. 2008. *Teure, Hunger, Großes Sterben. Hungersnöte und Versorgungskrisen in den Städten des Reiches während des 15. Jahrhunderts*. Stuttgart: Hiersemann.
- Kimball, Miles S. 1988. "Farmers' Cooperatives as Behavior toward Risk." *American Economic Review* 78, no. 1: 224–232.
- Kirchner Vives, Clàudia. 2021. *Der spanische Nachrichtenverkehr zu Zeiten des Oberpostmeisters Maffeo de Tassis (1518–1535)*. Regensburg: Pustet.
- Knight, Frank H. 1921. *Risk, Uncertainty and Profit*. Boston, MA: Houghton, Mifflin.
- Komlos, John, and David D. Landes. 1991. "Anachronistic Economics: Grain Storage in Medieval England." *Economic History Review* 44, no 1: 36–45.
- Kypta, Ulla. 2020. "Gelehrtes Recht oder gelebte Praxis? Kaufleute und ihre Vertreter im späten Mittelalter." *Das Mittelalter* 25: 103–118.
- Kypta, Ulla, Julia Bruch, and Tanja Skambraks, eds. 2019. *Methods in Premodern Economic History: Case Studies from the Holy Roman Empire, c. 1300–c. 1600*. Palgrave Studies in Economic History. London: Palgrave Macmillan.
- Le Goff, Jacques. 2010. *Le Moyen Âge et l'argent. Essai d'anthropologie historique*. Paris: Perrin.
- Link, Christina. 2014. *Der preußische Getreidehandel im 15. Jahrhundert*. Cologne et al.: Böhlau.
- Lopez, Robert. 1976. *The Commercial Revolution of the Middle Ages, 950–1350*. Cambridge: Cambridge University Press.

- Malanima, Paolo. 2009. *Pre-Modern European Economy. One Thousand Years (10th–19th centuries)*. Global Economic History Series 5. Leiden and Boston, MA: Brill.
- McCloskey, Donald N. 1976. “English Open Fields as Behavior towards Risk.” *Research in Economic History* 1: 124–170.
- McCloskey, Donald N., and John Nash. 1984. “Corn at Interest: The Extent and Cost of Grain Storage in Medieval England.” *American Economic Review* 74, no. 1: 174–187.
- McCusker, John J., and Cora Gravesteijn, eds. 1991. *The Beginnings of Commercial and Financial Journalism: The Commodity Price Currents, Exchange Rate Currents, and Money Currents of Early Modern Europe*. Amsterdam: Nederlandsch Economisch-Historisch Archief.
- Nedkvitne, Arved. 2013. *The German Hansa and Bergen 1100–1600*. Cologne et al.: Böhlau.
- Nehlsen-von Stryk, Karin. 1986. *Die venezianische Seeversicherung im 15. Jahrhundert*. Ebelsbach: Gremer.
- Nehlsen-von Stryk, Karin. 2000. “Die Krise des ‘irrationalen’ Beweises im Hoch- und Spätmittelalter und ihre gesellschaftlichen Implikationen.” *Zeitschrift der Savigny-Stiftung für Rechtsgeschichte: Germanistische Abteilung* 117: 1–38.
- Neitzert, Dieter. 2019. *Göttinger Boten und Gesandte. Reichweite und Intensität städtischer Kommunikation zwischen 1400 und 1450*. Bielefeld: Verlag für Regionalgeschichte.
- North, Michael. 2005. “Von der atlantischen Handelsexpansion bis zu den Agrarreformen 1450–1815.” In *Deutsche Wirtschaftsgeschichte. Ein Jahrtausend im Überblick*, edited by M. North, 112–196. Munich: Beck.
- Oberholzner, Frank. 2015. *Institutionalisierte Sicherheit im Agrarsektor: Die Entwicklung der Hagelversicherung in Deutschland seit der Frühen Neuzeit*. Berlin: Duncker & Humblot.
- Ogilvie, Sheilagh. 2004. “Guilds, Efficiency, and Social Capital: Evidence from German Proto-Industry.” *The Economic History Review* 57: 286–333.
- Ogilvie, Sheilagh. 2011. *Institutions and European Trade. Merchant Guilds, 1000–1800*. Cambridge and New York: Cambridge University Press.
- Ogilvie, Sheilagh. 2019. *The European Guilds: An Economic Analysis*. Princeton, NJ: Princeton University Press.
- Pauly, Michel. 2007. “Jahrmärkte in Europa vom 14. bis 16. Jahrhundert. Regionale Untersuchungen und der Versuch einer Typologie.” In *Messen, Jahrmärkte und Stadtentwicklung in Europa/Foires, marchés annuels et développement urbain en Europe*, edited by Franz Irsigler, and Michel Pauly, 25–40. Trier: Porta Alba.
- Persson, Karl G. 1999. *Grain Markets in Europe, 1500–1900: Integration and Deregulation*. Cambridge: Cambridge University Press.
- Persson, Karl G. 2010. *An Economic History of Europe. Knowledge, Institutions and Growth, 600 to the Present*. Cambridge: Cambridge University Press.
- Pindl, Kathrin. 2018. “Grain Policies and Storage in Southern Germany: The Regensburg Hospital (17th–19th Centuries).” *Jahrbuch für Wirtschaftsgeschichte | Economic History Yearbook* 59, no. 2: 415–446.
- Pindl, Kathrin. 2019. “Reviewed Sample Study 21: Measuring the Material Standards of Living.” In *Methods in Premodern Economic History: Case Studies from the Holy Roman Empire, c. 1300–c. 1600*, edited by Ulla Kypta, Julia Bruch, and Tanja Skambraks, 244–247. London: Palgrave Macmillan.
- Prak, Maarten, Catharina Lis, Jan Lucassen, and Hugo Soly, eds. 2018. *Craft Guilds in the Early Modern Low Countries. Work, Power, and Representation*. London: Routledge.
- Randalls, Samuel, and James Kneale. 2021. “A Fragile Network: Effecting Hail Insurance in Britain, 1840–1900.” *Enterprise & Society* 22, no. 3: 739–769.
- Richardson, Gary. 2005. “The Prudent Village: Risk-Pooling Institutions in Medieval English Agriculture.” *Journal of Economic History* 65, no. 2: 386–413.
- Rösener, Werner. 1992. *Peasants in the Middle Ages*. Cambridge: Polity Press.
- Rothmann, Michael. 1998. *Die Frankfurter Messen im Mittelalter*. Stuttgart: Steiner.
- Scheller, Benjamin. 2016. “Risiko—Kontingenz, Semantik und Fernhandel im Mittelmeerraum des Hoch- und Spätmittelalters.” In *Die Ungewissheit des Zukünftigen. Kontingenz in der Geschichte*, edited by Frank Becker et al., 185–210. Frankfurt/Main and New York: Campus Verlag.
- Scheller, Benjamin. 2017. “Experten des Risikos. Informationsmanagement und Wissensproduktion bei den Akteuren der spätmittelalterlichen Seeversicherung.” In *Wissen und Wirtschaft:*

- Expertenkulturen und Märkte vom 13. bis 18. Jahrhundert*, edited by Marian Füssel, Philip Knäble, and Nina Elsemann, 55–78. Göttingen: Vandenhoeck & Ruprecht.
- Scholten, Friederike. 2019. “Landlords as Rational Investors? Grain Storage on Noble Manors in the Rhineland Area, 1650–1850.” In *Stocks, Seasons and Sales. Food Supply, Storage and Markets in Europe and the New World, c. 1600–2000*, edited by Wouter Ronsijn, Niccolo Mignemi, and Laurent Herment, 19–36. Turnhout: Brepols.
- Selzer, Stephan, and Ulf C. Ewert. 2001. “Verhandeln und Verkaufen, Vernetzen und Vertrauen. Über die Netzwerkstruktur des hansischen Handels.” *Hansische Geschichtsblätter* 119: 135–161.
- Skambraks, Tanja. 2019. “Trust.” In *Methods in Premodern Economic History: Case Studies from the Holy Roman Empire, c. 1300–c. 1600*, edited by Ulla Kypta, Julia Bruch, and Tanja Skambraks, 33–35. London: Palgrave Macmillan.
- Spufford, Peter. 1988. *Money and its Use in Medieval Europe*. Cambridge: Cambridge University Press.
- Steinbach, Sebastian. 2019. “What Is Money?” In *Methods in Premodern Economic History: Case Studies from the Holy Roman Empire, c. 1300–c. 1600*, edited by Ulla Kypta, Julia Bruch, and Tanja Skambraks, 132–145. London: Palgrave Macmillan.
- Sturm, Beate. 2009. “*Wat ich schuldich war.*” *Privatkredit im frühneuzeitlichen Hannover*. Stuttgart: Steiner.
- Tocqueville, Alexis de. 1856. *The Old Regime and the Revolution*. Translated by John Bonner. New York: Harper & Brothers.
- Volckart, Oliver. 2004. “Die Dorfgemeinde als Kartell: Kooperationsprobleme und ihre Lösungen im Mittelalter und in der frühen Neuzeit.” *Jahrbuch für Wirtschaftsgeschichte | Economic History Yearbook* 45, no. 2: 189–204. DOI: 10.1524/jbwg.2004.45.2.189.
- Weber, Maria. 2021. *Schuldenmachen: Eine soziale Praxis in Augsburg (1480 bis 1532). Verhandeln, Verfahren, Entscheiden*. Munster: Aschendorff.
- Wubs-Mrozewicz, Justyna. 2015. “Mercantile Conflict Resolution and the Role of the Language of Trust: A Danzig Case in the Middle of the Sixteenth Century.” *Historical Research* 88, no. 241: 417–440. DOI: 10.1111/1468–2281.12105.
- Wubs-Mrozewicz, Justyna. 2020. “The Concept of Language of Trust and Trustworthiness: (Why) History Matters.” *Journal of Trust Research* 10, no. 1: 91–107. DOI: 10.1080/21515581.2019.1689826.
- Zuijderduijn, Jaco. 2009. *Medieval Capital Markets. Markets for Renten, State Formation and Private Investment in Holland (1300–1550)*. Leiden and Boston, MA: Brill.
- Zuijderduijn, Jaco. 2018. “The Ages of Women and Men: Life Cycles, Family and Investment in the Fifteenth-Century Low Countries.” In *Women and Credit in Pre-Industrial Europe*, edited by Elise Dermineur, 95–120. Turnhout: Brepols.
- Zuijderduijn, Jaco, and Tine de Moor. 2013. “Preferences of the Poor. Market Participation and Asset Management in Sixteenth-Century Holland.” *European Review of Economic History* 17: 233–249.
- Zuijderduijn, Jaco, and Kim Overlaet. 2021. “Strategies for Old Age and Agency of the Elderly in Towns of the Low Countries in the Renaissance.” *Continuity and Change* 36, no. 3: 265–284. DOI: 10.1017/S0268416021000291.

21

UNCERTAINTY AND INNOVATION

New Perspectives from Nineteenth-Century Patenting Behavior

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Following Knight (1921), economists distinguish between economic contexts characterized by risk and by uncertainty, respectively (see de Jong, Chapter 19 in this volume). Simply put, “risk” refers to situations in which agents have a sound understanding of all the possible outcomes of their decisions and can calculate, with good approximation, their relative odds. “Uncertainty” refers to situations in which the agents’ understanding is significantly more rudimentary, so they are not in the position to calculate dependable odds and often cannot even fully envisage all the possible outcomes of their decisions (Dequech 2006). In this respect, the search for innovation is clearly an economic activity characterized by ubiquitous uncertainty.

Knight’s distinction between risk and uncertainty complements, to some extent, Schumpeter’s views on entrepreneurship and innovation. Schumpeter (1934) argued that investments in innovation activities were not the outcome of rational calculations, but rather were undertaken by a special class of individuals (“entrepreneurs”) who, even if not able to formulate fully accurate forecasts about the future, were willing to incur the hazards and difficulties related to the introduction of innovations.

The subsequent literature, while preserving the emphasis of Schumpeter (and Knight) on the role of uncertainty, has gradually moved away from this somewhat heroic and idealized perspective of entrepreneurship, instead trying to reconstruct the cognitive heuristics and the organizational mechanisms that lead to the formulation of expectations and forecasts in the context of innovative processes. To be sure, most of the research carried out during the 1970s and 1980s on the role of expectations in innovation projects was critically aware of the role of Knightian uncertainty in research and development (R&D) decision-making. Accordingly, the main approach was the use of company-based case studies or of small samples of innovations to unravel the difficulties and potential biases which characterized these types of decisions. For example, in an important study Beardsley and Mansfield (1978) examined in detail the accuracy of the forecasts on the profitability of innovations carried out by a large US company, noting their overall fragility, which they ascribed to the “inherent uncertainty” of innovation processes.¹

This stream of detailed empirical research on the accuracy of and the biases affecting expectations and decision-making in inventive activities gradually petered out during the 1990s. In fact, despite the empirical evidence suggesting that innovation processes were typically surrounded by Knightian uncertainty, formal models of innovation, both in industrial organization—the literature on “patent races” (Reinganum 1989)—and in growth theory (Aghion and Howitt 1992), began to represent the stochastic features of innovation by means of simple probability distributions. Furthermore, it was also assumed that these probability distributions were known to the agents. In this way, these formal models completely removed the issue of Knightian uncertainty from the picture, preferring to settle for the more comfortable and mathematically treatable notion of risk.

In these models, the agents can resort to standard risk-adjustment methods to formulate their strategies. In other words, one of the key assumption of this literature is that agents can formulate “rational technological expectations.” This made it possible to apply game theory and standard neoclassical investment frameworks to the case of innovation (Hall and Lerner 2010). However, the insights emerging from this theoretical literature have found limited application in empirical studies, as the models are based on a wide range of parameters and variables for which it is difficult to find clear-cut empirical counterparts. In an empirical study of the pharmaceutical industry, where the patent race model seems plausible, Cockburn and Henderson (1994) found that the characterization of strategic interactions found in the patent race literature was of little relevance.²

On reflection, the disconnect between theoretical literature and empirical studies in this context is not surprising. Clearly, the notion of technological expectations is inherently elusive and of difficult empirical operationalization, especially in large scale samples. In the field of economic history, primary and secondary sources have been used to chart the dynamics of expectations about trends in economic activity and inflation (Binder 2016; Lennard, Meinecke, and Solomou 2023), but so far there has been no systematic research on expectations relating to innovation returns.

In this chapter we take advantage of a peculiar characteristic of the nineteenth- and early twentieth-century Italian patent system which allows us to carry out a systematic assessment of the profits expectations of innovators at different moments in time. Indeed, since the seminal contribution of Schmookler (1966), patents have become one of the favorite “guinea pigs” of innovation scholars. They have provided a way of gathering important insights on patterns of innovation at multiple levels of analysis, ranging from individual inventors and firms all the way to industries and countries. This research tradition has gained further momentum since the early 2000s with the availability of large and easily accessible datasets such as the NBER-USPTO (Jaffe and Trajtenberg 2002) and PATSTAT datasets.

Following the pioneering contributions of Dutton (1984) and Macleod (1988) for England (not the UK as a whole), and Sokoloff (1988) and Sokoloff and Khan (1990) for the United States, the use of patents as innovation indicators has developed into a consolidated tradition in economic history, too. Since then, historical patent data have been insightfully employed to reconstruct profiles of inventive activities for countries such as Germany (Streb, Baten, and Yin 2006), Italy (Vasta 1999; Nuvolari and Vasta 2015, 2017), Japan (Nicholas 2011a), Spain (Saiz 1999, 2012), France (Nuvolari, Tortorici, and Vasta 2023), Norway (Basberg 2006), Sweden (Andersson and Tell 2016), and in international comparative perspective (Nicholas 2011b).

To assess the expectations of innovators about the economic prospects of their inventions, this chapter, following the approach by Bessen (2008), expands on this line of research by providing new estimates of the inventors' evaluations in relation to their patents, based on a large sample of Italian historical patents and using the renewal method. We focus on the expectations on innovation returns at two critical instances: the moment of applying for the patent and the moment at which the inventor decides to abandon patent protection by not paying the required fee. By comparing *ex ante* and *ex post* evaluations, we can explore the different attitudes of innovators concerning the radical uncertainty surrounding the innovation process (see Nützenadel and Streb, Chapter 8 in this volume). We estimate the value of patents using renewal data (Schankerman and Pakes 1986). To the best of our knowledge, so far, the only implementation of the renewal approach in economic history is offered by Sullivan (1994), who used the method to estimate the value of British patents in the period 1852–1876. The approach assumes a rational (in the limited sense of profit-motivated) behavior of the patentee, who will keep on paying the renewal fees only as long as this is economically justified by the revenue streams generated by the patent.

The chapter is structured as follows. In the next section, we introduce the salient institutional features of the Italian patent system in this period, before going on to discuss the sources and outlining the main patterns of innovation as captured by patent data. Subsequently, we present the patent renewal model that we adopt to describe the distribution of patent values and carry out its econometric estimation. The *ex ante* and *ex post* patent values are then used to study innovators' attitudes toward uncertainty, before finally drawing some conclusions.

The Historical and Legal Background

The first Italian patent law was enacted in 1864 (Law n. 1657, January 31, 1864), three years after the political unification of the country. The original version of this law, inspired by the French and Belgian examples of 1844 and 1854, had been introduced in the Kingdom of Sardinia (Piedmont) in 1855. The Italian patent system was a registration system and, accordingly, there was no examination of the actual novelty of the invention patented. Controversies on the novelty of patents were intended to be settled by means of court cases. In the Italian system, in contrast with the practice prevailing in other countries such as the US, where patents could be registered only in the name of inventors, patents could also be registered in the name of companies.³ This peculiarity of Italian patent law enables an immediate assessment of whether a patent is to be ascribed to an independent inventor or to a firm.

For our aims, the crucial feature of the patent system were the rules determining the cost of registering a patent and thereafter keeping it alive. These costs affected the choice of inventors as to whether and how long to protect their inventions. In Italy, the system was extremely flexible: an inventor could register a patent for a duration of their choosing, ranging from 1 to 15 years. There was an initial payment that was proportional to the number of years for which the patent was requested (10 Italian Lire for one year, 20 Lire for two years, up to 150 Lire for 15 years). In addition, it was necessary to pay an annual renewal fee for keeping the patent in force, which increased over time: 40 Lire for the first three years, 65 Lire from the fourth to the sixth year, 90 Lire for the seventh up to the ninth year, 115 Lire for the tenth to the twelfth year and 140 Lire for the last three years. The *Gazzetta Ufficiale del Regno d'Italia* kept regular track of the lifetime of patents by publishing a list

of patents that had expired due to non-payment of the renewal fee. Furthermore, the law foresaw the possibility of extending the life of a patent initially registered for a shorter period. To do this, the inventor had to apply for an *attestato di prolungamento* (extension certificate). This cost 40 Lire plus all the other fees required for a normal patent of the same duration. Hence, since a *prolungamento* involved this additional cost of 40 Lire, if the inventor was sure about the prospects of their invention it was more convenient to immediately register the patent for the whole of the desired duration. However, when the prospects of the invention were uncertain, the possibility of applying for a *prolungamento* provided a further degree of flexibility.

Unfortunately, because of subtle differences in the structure of patent fees and in the actual enforcement of patent protection in different legislations, it is not straightforward to precisely compare the costs of patenting in different countries. The renewal fee structures for the UK and Germany have been recently discussed, respectively, by Nicholas (2011c) and by Streb, Baten, and Yin (2006).⁴ If the annual fees are measured in terms of the average weekly wages of workers in the engineering sector, for example, the costs for keeping a patent alive turns out to be systematically lower in Italy compared to Germany and the UK, with the sole exception of the initial year (cf. Nuvolari and Vasta 2015, 864). The lower cost of the Italian system is also confirmed when considering the total amount of the fees paid over the patent's lifetime. It is also worth mentioning that the most expensive annual renewal fees (those to be paid in years 13, 14, and 15) were lower than the cost in year 1. For this reason, it seems very unlikely that an inventor who had been able to register a patent in the Italian system paying the costs in year 1 was later affected in their renewal behavior by credit constraints. This feature of the Italian fee structure supports the use of renewal data as an indicator of the quality of patents (Nuvolari and Vasta 2015). Of course, this argument does not exclude that some independent inventors may not have been able to access the patent system because of credit constraints. Still, these inventors are not included in our sample (as without registration, we do not know about them) and consequently do not affect the results of our analysis. In our interpretation, the flexibility of the Italian patent system can account both for the significant growth of patenting activity in Italy in the period in question and for the attractiveness of the system for foreign inventors.

Nuvolari and Vasta (2015) also offer evidence of the dynamism in patent applications for the period 1861–1913, known as the Liberal Age in Italy. Patenting activity in Italy increased substantially during this historical phase. Even if Italy at the time was a latecomer country, its volume of patenting activity, at the end of the period, was not very different from that of a leading country of the Second Industrial Revolution such as Germany. This dynamism was coupled with the activities of some Italian inventors that were able to successfully develop “macroinventions” (Mokyr 1990). These included Ascanio Sobrero (1812–1888), an academic chemist working in Torino, who, in 1847, discovered nitroglycerine; Alessandro Cruto (1847–1908) who during the 1880s invented an extremely efficient electric light bulb that in a systematic series of experiments clearly outperformed Edison's; and Guglielmo Marconi (1874–1937), who pioneered the first successful long-distance radio transmission equipment, for which he was awarded the Nobel Prize for Physics in 1909.

Figure 21.1 provides a comprehensive comparative perspective on the “openness” of different patent systems, measured as the share of patents granted to foreign residents between 1871 and 1913. It suggests that the Italian patent system was extremely open relative to other major countries such as the United States, Germany, the UK, and France. Overall, the degree of openness of Italy resembles that of other small open economies such as Belgium,

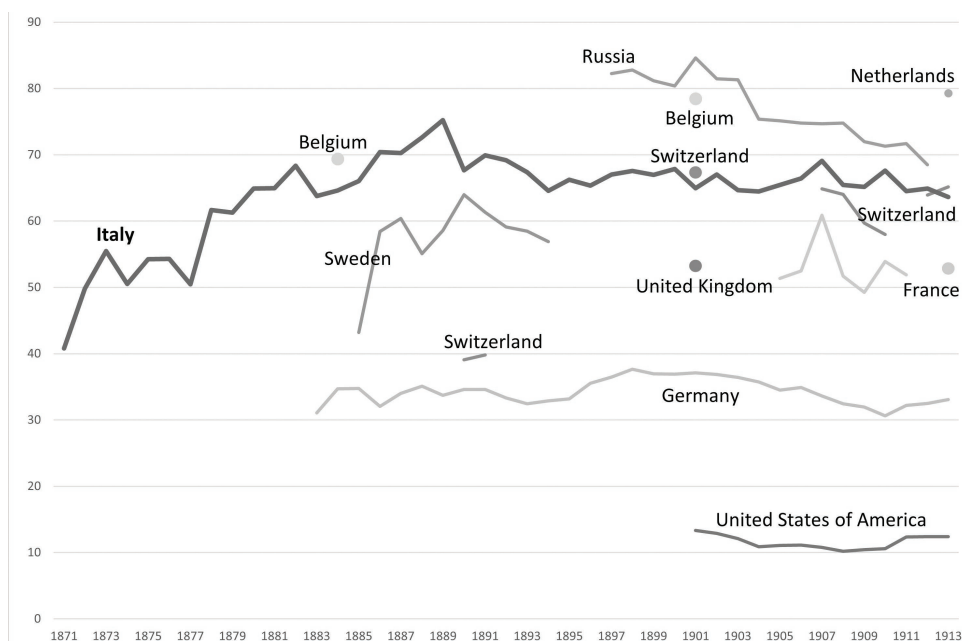


Figure 21.1 Degree of openness (share of foreign patents on total) of different patent systems, 1871–1913.

Source: Author’s own elaboration on WIPO Statistics Database (last accessed June 2017), data for Italy from MAIC (various years).

Netherlands, Sweden, and Switzerland. The significant activity of foreign inventors makes Italy a particularly interesting context to study the attitudes toward uncertainty among different (especially domestic vs. foreign) categories of inventors.

The Data

In this paper we use an updated version of the dataset on Italian patents constructed by Nuvolari and Vasta (2015) and fully described in Nuvolari and Vasta (2020). The dataset contains detailed information on all the Italian patents granted in five benchmark years: 1864–1865, 1881, 1891, 1902, and 1911 (selected in broad correspondence with the census years and providing an even coverage of the Liberal Age period of 1861–1913). For each patent we have collected information on the patentee, the invention, the technology class, the residence of the patentee, and the duration of the patent (for more details on the salient features of the dataset, see Nuvolari and Vasta 2015, 2020). This updated version of the dataset contains not only the patents registered in Italy, but also the “imported” patents, that is, patents that were originally registered in a foreign country, and for which the patentee applied for the Italian registration under the protocol of the Paris Convention of 1883.⁵ “Imported” patents are available for the years 1891, 1902, and 1911, but they are particularly significant only in the last benchmark year, corresponding to 22.1% of total patents (compared to 2.9% in 1891). Speculatively, this may suggest that the Convention became (at least for Italy) effective only from the 1910s (Nuvolari and Vasta 2020).

Based on the available information, it is possible to classify patents assigned to independent inventors and those assigned to firms, and further distinguish them according to whether they are Italian or foreign. As a result, our dataset includes, for the last three benchmark years, two categories of foreign patents. The first is the case of a foreign inventor applying for an Italian patent through the normal procedure. The second is the case of a foreign inventor holding a valid patent in a country that was a member of the Paris Convention, who applied for the registration of that patent in Italy.

Some characteristics of the data are worth mentioning to better frame the results of the econometric model presented in the next section. Two broad trends characterize the analyzed time period: the first is the increase in the share of firm patents or, from the alternative perspective, a decline in the share of independent inventors from 96% in 1864 to 1865 to 75.9% in 1911; correspondingly, the share of firms in the total number of patents increases from 4% in 1864 to 1865 to 24.1% in 1911. When imported and priority patents are excluded, the share of firm patents increases to 28.2% in 1911. This decline of independent invention in Italy in this historical period is common to other major countries, including the US, the UK, Japan, Spain, and Sweden (Nuvolari and Vasta 2015; Andersson and Tell 2016), and is consistent with the notion of the “industrialization of invention” proposed by Bernal (1953). The notion indicates the shift of inventive activities from independent inventors to the formalized R&D laboratories of companies concomitantly with the unfolding of the Second Industrial Revolution.

The second trend is that the share of firm patents in the case of foreign patents is significantly larger than the share of firm patents for domestic patents. When imported and priority patents are excluded, the 1911 share of firm patents is 31.9% in the case of foreign patents versus 14.3% in the case of domestic ones (Nuvolari and Vasta 2015). The share is even higher when imported and priority patents are considered (42.9% in 1911).

A Patent Renewal Model

In the analysis, we consider, as mentioned above, two kinds of duration. The first is what we call “ex ante” (planned) duration, that is, the number of years for which the patent was registered initially. The second is what we call “ex post” (realized) duration, that is, the number of years for which the patent was kept in force by the patentee through payment of the annual fee.

Figure 21.2 plots the distribution of the planned and realized duration of our sample of patents, by benchmark year, in terms of percentage share. The realized (ex post) duration (Figure 21.2a) confirms the notion of a skewed distribution of the value of patents, with a large fraction of patents with limited duration and a small number of patents extended for the maximum patent duration. In contrast, the distribution of planned (ex ante) duration (Figure 21.2b) shows a modal outcome at six years. Durations of one year, three years, six years, and 15 years also appear to be chosen frequently ex ante by the inventors, with very few applications for the periods from 7 to 14 years. Looking in detail at the data, we find that the planned duration is confirmed in 24.4% of cases, whereas more often the patent is abandoned earlier than its planned duration (57.3% of patents). In 18.3% of cases, the patent is extended beyond the originally planned duration. The differences between the two distributions of Figure 21.2a and 21.2b, in combination with the variety of the patent trajectories, suggest that our patent sample provide an insightful perspective on the inventors’ strategies under uncertainty.

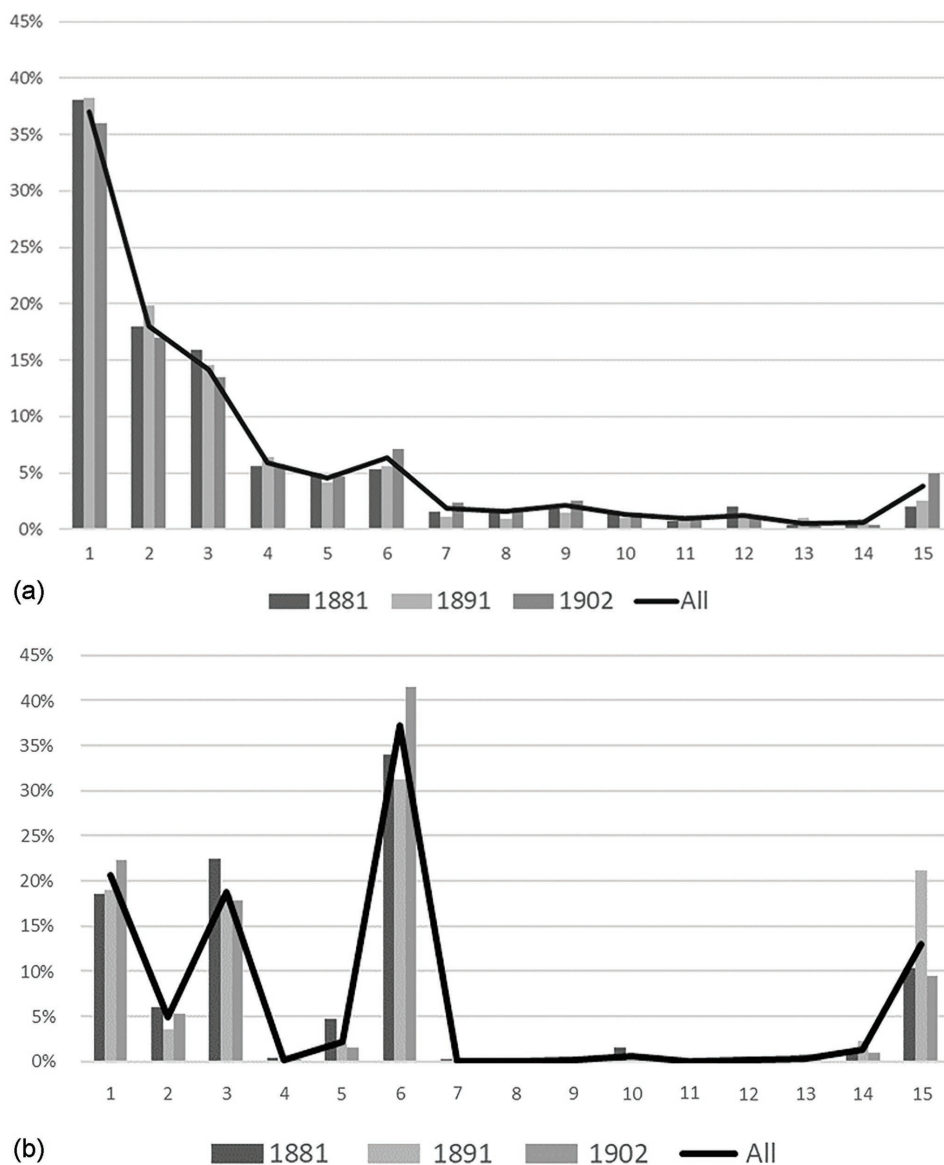


Figure 21.2 Planned (ex ante) and realized (ex post) durations. (a) Realized duration, share. (b) Planned duration, share.

Source: Author creation

In more detail, Table 21.1 compares the average value of the two types of duration (in years), while also distinguishing between patents of different types. Table 21.1 shows that ex post duration is on average lower than ex ante duration, so that a non-negligible share of inventors initially overestimated patent duration (value). Firm patents are characterized by longer durations than the patents of independent inventors and foreign patents are characterized by longer durations than Italian ones. Also, patents in high-tech sectors have a

Table 21.1 Average patent duration for benchmark years (in years)

	1864–1865	1881	1891	1902	1911
Average ex ante length (years)					
Total	6.3	5.2	6.5	5.1	4.8
Firm	6.0	6.0	7.9	6.8	6.5
Independent	6.4	5.1	6.2	4.6	4.1
Foreign	7.3	6.0	7.8	6.2	5.8
Italy	5.4	3.7	3.4	2.8	2.9
Hi-tech	6.1	6.0	7.3	5.7	6.0
Low-tech	6.5	4.8	6.1	4.6	4.2
Imported and priority patents			9.1	7.2	6.7
Average ex post length (years)					
Total		3.3	3.3	3.8	
Firm		5.2	4.9	5.7	
Independent		3.0	2.9	3.2	
Foreign		3.8	3.6	4.4	
Italy		2.7	2.8	2.5	
Hi-tech		3.8	3.7	4.2	
Low-tech		3.0	3.0	3.4	
Imported and priority patents			5.9	5.1	

Source: Nuvolari and Vasta (2020) and our computation on the dataset.

longer duration than those in low-tech ones. Finally, the patents with the longest duration are usually those registered under the Paris Convention. These patterns apply for both ex ante and ex post durations and for each benchmark year.

We estimate the determinants of the value of patents based on the renewal behavior of patentees, that is, the choice of keeping a patent “alive” or “aborting” it by not paying the renewal fees, using an econometric model. In the case of ex ante duration, it is reasonable to assume that applicants for inventions perceived as most valuable at registration will apply to register the patent for a longer duration. Analogous reasoning leads us to claim that also in the case of renewal (ex post) behavior, patentees are acting to an extent as rational/profit-motivated agents, meaning that at each moment in time, patentees assess the (potential) revenues arising from the patent and compare them with the costs of the renewal fee. This means that, as time goes by, only the most valuable patents are kept in force. The difference between the two distributions allows us to assess patentee attitudes toward uncertainty.

The renewal behavior of patentees is depicted in Figure 21.3a–d that compares observed ex post renewal rates with the initial ex ante durations. The figure is constructed by showing patent duration in years on the horizontal axis and the share of patents that are kept alive for any given duration on the vertical axis. In terms of ex ante duration (dotted lines), as we have mentioned, one can assume that the patents perceived as most valuable will be registered for a longer period. The diagrams show that ex post duration is on average lower than ex ante duration, suggesting that a non-negligible share of inventors initially overestimated the value of their inventions.

Remarkably, in terms of ex post duration, in the period 1878–1914 patentees using the Italian system exhibited a renewal behavior very similar to that of German patentees (Streb, Baten, and Yin 2006). The study found that in the period 1887–1907, the share of patents

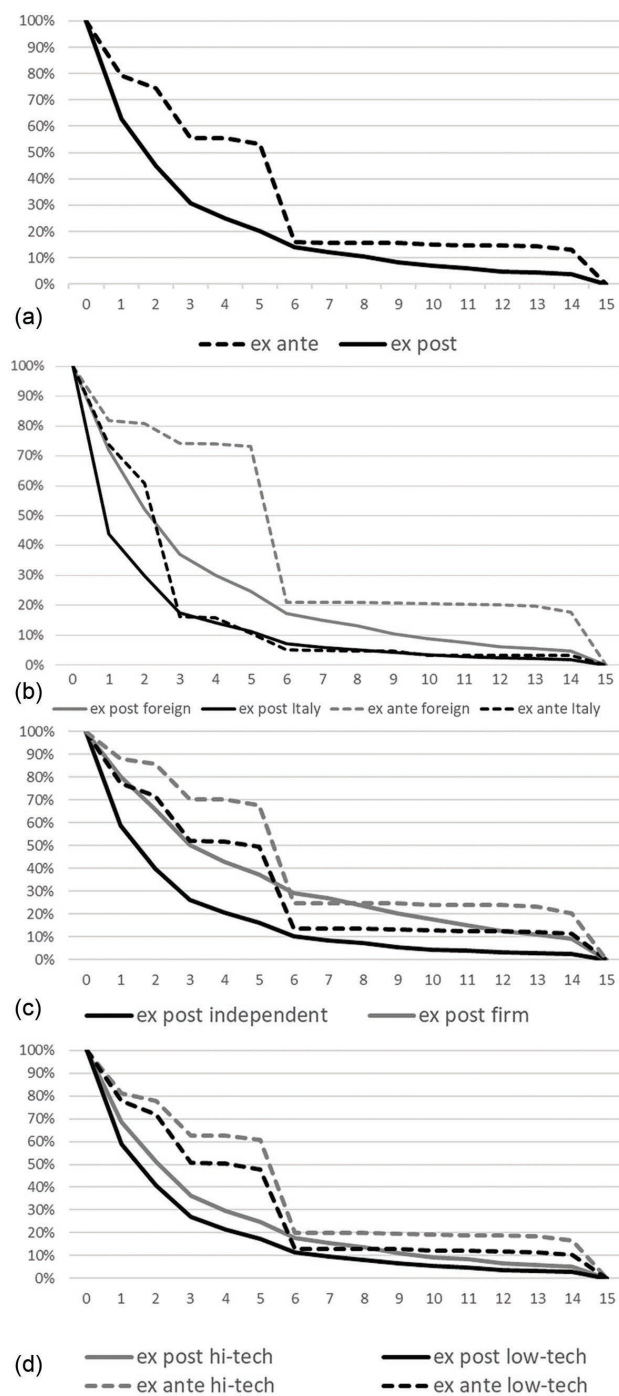


Figure 21.3 Observed renewal rates and ex ante duration, 1881–1902. (a) All patents. (b) By nationality. (c) By type of patentees. (d) By technological intensity.

Source: Author creation.

renewed for ten years or more ranged from 8% to 11% of the total. In the Italian case, we have a corresponding share of 8.4%. The renewal behavior of British patentees in the second half of the nineteenth century seems characterized by a similar pattern, with about 10% of patents kept in force for a duration of ten years or more (Nicholas 2011c, 327). Fascinatingly, these results suggest that nineteenth-century patentees adopted similar rules of thumb for assessing the value of patents. Note also that Table 21.1 shows plausible patterns in terms of a rational behavior of patentees. If we assume that “foreign,” “firm,” and “high-tech” patents will typically be more “valuable,” we correspondingly find longer durations.

Following Schankerman and Pakes (1986), we estimate the value of patents by considering the cost structure of the patent system and the renewal behavior of the patentees. Then, the estimated model is employed to compute ex ante values on the basis of ex ante planned durations. Let L be the patent length, $L = 1, \dots, 15$ years where the initial fee to be paid at the moment of the application was equal to $10 \cdot L$ Lire. Then, for each year of patent duration, the patentee is required to pay a fee to keep the patent in force, and this fee increases with patent length (Nuvolari and Vasta, 2020). As previously mentioned, the fee (in Italian Lire) is 40 for years 1–3, 65 for years 4–6, 90 for years 7–9, 115 for years 10–12, and 140 for the last three years (13–15). Example: a patentee who decides to take a patent for six years initially pays a registration fee of 60 Lire. Then, the renewal decision has to be made each year, with the patentee paying 40 Lire annually for the first three years and then 65 Lire annually from the fourth to the sixth year. We indicate with C_t the yearly fee at the time t (for example when $t = 6$, $C_t = 65$ Lire).

The estimate of the determinants of patent value are obtained on the basis of ex post durations using the approach developed by Bessen (2008).

Let $r_i(t)$ be the (unobserved) annual flow of rents for the patent i in year t . The annual flow of rents may be assumed to comprise the returns from directly commercializing the product covered by the patent, licensing it, but also any other economic returns arising from the strategic use of the patent (Penin 2012). We assume that the profit stream depreciates at a constant rate d , so that $r_i(t) = r_i(0) e^{-dt}$. In each period, the patentee has to decide whether to pay the patent fee to keep the patent in force for one more year or to give up. The patentee will renew the patent at time t if the present value of profits in the additional year exceeds the (observed) renewal fee, C_t . The present value of profits from t to $t+1$, can be computed as:

$$\int_t^{t+1} r_i(\tau) e^{-s\tau} d\tau = r_i(0) z_t$$

With $z_t = e^{-(d+s)t} \frac{1 - e^{-(d+s)}}{d+s}$, with s the discount rate. We follow the literature and set $s = 10\%$.⁶ In other words, at time t , the patent fee will be paid to keep the patent in force for an additional year if $r_i(0) z_t \geq C_t$, or:

$$\ln r_i(0) \geq \ln(C_t / z_t)$$

In this context, an estimate of the profit flow can be obtained by exploiting the yearly decision related to patent renewal. As an example, a patent that is renewed up to time 6, would have a value $r_i(0)$ such that $C_7 / z_7 \geq r_i(0) \geq C_6 / z_6$. Note that no upper bound would be

available to the estimated profit flows for those patents that are renewed at all time periods (up to year 15).

To characterize the profit flow as a function of observable characteristics of the patent, we consider the following equation:

$$\ln \cdot \eta_i(0) = \mathbf{x}_i' \boldsymbol{\beta} + u_i$$

The model parameters are estimated using a maximum likelihood approach, under the assumption that u_i is normally distributed with mean zero and standard deviation σ . The estimated parameters will allow us to characterize (estimate) patent value as a function of patent characteristics.⁷

The results of the estimated model are shown in Table 21.2. In Model 1, a dummy for high-tech industry is included among the regressors,⁸ whereas in Model 2 the dummy variable that identifies high-tech industries is replaced by a full set of industry-specific dummy variables.

Results are broadly consistent across the two model specifications and confirm the descriptive evidence provided above (Table 21.1 and Figure 21.2). The value of foreign patents is higher with respect to Italian patents, as well as patents in the high-tech sector (as opposed to low-tech patents), patents issued to companies (as opposed to patents registered by independent inventors), and the patents applied for under the Paris Convention (as opposed to domestic patents). As for the dynamics of value over time, patents granted in the year 1891 have a lower value compared to patents granted in the year 1902 (no difference emerges to patents granted in the year 1881). This could perhaps be related to the severe slump of the Italian economy in 1891, which fell in the middle of the period (1889–1994) that has been eloquently termed as the “darkest years of the economy of new Kingdom [of Italy]” (Luzzatto 1968).

The patent renewal model is further explored in Models three and seven, in which we estimate the value equation considering selected subsamples of the set of patents. In particular, Model three only includes patents granted to independent inventors; Model four is estimated on the set of patents granted to firms; foreign and Italian patents are considered in Model five and six, respectively; and Model seven only takes into account high-tech patents.⁹ The estimated value of σ is coherent across the different subsamples; whereas the value of the parameter d seems to be different across the subsample, ranging from a value of 0.3451 (95% confidence interval: 0.2124; 0.4778) that characterizes firm patents to a value of 0.5377 (95% confidence interval: 0.4129; 0.6627) for patents assigned to independent inventors. To explore this pattern, in Model eight and Model nine the parameter d is written as a function of the patent characteristics. As the parameter d (depreciation rate) is bounded in the 0–1 interval, the logistic function is used in the maximization process.¹⁰ This parametrization is used also in Model eight and nine. Being a monotonic transformation, the sign of the coefficients is directly linked to the direction of the effect (i.e. a positive coefficient indicates a positive effect of the associated variable). However, in order to enhance the readability of the results, Table 21.2 also shows, among squared brackets, the estimated value of the depreciation rate, d , for each patent type. The estimated values of d are coherent with the value of the depreciation rate estimated on the specific subsamples. The model confirms that foreign patents have a higher depreciation rate with respect to Italian patents. This might be due to a lack of knowledge of the local context, resulting in a lesser ability to

Table 21.2 Estimates of the ex post patent value model (discount rate = 10%)

	Model 1	Model 2	Model 3 (independent inventors)	Model 4 (firm)	Model 5 (Italian)	Model 6 (foreign)	Model 7 (high-tech)	Model 8	Model 9	Model 10 ($d = 15\%$)
Foreign	1.6859*** (0.1547)	1.6475*** (0.1527)	1.8520*** (0.1947)	1.1642*** (0.2798)	--	--	1.8927*** (0.2397)	1.8994*** (0.1878)	1.8738*** (0.1851)	0.9017*** (0.0549)
Independent	-1.9419*** (0.1747)	-1.8961*** (0.1718)	--	--	-1.9148*** (0.3192)	-1.9057*** (0.2052)	-2.1734*** (0.2574)	-1.0988*** (0.1732)	-1.0475*** (0.1707)	-1.0324*** (0.0599)
High-Tech	0.5657*** (0.1005)	--	0.3877*** (0.1129)	1.1156*** (0.2343)	0.1166 (0.1632)	0.7661*** (0.1283)	--	0.4015*** (0.1304)	--	0.3015*** (0.0493)
Imported and priority	0.8731*** (0.2356)	0.8347*** (0.2328)	0.9806*** (0.3011)	0.6439* (0.3815)	3.0307*** (1.7057)	0.8343*** (0.2474)	0.6765** (0.3129)	1.0883*** (0.3485)	1.0405*** (0.3464)	0.4681*** (0.1213)
Year 1881	-0.1052 (0.1296)	-0.0680 (0.1292)	-0.1284 (0.1469)	-0.1017 (0.3037)	0.0996 (0.2089)	-0.2326 (0.1627)	-0.1811 (0.1971)	0.3080* (0.1813)	0.3484* (0.1812)	-0.0547 (0.0688)
Year 1891	-0.3658*** (0.1077)	-0.3609*** (0.1074)	-0.3627*** (0.1255)	-0.4934** (0.2268)	0.2938 (0.1842)	-0.6741*** (0.1385)	-0.3884** (0.1540)	-0.0559 (0.1449)	-0.0339 (0.1443)	-0.1964*** (0.0557)
Constant	6.0051*** (0.2249)	5.7952*** (0.2985)	4.2922*** (0.1382)	5.3906*** (0.3410)	5.7612 (0.3670)	7.8151*** (0.3831)	6.3463*** (0.3352)	5.1336*** (0.2230)	4.8822*** (0.2997)	4.8026*** (0.0746)
s	3.1957*** (0.2237)	3.1560*** (0.2205)	3.2968*** (0.2827)	3.0527*** (0.3854)	2.8689*** (0.3633)	3.3016*** (0.2759)	2.9844*** (0.2929)	3.2192*** (0.2240)	3.1782*** (0.2201)	1.6994*** (0.0223)
d	0.4692*** (0.0468)	0.4677*** (0.0466)	0.5377*** (0.0636)	0.3451*** (0.0677)	0.3861*** (0.0744)	0.4981*** (0.0583)	0.4106*** (0.0596)			0.1500 (imposed)
								$d_i = \exp(x_i'g)/(1 + \exp(x_i'g))$		
Foreign								0.1870** (0.0897)	0.2035** (0.0894)	
Independent								[0.3667]	[0.3687]	
								0.5901*** (0.0861)	0.5945*** (0.0858)	
High-Tech								[0.4642]	[0.4633]	
								-0.1266* (0.0745)	-0.1601** (0.0746)	
								[0.2973]	[0.2887]	

(Continued)

Table 21.2 (Continued)

	Model 1	Model 2	Model 3 (independent inventors)	Model 4 (firm)	Model 5 (Italian)	Model 6 (foreign)	Model 7 (high-tech)	Model 8	Model 9	Model 10 ($d = 15\%$)
Imported and priority								0.1460 (0.1634) [0.3572]	0.1394 (0.1635) [0.3539]	
Year 2 (1881)								0.3571*** (0.1090) [0.4070]	0.3547* (0.1084) [0.4045]	
Year 3 (1891)								0.2658*** (0.0853) [0.3852]	0.2781*** (0.0851) [0.3862]	
Constant								-0.7334*** (0.1922) [0.3244]	-0.7415*** (0.1917) [0.3227]	
Industry Dummies	No	Yes	No	No	No	No	No	No	Yes	No
N	5,769	5,769	4,642	1,127	1,849	3,920	2,391	5,796	5,769	5,769
Log lik.	-11,838.3	-11,790.36	-8994.06	-2804.87	-2946.44	-8875.77	-5204.29	-11794.99	-11744.42	-11916.76

Note: Asterisks indicate the level of statistical significance: * 10%; ** 5%; *** 1%. Omitted benchmark year is 1902.

use the patent to prevent imitation. Furthermore, a higher d is also observed for independent inventors, who might have less resources to exploit the full potential of the patent when compared to companies. High-tech patents, which were probably more difficult to imitate, are characterized by a lower depreciation rate (even if the difference is different from zero only at a 10% level of significance), whereas the change in the value of the depreciation rate for imported and priority patents is not statistically different from zero. Overall, the depreciation rate that emerges from our estimates is higher with respect to the value that is usually found in the literature, which is about 15% (e.g., Pakes 1984; Pakes and Schankerman 1986; Sullivan 1994; Lanjouw 1998; Bessen 2008). Note that, with few exceptions (see Sullivan 1994), these estimates are based on patents applied for in more recent time periods. However, this may raise concerns related to the reliability of our estimates. To check the robustness of our results, Model ten is estimated by constraining $d = 15\%$. The magnitude of the estimated coefficients changes, but relevant patterns are coherent with the previous specifications, and results confirm the higher value of foreign, high-tech, and imported and priority patents, as well as the lower value of the patents granted to independent inventors.

The estimated coefficients in the patent renewal model are then exploited to obtain an estimate of the net present value of patents, using Monte Carlo simulation methods as in Bessen (2008).¹¹ Values are simulated both on the basis of the realized (ex post) decision on the renewal of the patent as well as of the planned (ex ante) decision. In the latter case, we simulate the value of the patent that would be estimated if the initial decision on the patent duration would be confirmed in each period. As a result, we are able to compute an estimate of the patentee's evaluation of each patent at two different points in time: when the patent is first applied for, and after some time, when the value of the innovation is "revealed." The distribution of simulated patent values is analyzed in the next section.

Uncertainty, Expectations, and Patent Values

The estimation of the monetary values of each single patent at two different moments of its life can provide insight into the changing perceptions of inventors and, more generally, their attitude toward uncertainty. Intuitively, an over-optimistic inventor will be inclined to attribute a significantly larger value to their patent at the moment of registration than the actual cumulative returns over the entire patent life. By contrast, an over-pessimistic inventor will perceive the initial value of the patent to be significantly lower than the actual cumulative returns (on beliefs under uncertainty see Schweighofer-Kodritsch, Chapter 4 in this volume).

Table 21.3 Distribution of estimated ex ante and ex post values by patent characteristics

	<i>All patents</i>	<i>Foreign patents</i>	<i>Independent patents</i>	<i>High-tech patents</i>	<i>Imported and priority patents</i>
Ex post duration					
Mean	2.6	3.0	2.1	3.0	4.3
Median	1.0	2.0	1.0	2.0	3.0
Ex-ante duration					
Mean	4.5	5.7	4.2	5.2	6.6
Median	5.0	5.0	4.0	5.0	5.0

(Continued)

Table 21.3 (Continued)

	<i>All patents</i>	<i>Foreign patents</i>	<i>Independent patents</i>	<i>High-tech patents</i>	<i>Imported and priority patents</i>
Estimated ex post value, Model 1					
1st quartile	17.65	29.91	14.85	23.34	220.59
Median	222.73	452.91	216.88	440.90	1,093.99
3rd quartile	1,180.55	2,047.603	1,069.66	2,061.01	4,277.32
Mean	128,104.1	162,753.9	74,48	184,603.8	197,696.2
Estimated ex post value, Model 8					
1st quartile	19.43	32.46	17.16	24.87	264.48
Median	272.56	366.66	251.53	301.51	1,244.39
3rd quartile	1,663.46	2,909.72	1,166.71	2,237.63	7,379.72
Mean	152,687.30	204,156.65	167,074.33	158,885.74	218,496.47
Estimated ex post value, Model 10					
1st quartile	22.89	30.28	20.88	26.57	84.94
Median	85.32	130.85	84.34	128.37	225.32
3rd quartile	233.06	296.87	223.15	297.62	453.38
Mean	772.43	955.77	521.36	1,032.33	1,316.05
Estimated ex ante value, Model 1					
1st quartile	226.66	530.30	215.41	456.64	3,816.20
Median	3,698.43	3978.39	1,993.20	3,865.43	4,091.84
3rd quartile	4,167.38	4344.09	4116.31	4,290.34	378,971.7
Mean	386,750.4	532605.3	307,425	517,868.8	308,665.9
Estimated ex-ante value, Model 8					
1st quartile	258.33	813	215.27	364.86	2,529.04
Median	1,993.87	4,951.35	3,042.74	3,054.91	6,720.44
3rd quartile	7,189.40	9,070.44	7,196.92	7,308.74	159,913.69
Mean	835,711.26	1,162,557.88	983,018.91	779,759.80	610,381.67
Estimated ex ante value, Model 10					
1st quartile	86	146.08	84.1	131.4	422.1
Median	412.8	432.7	293.52	424.9	441.4
3rd quartile	445.69	457.83	441.94	454.15	4,526.16
Mean	1,913.05	2,581.64	1,609.43	2,443.85	2,203.61
Difference, Model 1					
Median	441.95	3,066.71	441.31	468.14	2,269.24
Mean	258,636.25	369,836.96	232,935.05	333,251.35	110,965.79
Difference, Model 8					
Median	416.62	2,455.37	431.59	421.74	1,892.25
Mean	683,022.68	958,399.56	815,943.20	620,872.52	391,883.01
Difference, Model 10					
Median	114.62	220.2	115.27	117.08	160.76
Mean	1,140.62	1,625.87	1,088.07	1,411.52	887.56
N	5,769	3,920	4,642	2,391	223

Table 21.3 compares the distribution of ex ante and ex post values for different groups of patents, as estimated using Model one, eight, and ten, respectively. The results of the three models are very similar, so that we focus on Model one and the following analysis will only consider estimated values obtained based on estimated coefficients in Model one.

Results show that foreign, high-tech, and “imported” patents are characterized by higher values, whereas patents of independent inventors are characterized by lower values, both ex ante and ex post. Interestingly, under this calculation the most valuable profile, considering ex post value, is that of the “imported” patents. This seems plausible, since it may reflect the fact that these patents had been probably already begun to be successfully exploited in some other countries. The large difference between the mean and the median estimated values can be explained in terms of the skewed distribution of patent value and can be ascribed to the contribution of the most valuable patents when computing the mean. Indeed, patents that are renewed over the entire life (up to year 15) would be characterized by a value that satisfies the condition $r_i(0) \geq C_{15}/z_{15}$. The inability to “observe” an upper bound to patent value is one of the main criticisms of patent renewal analysis. However, there is evidence that extrapolation of patent value does not actually result in a major bias to the estimated value of patents (Bessen 2009a). Moreover, estimates based on the log-normal distribution fits the exogenous measure of value quite well (Scherer and Harhoff 2000).

For each patent, we also considered the difference among the two estimated values (ex ante and ex post). The difference tends to be positive (as expected, as more than 50% of patents are abandoned earlier than their planned duration), with differences across the different groups.

Looking at patent characteristics, larger differences emerge for foreign patents, both in the average and median values. High-tech patents exhibit the larger mean difference, whereas imported and priority patents are characterized by a large difference in the median value, but are smaller than the overall sample in terms of the mean value. Information on the value of the innovation covered by imported and priority patents may already be acquired in the originator country, leading to a more reliable estimate of the value of the innovation at patent application. Digging further into the analysis of the difference between ex ante and ex post value of the patents is interesting as this analysis can reveal the attitude of the different types of inventors in the assessment of the value of their patents.

To better understand the relationship between characteristics of the patent and difference (D) between ex ante and ex post values, we consider five categories: (1) large negative difference, i.e. the value of the innovation is largely understated at application (“very pessimistic expectations”): $D < P25$, with P25 the first quartile (25th percentile) of the distribution of negative values; (2) negative difference, i.e. the value of the innovation is understated at application (“pessimistic expectations”): $P25 \leq D < 0$; (3) no difference, i.e. the value of the innovation is well assessed at application: $D = 0$; (4) positive difference, i.e. the value of the innovation is overstated at application: $0 < D < P75$ with P75 the third quartile (75th percentile) of the distribution of positive values (“optimistic expectations”); (5) large positive difference, i.e. the value of the innovation is largely overstated at application (“very optimistic expectations”): $D \geq P75$. The distribution of the observations in the five categories is reported in Table 21.4. The number of observations is the same for all the three models considered, since the categories are defined on the basis of the quartile of the difference in the model-specific estimated value. Table 21.4 also reports the percentage of concordances in the classification of the differences across the three models used for simulating patent values, showing that there is large concordance between the categories defined based on Model one and Model ten, whereas some minor

Table 21.4 Distribution of the differences of the ex ante and the ex post estimated values for different models

	<i>All models n obs. (%)</i>	<i>Concordance among the classifications</i>		
		<i>Models one & eight (%)</i>	<i>Models one & ten (%)</i>	<i>Models eight & ten (%)</i>
large neg. difference	263 (4.56%)	87.45	100.00	87.45
negative difference	791 (13.71%)	95.83	100.00	95.83
no difference	1,409 (24.42%)	100.00	100.00	100.00
positive difference	2,480 (42.99%)	98.95	99.72	98.95
large positive difference	826 (14.32%)	96.85	99.15	96.85

differences are detected when comparing the classifications provided by Model eight. As the results of the three models are very similar, the following analysis will only consider estimated values obtained on the basis of estimated coefficients in Model one.

In Table 21.5 we present the differences between ex ante and ex post values according to the duration decision of the patentee at the moment of the application and at the point where the patentee decides not to renew the patent. This allows us to map the attitudes of the patentee toward uncertainty on the basis of the final economic outcome of the patents and to introduce an empirical characterization of the attitudes of inventors toward uncertainty. In the rows of the table we consider the ex ante duration of the patents, while the columns represent the ex post duration. The value of each cell is the average difference (in thousands of Italian lire) between the initial expected value of the patent and its actual value at the end of its life (due either to non-renewal or to expiry). Of course, an average value of zero is reported for cells along the main diagonal where the initial and final duration are the same. This group of patents is the one for which the evaluation by the patentee did not change during the life of the patent. In this case, we can assume that these patentees have accurately forecast the value of their patents.

In the upper triangle of the table, above the diagonal, we find patents whose value was underestimated at application. We distinguish between “pessimistic” (negative values in italic) and “very pessimistic” (negative values in bold) patentees. In the lower triangle of the table, there are “optimistic” (positive values in italic) and “very optimistic” (positive values in bold) patentees. Table 21.5 shows that it is crucial to focus on differences in values rather than simply on the differences in patent duration in year. For example, when looking at the values, a patentee taking a patent with initial duration of six years and dropping it at five years is classified as “optimistic” (average difference in value being 2.07 thousand Italian lire), whereas a patentee who takes a patent for ten years and drops it at nine years is classified as “very optimistic” (30.67) even if the difference in the duration is the same in both cases.

In Table 21.6, we show the share of patents in each behavioral category of our empirical characterization (from “very pessimistic” to “very optimistic”), distinguishing different type of patents (foreign and Italian patents, patents by independent inventors and by firms, high-tech and low-tech patents, imported and priority versus all the other patents). The share for the full sample is reported in the first column for the sake of comparison. The Pearson chi-squared test reported at the bottom of the table show that the distribution

Table 21.5 Average values of differences between ex ante and ex post values by patent durations (000 Italian liras)

		<i>Ex post duration</i>														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Ex ante duration</i>	1	0.00	-0.20	-0.47	-1.08	-1.92	-3.97	-8.30	-14.48	-29.33	-58.72	-104.40	-196.67	-399.60	-696.20	-3,172.12
	2	0.21	0.00	-0.27	-0.88	-1.71	-3.85	-8.07	-14.55			-97.69				-2,208.59
	3	0.47	0.27	0.00	-0.61	-1.44	-3.51	-7.76	-14.37	-28.39	-56.69	-101.90	-194.12	-397.94	-705.22	-2,912.94
	4	1.10	0.87		0.00		-3.00									
	5	1.92	1.72	1.44	0.84	0.00	-2.11	-6.35		-26.98	-56.60	-98.42			-660.51	-2,048.73
	6	3.98	3.79	3.51	2.92	2.07	0.00	-4.36	-10.81	-25.06	-54.90	-99.87	-193.85	-389.93	-709.87	-3,087.10
	7				7.54	6.34		0.00								
	8	15.07			13.11		10.82		0.00							
	9	28.59	29.33					17.96		0.00						
	10	58.74	58.25	59.21	56.27	59.17	54.03		44.34	30.67	0.00					-2,777.66
	11		97.81									0.00				-2,391.38
	12		199.26	200.25			189.07			164.75	138.87		0.00			
	13	392.00	390.97	373.78	388.86					383.14				0.00		
	14	685.48	690.53	701.66	689.55	682.03	673.40	652.77	671.68	638.55	625.17	592.27			0.00	-2,668.57
	15	2,759.89	2,795.98	2,806.90	2,835.35	2,878.17	3,194.57	2,813.92	2,932.27	2,961.22	2,643.71	3,066.18	2,809.54	2,230.63	1,986.69	0.00

Table 21.6 Distribution of patentee attitudes toward uncertainty across different categories of patents (%)

	<i>By Nationality</i>			<i>By patentee type</i>		<i>By tech. intensity</i>		<i>By application type</i>	
	<i>Total</i>	<i>Italian</i>	<i>Foreign</i>	<i>Firm</i>	<i>Independent</i>	<i>Low-Tech</i>	<i>High-Tech</i>	<i>Domestic</i>	<i>Imp. & Priority</i>
Very pessimistic	4.56	2.81	5.38	11.09	2.97	3.61	5.90	4.45	7.17
Pessimistic	13.71	15.14	13.04	15.35	13.31	13.56	13.93	13.76	12.56
Consistent	24.42	31.75	20.97	20.05	25.48	25.43	23.00	24.36	26.01
Optimistic	42.99	45.81	41.66	33.63	45.26	45.26	39.77	43.42	32.29
Very optimistic	14.32	4.49	18.95	19.88	12.97	12.14	17.40	14.01	21.97
Pearson test	—	270.67		203.56		56.44		19.62	
(p-value)		(<0.001)		(<0.001)		(<0.001)		(<0.001)	

Note: differences larger than 20% with respect to total are emphasized in bold.

across the behavioral categories displays significant differences according to specific patent characteristics.

In Table 21.6 we have highlighted (in bold) the values higher than 20% of the total to pinpoint the major differences across patent types. The results show that foreign patentees are more likely to be “very optimistic” compared to Italian patentees, who are better forecasters. This is likely to be related to the better knowledge of the internal market of the Italian patentees, while the “very optimistic” behavior of the foreign patentees is perhaps due to the combined effect of a scanty knowledge of the Italian market and of a larger availability of resources to cover the patent costs. Interestingly enough, firm patentees are overrepresented in both the “very pessimistic” (+243%) and the “very optimistic” categories (+139%) than the independent ones. Concerning the “very optimistic” behavior this reflects the prominent role of foreign companies, which amount to almost 80% of the total in this category. The finding about the very high share of the “very pessimistic” patentees is more difficult to interpret since it concerns both domestic and foreign companies. We speculate that this may be related to the nature of firm innovations, which were characterized by a higher degree of novelty, prompting the patentees to have initially a more cautious attitude, taking a patent for a short period and gradually exploring its potential. As for the technological characteristics of the patent, as expected we find that the high-tech patents are characterized by greater uncertainty; this makes their value more difficult to predict since there is a larger share of both “very pessimistic” and “very optimistic” patentees in comparison to the low-tech ones. Although the number of imported and priority patents is not very high, it is interesting to note that the patentees of these inventions are systematically characterized by an overrepresentation in both the “very pessimistic” and “very optimistic” categories. Considering that all these patents have already been tested in another market, one would have expected a larger fraction of accurate forecasters in this category of patentees. Instead, since this is not the case, our finding suggests that, in our case, technological transfer was surrounded by a high degree of uncertainty.

Conclusion

In the field of innovation studies, there has been a strong emphasis on the uncertainty which surrounds all phases of the innovation process. However, our knowledge of the implications of this uncertainty for the behavior of inventors has remained very limited. This is essentially due to the lack of systematic data that can adequately capture the changing perceptions of inventors about the possible returns of their innovations during the different phases of the innovation process. As a result, data on the expectations and profit prospects of innovations are available only by means of case studies or small-scale samples. In this paper, by exploiting a characteristic of nineteenth-century Italian legislation, we have been able to study the expectations and behaviors of inventors in different moments in time and to provide an empirical characterization of the heterogeneity in the attitudes of different type of inventors toward uncertainty. These results, if confirmed in other contexts, could represent new important stylized facts on the nature of innovation processes.

The analysis is not without limitations, mainly in relation to the econometric specification. The empirical analysis relies on a fully parametrized model that assumes a log-normal distribution of the value of patents. However, the log-normal distribution seems to be well-suited for the analysis of these data. Furthermore, the estimates of the long tail of patent value are constrained by the inability to observe an upper bound to the distribution of

returns. In this respect, it is reassuring that the model fits the empirical data to a meaningful extent, and our characterization of patentee behavior is only marginally affected by the censoring problems.

A further development of this research agenda would be to combine estimates of patent values based on renewal data, as in this paper, with other measures of patent values such as those constructed using data on actual sales of patents.

Notes

- 1 Schnaars and Berenson (1986) examine forecasts of market growth of 90 major technological innovations published in the US business press in the period 1960–1979: 50 percent of these turned out to be widely mistaken. Reviewing this literature, Freeman and Soete (1997) have argued that the degree of uncertainty which characterizes innovation activities is such that they do not lend themselves even to sophisticated methods of risk assessment. See also the discussion in Mansfield et al. (1971, 47–63) who also argued that, notwithstanding the adoption of quantitative techniques of risk assessment, “intuition and gut reaction” played a very important role in R&D decision making.
- 2 For a thorough criticism of the representation of innovation processes in the patent race and the endogenous growth literature, see Dosi and Nelson (2010).
- 3 Article 27 of the *Regolamento* (regulation) of the 1864 law stated explicitly that the application for a patent could be submitted both by individuals and by corporations or other organizations.
- 4 The maximum patent duration of the German system was 15 years, whereas in the British system the maximum patent duration was 14 years.
- 5 For an historical account of the Paris Convention, see the classic work by Penrose (1951).
- 6 See e.g., Bessen (2008). Note that, by changing the value of the discount rates, estimated effects do not change.
- 7 Refer to Bessen (2008) for additional details on the estimation procedure.
- 8 The classification is drawn from Nuvolari and Vasta (2015) who defined as high technology sectors those that, by the standards of the time considered, can be regarded as characterized by a certain degree of technological sophistication. This comprises both the emerging industries of the Second Industrial Revolution (such as steel, electricity, and chemicals), but also, in order to take into account Italy’s status as a latecomer country, some breakthrough technologies of the First Industrial Revolution such as steam, machinery, and machine tools. Accordingly, the sectors classified as high-tech are chemicals, electricity, machine tools, machinery, components and metalworking, steam engines, and weapons. In contrast, the low-tech sectors in our database are agriculture, construction and construction materials, food and beverages, mining, paper and printing, various instruments, textiles, apparel and leather, transport, and other manufacturing sectors.
- 9 A separate model for “imported and priority” patents is not estimated due to the small number of observations that characterize this group (223 patents).
- 10 We exploit the invariance property of the maximum likelihood estimator. Estimates of d are reported in Table 21.5, Models 1–7. Standard errors are computed using the delta method.
- 11 On the basis of the estimated values of β , σ and d we first determine the bounds on the error term u_i for each observation, conditional on the renewal decision made for the patent. Then, a random draw for u_i is considered from the appropriate lognormal distribution, and the corresponding log ($r_i(0)$) is calculated. The average of 20 Monte Carlo iterations is considered for each patent. Estimates obtained in Model 1, Model 8, and Model 10 are used for providing the value of patents.

References

- Aghion, Philippe, and Peter Howitt. 1992. “A Model of Growth through Creative Destruction.” *Econometrica* 60, no. 2: 323–351. DOI: 10.2307/2951599.
- Andersson, David, and Fredrik Tell. 2016. “Patent Agencies and the Emerging Market for Patenting Services in Sweden, 1885–1914.” *Enterprises et Histoire* 82, no. 1: 11–31.

- Basberg, Bjorn. 2006. "Patenting and Early Industrialization in Norway, 1860–1914. Was There a Linkage?" *Scandinavian Economic History Review* 54, no 1: 4–21. DOI: 10.1080/03585520600578540.
- Beardsley, George, and Edwin Mansfield. 1978. "A Note on the Accuracy of Industrial Forecasts of Profitability on New Products and Processes." *Journal of Business* 51, no. 1: 127–135.
- Bernal, John D. 1953. *Science and Industry in the Nineteenth Century*. London: Taylor & Francis.
- Bessen, James, and Thoma Grid. 2014. "Which Patent Systems Are Better for Inventors?" Law and Economics Research Paper, no. 14–50. Boston, MA: Boston University School of Law. URL: https://scholarship.law.bu.edu/cgi/viewcontent.cgi?article=4167&context=faculty_scholarshipBessen.
- Bessen, James. 2008. "The Value of US Patents by Owner and Patent Characteristics." *Research Policy* 37, no. 5: 932–945. DOI: 10.1016/j.respol.2008.02.005.
- Binder, Carola Conces. 2016. "Estimation of Historical Inflation Expectations." *Explorations in Economic History* 61: 1–31. DOI: 10.1016/j.eeh.2016.01.002.
- Cockburn, Iain, and Rebecca Henderson. 1994. "Racing to Invest? The Dynamics of Competition in the Ethical Drug Discovery." *Journal of Economics and Management Strategy* 3, no. 3: 481–519. DOI: 10.1111/j.1430–9134.1994.00481.x.
- Dequech, David. 2006. "The New Institutional Economics and the Theory of Behavior under Uncertainty." *Journal of Economic Behavior and Organization* 59, no. 1: 109–131. DOI: 10.1016/j.jebo.2004.03.012.
- Dosi, Giovanni, and Richard Nelson. 2010. "Technical Change and Industrial Dynamics as Evolutionary Processes." In *Handbook of Economics of Innovation*, edited by Bronwyn Hall, and Nathan Rosenberg, 1: 51–127. Dordrecht: Elsevier. DOI: 10.1016/S0169–7218(10)01003-8.
- Dutton, Harry I. 1984. *The Patent System and Inventive Activity during the Industrial Revolution*. Manchester: Manchester University Press.
- Freeman, Christopher, and Luc Soete. 1997. *The Economics of Industrial Innovation*. 3rd ed. Cambridge, MA: MIT Press.
- Hall, Bronwyn, and Josh Lerner. 2010. "The Financing of R&D and Innovation." In *Handbook of Economics of Innovation*, edited by Bronwyn Hall, and Nathan Rosenberg, 1: 609–639. Dordrecht: Elsevier. DOI: 10.1016/S0169–7218(10)01014-2.
- Jaffe, Adam, and Manuel Trajtenberg. 2002. *Patents, Citations and Innovation. A Window on the Knowledge Economy*. Cambridge, MA: MIT Press.
- Knight, Frank H. 1921. *Risk, Uncertainty and Profit*. Boston, MA: Houghton Mifflin Co.
- Lanjouw, J.O., Pakes, A. and Putnam J. 1998. "How to Count Patents and Value Intellectual Property: The Uses of Patent Renewal and Application Data." *Journal of Industrial Economics* 46, no. 4: 405–432.
- Lennard, Jason, Finn Meinicke, and Solomos Solomou. 2023. "Measuring Inflation Expectation in Interwar Britain." *Economic History Review* 76: 844–870. DOI: 10.1111/ehr.13215.
- Luzzatto, Gino. 1968. *L'economia italiana dal 1861 al 1894*. Turin: Einaudi.
- Macleod, Christine. 1988. *Inventing the Industrial Revolution. The English Patent System, 1660–1800*. Cambridge: Cambridge University Press.
- Mansfield, Edwin, John Rapoport, Jerome Schnee, Samuel Wagner, and Michael Hamburger. 1971. *Research and Innovation in the Modern Corporation*. London: MacMillan.
- Ministero di Agricoltura, Industria e Commercio [MAIC]. 1864–1885. *Bollettino delle privative industriali del Regno d'Italia*. Turin: Ministry of Agriculture, Industry and Commerce.
- Ministero di Agricoltura, Industria e Commercio [MAIC]. 1886–1893. *Bollettino delle privative industriali del Regno d'Italia*. Rome: Ministry of Agriculture, Industry and Commerce.
- Ministero di Agricoltura, Industria e Commercio [MAIC]. 1894–1901. *Elenco degli attestati di privativa industriale, di prolungamento, completivi, di importazione e di riduzione*. Rome: Ministry of Agriculture, Industry and Commerce.
- Ministero di Agricoltura, Industria e Commercio [MAIC]. 1902–1916. *Bollettino della proprietà intellettuale*. Rome: Ministry of Agriculture, Industry and Commerce.
- Mokyr, Joel. 1990. *The Lever of Riches. Technological Creativity and Economic Progress*. Oxford: Oxford University Press.
- Nicholas, Tom. 2010. "The Role of Independent Invention in US Technological Development, 1880–1930." *Journal of Economic History* 70: 57–82. DOI: 10.1017/S0022050710000057.
- Nicholas, Tom. 2011a. "The Origins of Japanese Technological Modernization." *Explorations in Economic History* 48, no. 2: 272–291. DOI: 10.1016/j.eeh.2011.01.001.

- Nicholas, Tom. 2011b. "Independent Invention during the Rise of the Corporate Economy in Britain and Japan." *Economic History Review* 64, no. 3: 995–1023. DOI: j.1468-0289.2010.00586.x.
- Nicholas, Tom. 2011c. "Cheaper Patents." *Research Policy* 40, no. 2: 325–339. DOI: 10.1016/j.respol.2010.10.012.
- Nuvolari, Alessandro, and Michelangelo Vasta. 2015. "Independent Invention in Italy during the Liberal Age, 1861–1913." *Economic History Review* 68, no. 3: 858–886. DOI: 10.1111/ehr.12087.
- Nuvolari, Alessandro, and Michelangelo Vasta. 2017. "The Geography of Innovation in Italy, 1861–1913: Evidence from Patent Data." *European Review of Economic History* 21, no. 3: 326–356. DOI: 10.1093/ereh/hex006.
- Nuvolari, Alessandro, and Michelangelo Vasta. 2020. "The Italian Patent System during the Long Nineteenth Century. From Privileges to Property Rights in a Latecomer Industrializing Country." In *Patent Cultures. Diversity and Harmonization in Historical Perspective*, edited by Graeme Gooday, and Saul Wilf, 147–165. Cambridge: Cambridge University Press.
- Nuvolari, Alessandro, Gaspare Tortorici, and Michelangelo Vasta. 2023. "British-French Technology Transfer from the Revolution to Louis Philippe (1791–1844): Evidence from Patent Data." *Journal of Economic History* 83, no. 3: 833–873. DOI: 10.1017/S0022050723000232.
- Penin, Julien. 2012. "Strategic Use of Patents in Markets for Technology: A Story of Fabless Firms, Brokers and Trolls." *Journal of Economic Behavior and Organization* 84, no. 2: 633–641. DOI: 10.1016/j.jebo.2012.09.007.
- Penrose, Edith T. 1951. *The Economics of the International Patent System*. Baltimore, MD: The John Hopkins Press.
- Reinganum, Jennifer F. 1989. "The Timing of Innovation: Research, Development and Diffusion." In *Handbook of Industrial Organization*, edited by Richard Schmalensee, and Robert Willig, 1: 894–908. Dordrecht: Elsevier. DOI: 10.1016/S1573-448X(89)01017-4.
- Saiz, Patricio. 1999. *Invenccion, Patentes e Innovacion en la Espana Contemporanea*. Madrid: OEPM.
- Saiz, Patricio. 2012. "Social Networks of Innovation in the European Periphery: Exploring Independent Versus Corporate Patents in Spain Circa 1820–1939." *Historical Social Research* 37, no. 4: 348–369.
- Schaars, Steven, and Conrad Berenson. 1984. "Growth Market Forecasting Revisited: A Look Back At a Look Forward." *California Management Review* 28, no. 4: 71–88. DOI: 10.2307/41165217.
- Schankerman, Mark, and Ariel Pakes. 1986. "Estimates of the Value of Patent Rights in European Countries during the Post-1950 Period." *Economic Journal* 96, no. 384: 1052–1076. DOI: 10.2307/2233173.
- Scherer, Frederic M., and Dietmar Harhoff. 2000. "Technology Policy for a World of Skew-Distributed Outcomes." *Research Policy* 29: 559–566. DOI: 10.1016/S0048-7333(99)00089-X.
- Schmookler, Jacob. 1966. *Invention and Economic Growth*. Cambridge, MA: Harvard University Press.
- Schumpeter, Joseph A. 1934. *The Theory of Economic Development*. Cambridge, MA: Harvard University Press.
- Sokoloff, Kenneth L. 1988. "Inventive Activity in Early Industrial America: Evidence from Patent Records." *Journal of Economic History* 48, no. 4: 813–850. DOI: 10.1017/S002205070000663X.
- Sokoloff, Kenneth L., and B. Zorina Khan. 1990. "The Democratization of Invention during Early Industrialization: Evidence from the United States, 1790–1846." *Journal of Economic History* 50, no. 2: 363–378. DOI: 10.1017/S0022050700036494.
- Streb, Jochen, Joerg Baten, and Shuxi Yin. 2006. "Technological and Geographical Knowledge Spillover in the German Empire, 1877–1918." *Economic History Review* 59, no. 2: 347–373. DOI: 10.1111/j.1468-0289.2006.00347.x.
- Sullivan, Richard. 1994. "Estimates of the Value of Patent Rights in Great Britain and Ireland, 1852–1876." *Economica* 61, no. 241: 37–58.
- Vasta, Michelangelo. 1996. "Innovative Capabilities in the Italian Take-off: the Electrical and Chemical Industries (1880–1914)." PhD diss., Oxford University. ALMA: 990133362460107026. World Intellectual Property Organization (WIPO). *Statistics Database*. URL: <https://www.wipo.int/ipstats/en/>.

EXPECTATIONS IN THE HISTORY OF CONSUMPTION, C.1500 TO THE PRESENT¹

Frank Trentmann

Expectations and consumption form an inseparable couple. Without expectations, we would not live in a world ruled by ever greater consumption. Equally, current regimes of consumption shape our expectations of life in the future. Ironically, expectations are so woven into consumer culture that they have tended to be taken for granted by scholars, and all but disappear from sight.

History and economics have taken divergent approaches to the practice of consuming. In economics, intertemporal choice is a central concern, and with it the trade-offs between present and future consumption (Deaton 1992); you can either spend now, or save now and spend later. In the analysis of such decisions, income tends to be put in the driver's seat, with consumption responding. For John Maynard Keynes, consumption reflected current income; for Milton Friedman it responded to future expectations and changes in permanent income, including assets and human capital, as well as temporary earnings. The life-cycle hypothesis, first developed by Franco Modigliani in the late 1950s, assumes that during their adult earning years, people are motivated to save for their future retirement. Consumption thus becomes the result of what is left over (see Hesse, Knake, and Lehmann-Hasemeyer, Chapter 23 in this volume).

One reason expectations are buried in historical studies is that historians, sociologists, and anthropologists tend to take a much broader view of what consumption is than economists do. In addition to the act of purchase, they have seen it as embracing material desires, commodities, lifestyles, identities and infrastructures, consumer groups, and politics. Consumption consequently reflects far more than income or interest rates, or short-term revealed preferences. Alongside spending, historical studies try to understand the changing ideals and styles of consumption, ultimately arriving at the questions of why consuming more should have become so desirable, and why it became a norm in the first place. These socio-cultural approaches are therefore concerned more with the collective transformation of preferences than with individual expressions of existing ones.

All this does not mean expectations do not play a role in histories of consumption, simply that we need to excavate them from where they have remained hidden. Instead of focusing on individual preferences and expectations—for which historical data is limited before the twentieth century—this chapter explores the socio-economic, cultural, and political

contexts in which expectations of greater consumption have been shaped, nurtured, and steered over the last 500 years. The key sites that deserve particular attention are novelty and fashion, credit and welfare, and infrastructures and domestic comfort. In combination, the desire for more, the idea of a “good life” being a life rich in material things, new social habits, and rising levels of comfort all helped create the basic expectation that our lives would (and should) improve with greater consumption. Placing these formative contexts next to each other, however, also reveals a troubling dialectic between diversity and standardization with profound implications for the planet.

Novelty and Fashion

Since the 1970s, several thousand books and articles have been published on the global rise of consumption. Some authors have traced its “birth” to eighteenth-century Britain (McKendrick, Brewer, and Plumb 1982), others have looked back to the Italian Renaissance (Welch 2005), and yet others to the Middle Ages (Dyer 2005). Part of the chronological confusion arises from a conceptual confusion about “consumption.” Human societies have consumed since time immemorial. What changed from the sixteenth century was the logic of consumption as well as its volume (Brewer and Porter 1993; Trentmann 2016). These shifts involved a temporal reorientation of material expectations.

Late Ming China (late fifteenth to the early seventeenth century) prized antique furniture and possessions. Value lay in a golden past, and preferences favored the accumulation, preservation, and appreciation of existing ancient items (Clunas 1991). Renaissance Italy already saw some signs of innovation, such as the use of chairs among wide sections of societies beyond the elite, as well as an expanding range of tableware, board games, and much else. Overall, however, the emphasis was on the decorative refinement of an existing set of goods (Ajmar-Wollheim, Dennis, and Miller 2006). Consumption mainly operated in a circular mode, with jewelry and fine objects moving back and forth between generations, family, and business networks (Welch 2005). In stark contrast to what is often put forward by economic theory, consumption did not always function as the opposite of saving. Instead, precious textiles in particular served as storehouses for wealth, which in an under-monetized economy could be released at a future moment of time as and when it became necessary.

It was in the seventeenth and eighteenth centuries, in England and the Netherlands (Schama 1987), that a paradigm shift occurred which changed the logic of consumption, and with it the role of expectations. A cult of novelty took hold. There was a proliferation of new items in ever greater variety. In 1600, for example, window curtains were effectively unknown in England. By the 1720s, in major towns almost every second home had them. Buckles and buttons proliferated and so did trinkets, alongside clothing with more pockets to put them in, as noted by Adam Smith at the time. As Smith observed, the pursuit of novelty involved a qualitative shift in expectations: the acquisition of new goods did not ultimately make people happier, but was now seen to hold out the prospect (or fantasy) of a better life (Smith 1759, 1776).

Such a cultural shift—the establishment of the idea that new was best and the more products the better—would have been unthinkable without a parallel reassessment of consumption and its effects on society, morals, and politics as well as on the economy. Well into the early modern era, a desire for goods was largely condemned by rulers, priests, and elites for undermining authority and social and gender hierarchies through its encouragement of

emulation and overspending, and for wasting scarce coinage on imported luxuries (Berry 1994). Sumptuary laws repressed demand by punishing those people who were consuming goods above their station (Ogilvie 2010). The seventeenth to nineteenth centuries brought a sea-change. Critics of luxury now faced a growing chorus of voices that defended luxury in moderation. The argument had many registers but it amounted to a fundamental shift in the imagining of a better possible future: consumption promised civilization. The longing for, purchase, and use of more things, it was thought, refined people's senses and made them more industrious and ambitious. It encouraged innovation, sociability, and commercial exchange, and stimulated economic development. Instead of being frivolous or a tool of the devil, things began to be appreciated as a vital part of selfhood and identity: a person's "material self" (James 1890). The result of this revaluation was a more liberal and dynamic approach to consumption, which normalized a general expectation that people should be allowed to choose new goods, indeed should be encouraged to want more.

The first manifestations of this demand for novelty were cotton, porcelain, tea, coffee, sugar, and tobacco. All of these were "exotic" goods, whose value derived from the fact that they came from India, China, or the new slave plantations in the colonies in the West Indies and in North and South America. Mercantilist empires were vital conveyor belts, helping to turn luxuries into popular staples. By 1725, over a third of homes in London owned pieces of china (Weatherill 1988, table 4.4). London working women began to wear colorful, printed cotton scarfs, and artisans in Amsterdam sipped their tea from porcelain cups (Blondé 2003; Styles 2007). In the long run, the rise in demand was helped by cheaper production and a fall in prices, but ultimately it hinged on a shift in values that elevated new items over existing ones (cotton was more colorful but not cheaper than wool or linen). The shift in preferences is inexplicable without the political economy of empire, trade barriers, and the monopolies accorded to the East India Companies. In the eighteenth century, the demand for exotic goods triggered a race of emulation and innovation, in which British and European manufacturers, with the help of infant industry protection, tried to copy and replicate Asian makes and designs (Berg 2004).

Not all consumption is fed by desire, but without desire, the demand for more would be difficult to explain. In economics, unfortunately, desire is often treated as a given. In Paul Samuelson's standard account, for example, utility expresses the revealed preferences of consumers; their changing motivations thus disappear from the analysis (Samuelson 1938). More recent economists, by contrast, have highlighted the importance of novelty and the active role played by consumers in changing the dynamics of consumption (Bianchi 1998). This happens in two main ways. First, the products we buy (market goods) are the vital inputs for what we consume. But it is then the consumers who, through their use, turn them into particular outputs; sneakers or a cell phone, for example, can be used in a variety of ways and for different activities. Second, the consumer also creates new types of consumption (output)—the development of mountain bikes by avid cyclists is a classic example (von Hippel 2005). Novelty thus plays a major role in driving demand, simultaneously seeking new pleasures and expanding the possibilities of consumption.

The cult of novelty that took off in the seventeenth and eighteenth centuries amounted to a decisive shift in expectations about future possibilities of consumption, and arguably remains the bedrock of what is associated with the era of "growth," GDP, and "progress" after the Second World War. The idea that things could be (indeed, ought to be) different and better—however much of an illusion—makes people restless with what they do have, as they search for new things in hope of a brighter future. Novelty has fostered a

general expectation that life and commodities will change and vary, and not stand still: the wallpaper, kitchen, clothes, car, and bicycle will all be replaced in a few years' time.

Desire shapes expectations by giving them a target. The sociologist Colin Campbell has pointed to anticipation as a defining feature of modern consumerism and traced it to the romantic imagination. Pleasure here comes from the longing for an object and the imagined joy from its future acquisition (distinct from the act of purchase itself, after which the pleasure often diminishes). In this view, *wanting* rather than *having* is the driver of demand. For Campbell, "self-illusory hedonism" focuses on "imaginative stimuli and their necessarily covert enjoyment" that can be traced to daydreaming and to bohemians in the eighteenth and nineteenth centuries who were exploring a new self and lifestyle distinct from the one accepted by the bourgeoisie (Campbell 1987, 2021, 21). Media, advertisers, and corporations then exploit this mental disposition by pitching new products with the promise that dreams can come true.

The demand for new consumer goods played an important role in unleashing what the economic historian Jan de Vries has termed the "industrious revolution" beginning in the mid-seventeenth century, first in the Netherlands, then in Britain and in North America, as households began to reallocate their time and labor. Instead of producing for their own consumption, they began to produce *for* the market—spinning, weaving, and farming to sell their yarn, wool, and dairy products—in order to be able to purchase new goods *on* the market (de Vries 2008). More women took on paid work outside the home. Household specialization (see Guinnane and Streb, Chapter 24 in this volume) and consumption propelled each other forward.

For all its attractive features, this theory hits a problem when it comes to the middle classes. In addition to urbanization and high wages, one reason eighteenth-century Britain was in the vanguard of consumption lay in the large size of its "middling sort" which, by some counts, made up 20 percent of the population. Far from making their wives and daughters join an industrious revolution, the middle classes did the opposite: they made business and public life a male preserve and pushed women into the private sphere, spearheading a growing "separation of spheres." Arguably of greater importance for the middle classes' demand for new possessions (such as porcelain, curtains, and carpets) was that new forms of sober and productive types of consumption, comfort, and convenience, such as tea parties, conversation, and domestic sociability, provided them with their own lifestyle and identity distinct from the aristocracy.

An outgrowth of the lure of novelty has been the fashion system. This plays a major role in advancing a material through-put system in which items that have not lost their practical utility are replaced by new ones in order not to appear outdated. Fashion meets the general predilection in favor of change by holding out new items while simultaneously routinizing change, for example with repetitive fashion seasons (Simmel 1957; Gronow 2020). "Fast fashion," since the 1980s, has merely accelerated the cycle of change. New styles of dress were already attracting demand in the Middle Ages in Asia as well as Europe. The breakthrough of a truly coordinated fashion system, however, came in the eighteenth century, with fashion magazines, advertisements, fashion dolls, and a network of merchants, spies, and designers seeking to anticipate and respond to new trends by bringing distant centers of production (such as Kerala, India, which specialized in bold, colorful designs hand-printed on cotton) into line with the tastes of consumers in London, Paris, and Amsterdam (Lemire 1991; Roche 1994). As recent historians have pointed out, fashion was not a European preserve. In nineteenth-century East Africa, each tribe had its own changing preferences

for fashionable beads and metalware, which created challenges for European traders who arrived with goods that had gone out of fashion by the time they reached those shores (Prestholdt 2004).

Private Credit, Public Welfare

People need money to satisfy desires and acquire new items. Consequently, consumption is not only shaped by current income but also by expectations of future earning power and access to money. This financial potential was transformed by two institutions in the twentieth century: private credit and public benefits.

The United States led the way in the remoralization of buying on credit. Societies had, of course, been accustomed to credit well before the twentieth century. In England in 1700, every fourth household carried debts that exceeded its assets when the head of the household died (Muldrew 1998). Still, credit, usury, and “buy now, pay later” were demonized in law, religion, and literature. Things began to change slowly in the nineteenth century and then rapidly in the twentieth century (Calder 1999). In New York City, in the 1830s, stores began to sell furniture on installment. German, British, and French shops developed their own credit and check trading systems by the end of the century. Usury laws were abolished in most of Europe by the 1850s. But it was in the twentieth century that consumer credit took off. In inter-war America, department stores introduced “charge plates,” a forerunner of the credit card, and the car manufacturer General Motors introduced its own credit scheme. Americans were in the vanguard for a reason. In the half century up to the Wall Street Crash in 1929, their real incomes had been rising by 1 percent a year. In other words, the United States had not only become a high-wage economy but one in which people came to expect that their wages would continue to rise in the future. Such more favorable credit conditions did not reach Western European societies until the 1960s–1980s.

The transfiguration of credit from evil (“he that goes a-borrowing goes a-sorrowing,” in Benjamin Franklin’s popular words from the 1730s) into a sign of enterprise and energy is a prime example of how a shift in expectations—one that saw a better, richer future within reach—helped to drive and justify higher levels of consumption. For the economist Simon Patten, writing in the years around 1900, the United States was the first society to have entered an era where abundance had taken the place of scarcity. Instead of never having enough, society had to learn to live with having more than enough. This switch entailed a more positive view of consumers, desire, and credit. Rather than condemning female secretaries who bought fine clothes on credit for their “loose morality,” Patten told audiences they should welcome such installment purchases as a sign of their “growing moral development,” for it signaled their ambition to get on in life and rise up the career ladder (Patten 1913). In the next few decades, contemporaries explained how buying with credit made people better citizens by stimulating their ambition and initiative and increasing their taste, intelligence, and contribution to public life. The nation as a whole was seen to benefit from this, and the rise in home ownership and mortgages would complete this new virtuous cycle.

While in the ascendance, this increasingly positive, democratic culture of credit was never universally shared. Black Americans were for a long time excluded from “charge” and, later, from credit cards. White American workers did not hold the same optimistic expectations as the professional middle classes, either. A team of researchers in the late 1950s observed working and middle-class families in suburban America. In the previous two decades,

working families had seen an extraordinary tenfold increase in their wages. Nonetheless, they carried the experience of the Great Depression (see O'Sullivan, Chapter 27 in this volume) and the resulting unemployment and uncertainty at the back of their minds. Unlike middle-class housewives, who looked ahead to a bright future with their husbands getting promotions, and who instinctively wanted more and newer things, the wives of many workers were worried about the future. To them, novelties and luxuries looked frivolous, credit was a vice, and department stores were suspicious. They prized goods that were practical and durable instead. These working-class housewives in affluent America were far removed from the day-dreaming hedonists taking pleasure from novelty. They were suffering from "depression phobia," the fear of another world recession, concluded the researchers at the time (Rainwater, Coleman, and Handel 1959, 744).

West Germany and Japan (and, later, Korea) took an alternative path to mass consumption. Reconstruction after the Second World War prioritized saving to raise the necessary investment for domestic industry, to contain inflation, and to conserve precious dollars by keeping down the demand for foreign goods. Consumer credit was not entirely absent—in 1953, 15 percent of all retail sales in West Germany were financed with credit, roughly half of the equivalent figure in the United States (Logemann 2008). However, in Japan as in West Germany, credit was subordinate to a gospel of thrift that was broadcast by governments, central banks, savings banks, and schools. In Japan, it had additional grass-roots support from the housewives' association (*Shufuren*) (Garon 2012). These savings campaigns cultivated their own type of economic expectations. Housewives advanced to modern bookkeepers whose scientific housekeeping and sacrifices held out to their families the hope of a future purchase of an electric rice cooker or television set.

There can be little doubt that these campaigns and policies boosted the household savings rates in the years of reconstruction and during the economic miracle that followed. We must be careful, though, not to take all the claims made by the promoters of saving at face value. References to an average national savings rate frequently obscure the considerable variety of financial practices and motivations hidden in that average (Trentmann 2023, 585–598). In West Germany, a significant minority did not save at all, either because money was tight or because they preferred to spend and enjoy now instead of saving for later. The same experience in the past could lead to radically different expectations about the future. Hyperinflation in 1923 and the currency reform of 1948 had wiped out savings. Interviews reveal that many people continued to save regardless—not because of some economic expectation but because saving embodied ideals of honesty and autonomy, giving the saver a sense of virtue and control in uncertain times (see Hesse, Knake, and Lehmann-Hasemeyer, Chapter 23 in this volume). Others meanwhile had learned the opposite lesson and, having been burnt before, told their families to live and enjoy the moment (Heisterhagen and Hoffmann 2003).

As important as consumer credit for the rise of mass consumption, but largely ignored by historians, has been the welfare state, which expanded rapidly after the Second World War across industrial societies. Its contribution was similar: raising purchasing power and easing the purchase of larger items by regularizing and smoothing income over time. Before the Second World War, income and employment had been uncertain for many working-class families. Most budgeted week by week, the lucky ones for a month, but few had jobs or savings that made it possible to plan ahead for an entire year, let alone for life. This limited the pool for the purchase of more expensive products, even on installment plans. Unemployment insurance, pensions, social housing, child and other benefits, plus subsidies for

culture and leisure, lengthened the horizon of material expectations by providing basic security. Instead of budgeting week by week, new-found financial security made it possible to imagine and plan for acquisitions in the years ahead. In the course of the 1960s and 1970s, working-class families in Britain, West Germany, Italy, and France were purchasing their first television set and washing machine (in that order), followed by an automobile, just as Americans had begun to do a generation earlier. The precise nature and effect of such financial transfers via public spending depended on the particular configuration of the welfare state in the individual country. What all developed countries did was to move in the same direction. In the OECD, the club of rich countries, public social spending rose from 8 percent of GDP in 1960 to 20 percent in 2010; in France it was 30 percent, and even in the United States it reached 17 percent.

Students of consumption tend to focus on markets, and hence on market goods and market income. But this is only part of the picture. In France and Finland, one fifth of household consumption is made possible thanks to social transfers, especially public spending on education and health services. In the United States, it is 10 percent (Stiglitz, Sen, and Fitoussi 2009). Put differently: take away state pensions, public benefits, and services, and poorer consumers especially would have to tighten their belts and would find themselves unable to afford all the consumer goods that they currently can. The welfare state has pulled an entire segment of the population up onto the stage of mass consumption (Trentmann 2016, 522–561).

The promise of a higher standard of living has not been limited to capitalist democracies. The Soviet leader Joseph Stalin promised in 1935 that “Life is Getting Better!” Gramophones and fashionable suits and dresses were held out as incentives for hard-working Stakhanovites (Siegelbaum 1988). Here was a short-lived communist version of the “industrious revolution.” Hitler’s Germany and Mussolini’s Italy developed their own fascist versions with promises of better homes, holiday cruises, and “people’s” radios and cars. The fact that these only reached a few and the majority saw their down payments for a Volkswagen car go up in smoke should not distract from the overall influence these campaigns had on people’s dreams: the future would be bright.

The period from the early 1950s to the early 1970s is often treated as a new era—the boom years, Golden Age, or *Wirtschaftswunder* (economic miracle). Economic growth in these years was certainly spectacular and unprecedented across Europe and North America. Still, rather than a sudden new departure, the foundation for a higher standard of living had already been laid before the boom got under way (Gordon 2016). Tellingly, even during the worst shortages and blackouts in ruined Berlin in 1947–1948, the city’s electricity works ran an advertising campaign that assured citizens that cookers, boilers, and other appliances would soon return in even greater numbers.

As the two rival social and ideological systems competed with each other over growth and the standard of living, the Cold War entrenched expectations of rising material comfort. Alongside providing loans for reconstruction, the American Marshall Plan funded exhibitions, films, and radio programs that presented Western Europeans with a vision of high-earning and high-consuming American families. They carried an anti-Communist message. Instead of leading to impoverishment and wage slavery, capitalism liberated people from want and oppression. In this vision, it was consumers who, with their buying power, set in motion the wheel of greater productivity and wealth; the United States was a “consumers’ republic” (Cohen 2004). The reception of this message in Western Europe was not uniform, but adapted to national contexts (Kroen 2006). In France, where there

was a strong Communist party, the ruling parties tried hard to avoid charges of “Coca-colonization” and of being in the pocket of American capitalists, and highlighted workers’ rights and their pay packet. West Germany banned the Communist Party and embraced the material dream more fully. In 1953, a hugely successful trade fair took place in Dusseldorf about improving consumer goods through better mass production, titled “Everyone should live better” (“Alle sollen besser leben”). Raising aspirations was as important as promoting savings. Tax credits encouraged German families to buy refrigerators and other appliances (Trentmann 2016, 308–310).

The climax of the ideological competition over the standard of living came in 1959 with the so-called “kitchen debate” at the international exhibition in Moscow. At the American pavilion, Vice-President Richard Nixon showcased the marvels of a fully electrified modern kitchen in a ranch house that, he said, every American worker could afford. The Soviet leader Nikita Khrushchev, in response, belittled the many American gadgets compared to the standardized products in socialism. If the two protagonists disagreed about the value of choice and variety, they nonetheless shared the belief that their respective citizens had a right to expect rising levels of comfort and convenience (Oldenzil and Zachmann 2009).

Recent scholars have even questioned the extent to which Mao’s China turned its back on consumption. Plans by the Communist leaders at the center to suppress consumption triggered grey markets on the ground, with manufacturers trying to satisfy people’s desire for distinguishing themselves from the mass. The People’s Liberation Army might have managed to get rid of rank, but urban cadres would sport Japanese and Swiss wristwatches instead. In the course of the 1960s, the “Three Great Things” (wristwatch, bicycle, and sewing machine) came into the reach of many millions of people. By the time of Chairman Mao’s death in 1978, they had become the “Three Old Great Things,” and people now set their eyes on a fridge, washing machine, television, and motorbike (Gerth 2020).

Built-In Expectations

Economists tend to approach expectations by focusing on individual preferences. In recent years, behavioral economics has added psychological factors to the elements that affect individual decisions. The historical research discussed so far takes a step back from the individual to understand the social, cultural and political forces, and contexts that have shaped and changed the preferences of consumers in the past. Here, individual psychology is more the secondary imprint of historical factors than the primary agent. Still, many of these studies share a concern with choice and commodities.

There are, however, other approaches to consumption that are worth considering. Plenty of consumption involves ordinary goods and activities that do not necessarily follow desire and choice. Sometimes these are relegated to the category of “basic” goods or “basic” needs, but this is problematic, analytically as much as historically. Consumption is an ongoing story of “wants” turning into “needs.” A century ago, a hot bath or an automobile were luxuries; today they are considered normal parts of everyday life. Our unprecedented and unsustainable lifestyle today rests on many “ordinary” forms of consumption to which we have become so accustomed that they are taken for granted and are rarely noticed as forms of consumption at all (Gronow and Warde 2001). These include material infrastructures and networks, coal, gas, water, and electricity, along with the routine practices of everyday life the former make possible such as driving, washing, eating and cooking, entertaining, and communicating. The climate crisis has brought long overdue attention to

these consumption practices. They have more to do with habits than with choice and are anchored in social norms and conventions rather than in individual motivations. The study of expectations has the potential to enrich the emerging literature on comfort, convenience, and mobility (Shove 2003; Rinkinen, Shove, and Marsden 2020). For this potential to be realized, however, we need to shift from a psychological to a material level and from individual choice to social routines and customs.

Housing and infrastructures are key sites where expectations of consumption have been built into the physical environment. Energy policies and decisions to build new power plants, for example, imagine a future need for electricity. Such projections can turn out to be fantastically wrong (as the 1970s showed dramatically, when actual electricity consumption turned out to be lower than expected and became relatively decoupled from economic growth). Since infrastructures are long-lasting, once they are built they cast a shadow over the future.

Expectations matter because homes, offices, and infrastructures have been increasingly planned with an imagined user and lifestyle in mind. The number of sockets and Wi-Fi points for electrical and digital devices in new office buildings, for example, has risen sharply in the last two decades. Homes have seen rising levels and diffusion of thermal comfort. Most British homes, to take one example, heated only their living room at the end of the Second World War. By 1990, four out of five homes had central heating (Palmer and Cooper 2013).

It is naïve to think that infrastructures simply meet existing demand, as supply-oriented approaches and engineers have tended to do. Recent work in the social sciences shows instead how infrastructures and practices (what people do) “co-constitute” supply and demand, each prodding the other along (Shove and Trentmann 2019). For instance, the transition from a single heat source in the living room to central heating that spread heat across the entire home simultaneously opened up spaces for activities which in turn created new forms of demand; instead of being a place for sleeping only, children’s bedrooms turned into play areas, where children could read and study, hang out together, listen to music, and so on. In inter-war America, air conditioning was initially used only in factories and movie theaters. It was only in the 1950s and 1960s that it began to conquer the private home, helped by new mortgage facilities but also by a new ideal of children playing and learning indoors under the safe supervision of their parents (Cooper 1998). In European homes, by contrast, “AC” remains a rare sight. More generally, though, new hobbies and habits have tended to reinforce the demand for higher levels of comfort and cleanliness. Once more flats were equipped with a shower, fitness culture and bodily ideals of cleanliness led to people showering more frequently. One contributing factor to rising energy demand in Australia, research suggests, is that people leave on the air-conditioning when they leave the house because they want their pets to enjoy cool air, too (Strengers, Nicholls, and Maller 2014).

Homes, roads, and infrastructures have, of course, always been designed with a user in mind. What is radically new is the triumph of standards in the last century. From the minimum size of rooms to the number of sockets and appliances, to air ventilation and heating levels, the expected form and level of consumption has increasingly been standardized. There was nothing inevitable about this development. In Britain immediately after the Second World War, engineers, urban planners, and fuel experts were divided over the question of standards, with some arguing that it was wrong to impose the same degree of thermal comfort on the working classes and make them pay for something they had so far lived without. District heating, similarly, faced opposition from defenders of the open

coal fire. Standards could be seen to interfere with individual choice and diverse lifestyles. Ultimately, uniform standards won out, buttressed by the social democratic ideals of the welfare state. In Britain, the Parker Morris Report in 1961 specified a minimum of 18.3° Celsius (65° Fahrenheit) for living areas and 12.8°C (55°F) for kitchens. The expectation was that bedrooms could then be used as studies.

The triumph of standards did not automatically mean consumers got what they wanted. In Britain in the 1950s and 1960s, many tenants were nostalgic for the cheerful flickering of the coal fire and resisted or mismanaged the new gas and electric heating systems, defying the expectations of planners and reducing the efficiency of buildings in the process (Trentmann and Carlsson-Hyslop 2018). In Germany, housewives had to put up with lower standards than they would have liked. The industry norm DIN 18022, introduced in 1957, envisaged new-build kitchens as small work units of 5.8 square meters, and this would be the standard in the 1960s; housewives' protests that this was too small fell on deaf ears (Gerber 2015, 174–183). On the other hand, there is evidence that in recent years commercial standards have had a “ratcheting” effect in the ways new office buildings are provisioned with ever more Wi-Fi points, lifts, bathrooms, lighting, and air-conditioning. Design and industry standards (as opposed to official building regulations) are strictly speaking voluntary and not mandatory, but in reality, standards such as the British Council for Offices (BCO) Guide to Specification have become the norm accepted by the building industry and investors competing with each other to build and sell over-specified high-status office buildings for companies and their imagined staff. Industry standards and cultural ideas of what is “normal” and “needed” have been found to be virtually inseparable (Cass, Faulconbridge, and Connaughton 2019). Standards have not eliminated the considerable diversity of how people live and consume; thermostats are set to varying levels and energy poverty continues to scar rich societies. Nonetheless, official and industry standards set important parameters which have oriented expectations and practices upward, and continue to do so. Between 1970 and 2010, the average indoor temperature of British homes climbed from 14°C to 18°C, a jump that reflects a rising sense of comfort and standards of insulation as well as milder weather (Palmer and Cooper 2013, 58–60).

Outlook

Since the United Nations' 1987 report “Our Common Future” (Brundtland 1987), national and international visions of future consumption have been framed through their “sustainability” (Reisch and Thøgersen 2015). The expectation is that, with better information and renewable technologies, consumption can be sufficiently cleaned up to deliver “green growth.” When it comes to consumers, this expectation reflects the two contradictory logics of consumption identified in this chapter: individual choice and standardized norms. On the one hand, sustainable consumption upholds choice: the expectation is that people in the future should have as much choice as possible to pursue the greatest variety of products and lifestyles. Here is the legacy of the culture of novelty, fashion, and individuality which was said to enable people to cultivate their very own “material self.” On the other hand, advocates of sustainable consumption envisage technological innovation as a process of convergence, where eventually, everyone will drive an electric car and every home will be heated by a heat pump. This is the legacy of standards, where built-in expectations of future collective lifestyles resemble a one-way street of normalization instead of ever-greater variety. The history of consumption involves a profound dialectic between these two rival

forms of expectations, which conceive of behavior either as individual and psychological or as social and material. The underlying tension between these approaches deserves more recognition and debate.

Note

- 1 Special thanks to colleagues at the Centre for Consumer Society Research, Helsinki, for a seminar on expectations.

References

- Ajmar-Wollheim, Marta, Flora Dennis, and Elizabeth Miller, eds. 2006. *At Home in Renaissance Italy*. London: V&A.
- Berg, Maxine. 2004. "In Pursuit of Luxury: Global History and British Consumer Goods in the Eighteenth Century." *Past & Present* 182: 85–142.
- Berry, Christopher. 1994. *The Idea of Luxury*. Cambridge: Cambridge University Press.
- Bianchi, Marina, ed. 1998. *The Active Consumer: Novelty and Surprise in Consumer Choice*. London: Routledge.
- Blondé, Bruno. 2003. "Toe-eigening en de taal der dingen: Vraag- en uitroepetekens bij een stimulerend cultuurhistorisch concept in het onderzoek naar de materiële cultuur." *Volkskunde* 104: 159–173.
- Brewer, John, and Roy Porter, eds. 1993. *Consumption and the World of Goods*. London: Routledge.
- Brundtland, Gro Harlem. 1987. *Our Common Future: Report of the World Commission on Environment and Development*. Geneva, UN document A/42/427. URL: <https://www.un-documents.net/ocf-ov.htm>.
- Calder, Lendol. 1999. *Financing the American Dream: A Cultural History of Consumer Credit*. Princeton, NJ: Princeton University Press.
- Campbell, Colin. 1987. *The Romantic Ethic and the Spirit of Modern Consumerism*. Oxford: Blackwell.
- Campbell, Colin. 2021. *Consumption and Consumer Society*. London: Palgrave Macmillan.
- Cass, Noel, James Faulconbridge, and John Connaughton. 2019. "How Standards Define 'Normal' Design Practices and Work Infrastructures." In *Infrastructures in Practice*, edited by Elizabeth Shove, and Frank Trentmann, 77–89. Abingdon: Routledge.
- Clunas, Craig. 1991. *Superfluous Things: Material Culture and Social Status in Early Modern China*. Cambridge, MA: Polity Press.
- Cohen, Lizabeth. 2004. *A Consumers' Republic: The Politics of Mass Consumption in Postwar America*. New York: Knopf.
- Cooper, Gail. 1998. *Air-Conditioning America: Engineers and the Controlled Environment, 1900–1960*. Baltimore, MD: Johns Hopkins University Press.
- Deaton, Angus. 1992. *Understanding Consumption*. Cambridge: Cambridge University Press.
- De Vries, Jan. 2008. *The Industrious Revolution*. Cambridge: Cambridge University Press.
- Dyer, Christopher. 2005. *An Age of Transition? Economy and Society in England in the Later Middle Ages*. Oxford: Clarendon Press.
- Garon, Sheldon. 2012. *Beyond Our Means: Why America Spends While the World Saves*. Princeton, NJ: Princeton University Press.
- Gerber, Sophie. 2015. *Küche, Kühlschrank, Kilowatt: Zur Geschichte des privaten Energiekonsums in Deutschland, 1945–1990*. Bielefeld: Transcript.
- Gerth, Karl. 2020. *Unending Capitalism: How Consumerism Negated China's Communist Revolution*. Cambridge: Cambridge University Press.
- Gordon, Robert J. 2016. *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War*. Princeton, NJ: Princeton University Press.
- Gronow, Jukka, and Alan Warde, eds. 2001. *Ordinary Consumption*. London: Routledge.
- Gronow, Jukka. 2020. *Deciphering Markets and Money*. Helsinki: Helsinki University Press.
- Heisterhagen, Tilman, and Rainer-W. Hoffmann. 2003. *Lehrmeister Währungskrise?! Drei Familien-Generationen zwischen Gold, Mark und Euro*. Wiesbaden: Westdeutscher Verlag.

- James, William. 1890. *The Principles of Psychology*. New York: Holt.
- Kroen, Sheryl. 2006. "Negotiations with the American Way: The Consumer and the Social Contract in Post-war Europe." In *Consuming Cultures, Global Perspectives: Historical Trajectories, Transnational Exchanges*, edited by John Brewer, and Frank Trentmann, 251–277. Oxford: Berg.
- Lemire, Beverley. 1991. *Fashion's Favourite: Cotton Trade and the Consumer in Britain, 1660–1800*. Oxford: Oxford University Press.
- Logemann, Jan. 2008. "Different Paths to Mass Consumption." *Journal of Social History* 41, no. 3: 525–559.
- McKendrick, Neil, John Brewer, and John Harold Plumb. 1982. *The Birth of a Consumer Society: Commercialization of Eighteenth Century England*. Bloomington, IN: Indiana University Press.
- Muldrew, Craig. 1998. *The Economy of Obligation: The Culture of Credit and Social Relations in Early Modern England*. New York: St Martin's Press.
- Ogilvie, Sheilagh. 2010. "Consumption, Social Capital, and the 'Industrious Revolution' in Early Modern Germany." *Journal of Economic History* 70, no. 2: 287–325.
- Oldenziel, Ruth, and Karin Zachmann, eds. 2009. *Cold War Kitchen: Americanization, Technology, and European Users*. Cambridge, MA: MIT Press.
- Patten, Simon. 1913. "Extravagance as a Virtue." *Current Opinion* 54: 51–52.
- Pretholdt, Jeremy. 2004. "On the Global Repercussions of East African Consumerism." *American Historical Review* 109, no. 3: 755–781.
- Rainwater, Lee, Richard P. Coleman, and Gerald Handel. 1959. *Workingman's Wife: Her Personality, World and Life Style*. New York: Oceana Publications.
- Reisch, Lucia A., and John Thøgersen, eds. 2015. *Handbook of Research on Sustainable Consumption*. Cheltenham: Edward Elgar Publishing.
- Rinkinen, Jenny, Elizabeth Shove, and Greg Marsden. 2020. *Conceptualising Demand: A Distinctive Approach to Consumption and Practice*. London: Routledge.
- Roche, Daniel. 1994. *The Culture of Clothing: Dress and Fashion in the Ancien Regime*. Cambridge: Cambridge University Press.
- Samuelson, Paul A. 1938. "A Note on the Pure Theory of Consumer Behaviour." *Economica* 5, no. 17: 61–71.
- Schama, Simon. 1987. *The Embarrassment of Riches: An Interpretation of Dutch Culture in the Golden Age*. New York: Knopf.
- Siegelbaum, Lewis H. 1988. *Stakhanovism and the Politics of Productivity in the USSR, 1935–41*. Cambridge: Cambridge University Press.
- Shove, Elizabeth. 2003. *Comfort, Cleanliness and Convenience: The Social Organization of Normality*. Oxford: Berg.
- Shove, Elizabeth, and Frank Trentmann, eds. 2019. *Infrastructures in Practice: The Dynamics of Demand in Networked Societies*. London: Routledge.
- Simmel, Georg. 1957. "Fashion." *American Journal of Sociology* 18, no. 6: 541–558.
- Smith, Adam. 1759. *The Theory of Moral Sentiments*. London and Edinburgh: Millar, Kincaid and Bell.
- Smith, Adam. 1776. *The Wealth of Nations*. London: Strahan and Cadell.
- Stiglitz, Joseph E., Amartya Sen, and Jean-Paul Fitoussi. 2009. *Report by the Commission on the Measurement of Economic Performance and Social Progress (CMEPSP)*. URL: <https://ec.europa.eu/eurostat/documents/8131721/8131772/Stiglitz-Sen-Fitoussi-Commission-report.pdf>
- Styles, John. 2007. *The Dress of the People: Everyday Fashion in Eighteenth-Century England*. New Haven, CT: Yale University Press.
- Trentmann, Frank. 2016. *Empire of Things: How We Became a World of Consumers, From the Fifteenth Century to the Twenty-First*. London: Allen Lane/Penguin.
- Trentmann, Frank, and Anna Carlsson-Hyslop. 2018. "The Evolution of Energy Demand in Britain: Politics, Daily Life, and Public Housing, 1920s–1970s." *The Historical Journal* 61, no. 3: 807–839.
- Trentmann, Frank. 2023. *Out of the Darkness: The Germans, 1942–2022*. London: Allen Lane/Penguin.
- United Kingdom Department of Energy and Climate Change (DECC). 2013. *United Kingdom Housing Energy Fact File*, edited by Jason Palmer and Ian Cooper. London: DECC.
- Von Hippel, Eric. 2005. *Democratising Innovation*. Cambridge, MA: MIT Press, 2005.

- Weatherill, Lorna. 1988. *Consumer Behaviour and Material Culture in Britain, 1660–1760*. London: Routledge.
- Welch, Evelyn. 2005. *Shopping in the Renaissance. Consumer Cultures in Italy 1400–1600*. New Haven, CT: Yale University Press.
- Wright, Rebecca, and Frank Trentmann. 2018. “The Social Life of Energy Futures: Experts, Consumers and Demand in the Golden Age of Modernisation, c. 1900–73.” In *Work in Progress: Economy and Environment in the Hands of Experts*, edited by Frank Trentmann, Anna Barbara Sum, and Manuel Rivera, 47–77. Munich: oekom.

SAVING BEHAVIOR IN THE NINETEENTH AND TWENTIETH CENTURIES

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The Relationship between Expectations and Savings

In economics, saving is not treated as an independent optimization problem. It is typically modeled as a by-product of the optimal intertemporal decision to consume (see Trentmann, Chapter 22 in this volume). Friedman (1957) introduced the idea that a forward-looking individual does not simply spend her entire annual income on current consumption, but chooses current and future consumption levels to maximize her lifetime utility function. Since savings in each period are conceptualized as the difference between income and consumption, the choice of the optimal intertemporal consumption path also determines the optimal savings over time. When optimizing her intertemporal consumption path, a person must respect her intertemporal budget constraint, according to which the present value of her lifetime consumption cannot be greater than the present value of her total wealth, which consists of her financial assets and her current and future earned income. The solution to this maximization problem can be described with the Euler equation (see for instance Dräger and Nghiem 2021; Lehmann-Hasemeyer et al. 2023). An individual has reached her intertemporal optimum when for her, there is no difference in utility between consuming another unit of income today and saving that unit to finance consumption in the future. The logic of Euler's equation suggests that when expected real interest rates fall, current consumption rises and less is saved, because the lower real interest rate makes future consumption more expensive relative to today's consumption.

There are several variations and extensions of this basic model. Some add an infinite time horizon—which increases uncertainty in the model—, some add borrowing constraints, some include assets, and others include specific risks (for a recent overview see Gomes et al. 2021). The most prominent neoclassical approach of the post-Second World War period was Franco Modigliani's (1954) "life-cycle hypothesis," the idea that savings vary with income over an individual's lifetime, with younger people saving modestly and reaching a maximum just before retirement, from which point they live off their savings.

Scholars have formulated various saving motives and possible hierarchies between them in order to address the huge heterogeneity observed between different economic actors in a given macroeconomic setting. The theoretical models that attempt to describe the different

motives (see for instance Browning and Lusardi 1996; Canova et al. 2005) are all based on the Euler equation. In recent years, the more classical saving determinants have been expanded by concepts such as the theory of rational inattention, which assumes that agents cannot process all available information, but they can choose which information to pay close attention to (see Maćkowiak et al. 2023). Another concept that is able to explain deviations from the predicted optimal savings level is the concept of financial literacy (see for instance Japelli and Padual 2013).

In summary, irrespective of the specific motives for saving highlighted above, saving is generally modeled as a medium- to long-term economic activity that requires the saver to have concrete expectations about the development of various economic variables. These include, obviously, the inflation rate and nominal interest rates, but also individual circumstances such as one's career and the income associated with it, the future size of one's family, the probability of illness and other misfortunes, and so on. Savers face great uncertainty when forming expectations, and this uncertainty also mirrors their motives for saving and their ranking of them.

Failure to consider how individuals build expectations about the future and how expectations change when new information becomes available, and how quickly they are adjusted, can significantly influence the success of newly introduced policies (Börsch-Supan et al. 2009). Individual experiences are an important determinant of expectations here. These are of course very heterogeneous, and it is not necessarily only economic experiences that determine the expectations of individual actors.

Empirical studies often show large deviations from the predictions of theoretical models. As early as the 1950s, Duesenberry ([1949] 1967) described differences in savings rates between African-American and white American households with the same income level. The short theoretical overview made clear that saving behavior is complex and, in many cases, the available data—irrespective of whether they are historical or modern—miss important predictors such as variables that capture expectations or experience, potential other investment opportunities apart from savings deposits, or does not differentiate between savings of individuals and of households that make joint saving decisions. Moreover, based on the data, it is not always possible to disentangle the actual motives for saving. For example, in several surveys carried out in Germany and the US between 1960 and 1990, the most important saving motive was the very unspecific “saving for a rainy day.” This was reported as more important than saving for old age, for education, or for specific goals.¹ This clearly reflects an awareness of the great uncertainty under which savers have to make their decisions. But this uncertainty can be anything, from a concrete fear of job loss to the situation of savers who may have experienced health issues in the past and want to hedge against similar events. Moreover, these aggregate data suggest that the hierarchy of saving motives was similar in the US and Germany at this period and relatively stable over time. In the remainder of this article, we discuss empirical research on savings and expectations in these countries to show that the opposite is true.

The Economic History of Saving—Sources and Empirical Strategies

The previous section has shown that empirical research is necessary to learn how individual experience forms expectations and influences saving decisions in varying economic and political environments. The nineteenth and twentieth centuries are particularly promising periods for the study of these questions; economic historians have used several sources

at different aggregation levels to study saving behavior in these centuries. It is interesting to note that it seems more difficult to obtain reliable information at a national level than to construct samples of individual saving behavior. To calculate national figures and for the sake of convenience, economists define savings as the residual between income and consumption, and it is easy to derive national savings rates from GDP measures with this method.

At a lower level of aggregation, official micro-economic surveys like the Sample Survey of Income and Expenditure (*Einkommens- und Verbrauchsstichprobe*) of Germany's Federal Statistical Office offer qualitatively satisfying data from the 1970s onward. For earlier periods, official historical statistics often provide comprehensive information about the existence and performance of the *Sparkassen* (local banks) including information on the number of savings accounts, distribution of savings amounts, paid interest, and many more details. Lehmann-Hasemeyer and Wahl (2020) and Lehmann-Hasemeyer and Streb (2018), for instance, used the statistics for the Prussian savings banks provided by the Prussian statistical yearbook series. Even more promising sources for historical research on saving behavior can be found in the archives of financial institutions. Lehmann-Hasemeyer, Streb, and Neumayer (2023), for instance, collected data on 2,500 individual savers of the *Oberamtssparkasse Ludwigsburg* in the historical state of Württemberg in southwest Germany,² whose deposits and withdrawals were recorded on a daily basis (see below for a more detailed discussion on this study). Other researchers have studied saving behavior using sources from American savings banks such as the Philadelphia Saving Fund Society (Alter et al. 1994; Wadhvani 2002) and the New York Emigrant Industrial Savings Bank (Kelly and Ó Gráda 2000; White and Ó Gráda 2003). In contrast to the officially published data records, however, these samples are problematic due to the fact that they may not be representative for a regional or even national financial system.

From the 1960s onward, numerous marketing surveys were conducted by financial institutions. Many of these unpublished studies provide interesting new insights (Neeb and Knake 2019). A business history approach can help in understanding how financial institutions tried to incorporate their customers' saving behavior into their day-to-day operations or used it to create long-term strategies (Knake 2024). A recent research strategy is to look at economic forecast models used by different financial institutions, from central banks to savings banks. Many of these models provide information about what banks believed to be the determinants of household savings at the time (Knake 2023b).

Saving and Heterogeneous Inflation Expectations

Many empirical studies focus on the classical determinants of saving behavior such as, for example, the reaction of households or individuals to changes in interest and inflation rates. In principle, according to the Euler equation, people save more when interest rates are higher and less when they are lower. By the same logic, they save less if inflation expectations (see Weber and D'Acunto, Chapter 7 in this volume) are high and more if they are lower. The uncertainty about interest and inflation rates in the future increases with the time span for which an individual forms expectations. It is therefore very important to understand how expectations are formed by economic actors in order to infer the economic effects of interest rate changes motivated by monetary policy. For a long time, macroeconomic panel studies, such as study data from 135 countries from 1995 to 2014, were used to test the effects of a change in the interest rate on savings empirically (see Masson et al.

1998; Loayza et al. 2000; Aizenman et al. 2017). These showed that low interest rate levels (real and nominal) yield different effects on private savings in different economic environments. They suggested that the positive relationship between real interest rate and savings is less pronounced in developing countries than in developed countries, where people are wealthier and protected against life risks by a tighter social safety net. Again, this supports the notion that individual experience and the resulting expectations are strongly determined by many different aspects and in this case, to a large extent by institutional circumstances.

The overall impact of these effects on the savings rate is a challenging empirical question, because it depends on households that have heterogeneous time preferences, intertemporal rates of substitutions, income and wealth, imperfect information etc. (Attanasio and Weber 2010). Thus, in the last decade, microeconomic studies that analyze the empirical saving behavior of individual households using national survey data have gained prominence. These studies have several advantages (Burke and Ozdagli 2013). First, they avoid the biases that arise in the aforementioned macroeconomic panel studies due to idiosyncratic differences across the countries under consideration. Second, they use information on the individuals' expectations about future inflation and interest rates, which makes it easier to identify their specific motives and prove causality. Third, microeconomic studies draw on a wide range of socioeconomic data from the households surveyed, which makes it possible to explain individual saving behavior as a function of gender, age, marital status, education, and income, thus avoiding aggregation bias. At the same time, researchers became accustomed to examining the influence of expected inflation and the nominal interest rate separately, in part because many researchers assumed that the consumers surveyed would not understand the concept of the real interest rate.

In a seminal microeconomic study based on the Michigan Survey of Consumers, Bachmann et al. (2015) found that between 1984 and 2012, the willingness of US consumers to purchase durable consumer goods today did not increase with an increase in inflation expectations. Bachmann et al. (2015) explain this result by money illusion among consumers, who were thought unlikely to understand the difference between nominal interest rates and real interest rates. Burke and Ozdagli (2013) confirm the empirical results of Bachmann et al. (2015) on the basis of the New York Fed/RAND-American Life Panel Household Expectations Survey for the period 2008 to 2012. Unlike Bachmann et al. (2015), however, they attribute the lack of a positive relationship between expected inflation and current consumption not to financial illiteracy but to an income effect resulting from pessimistic expectations about the future. Consumers reduced their current consumption due to lower expected lifetime wealth because they expected that the increase in their future nominal income would not keep pace with inflation.

In contrast to the US survey data, surveys from Japan and Europe tend to confirm the presumed relationship between inflation expectations and consumption. Malmendier and Nagel (2016) showed that rising inflation rates during the Great Inflation of the 1970s led to a parallel rise in the average inflation expectations of American citizens. Moreover, they showed that the inflation expectations of young and older Americans differed systematically. To explain this age-related heterogeneity, Malmendier and Nagel (2016) assumed that economic agents do not use all objectively available information about past inflation rates to form their adaptive expectations, but only consider personally experienced inflation rates from calendar years in which they themselves lived. Older people, therefore, look back on a long period of inflation experience, while young people look back on a short period of inflation experience.

Lehmann-Hasemeyer, Neumayer, and Streb (2023) use the correlation between inflation experiences and inflation expectations, which has been empirically confirmed many times over the past decade and assumes that historical savers formed their inflation expectations similarly to people today, i.e., based on their individual inflation experiences. Unlike Malmendier and Nagel (2016), however, they do not focus on the entire lifetime of savers, but only on the historical period during which the savers held a savings account. For this purpose, they constructed a historical panel dataset with information on 2,500 individual savers at a specific district savings bank, the *Oberamtssparkasse Ludwigsburg*, whose deposits and withdrawals were recorded on a daily basis from 1852 to 1910. The authors focus on the impact of inflation expectations on savings because, given the rigid nominal interest rate offered by the savings bank to its customers, changes in real interest rates were mainly driven by changes in prices. Their study reveals that individual inflation and deflation experiences significantly affected the saving behavior of workers. They observed a non-linear and inverted-U shaped relationship: savings decreased both when savers experienced high deflation and high inflation, implying that historical savers responded only to exceptionally high inflation and deflation experiences, ignoring smaller fluctuations in this measure.

This apathy in the case of small changes can occasionally also be observed among today's savers, who tolerate even negative real savings interest rates as long as they do not become too large. In 2022, for example, 35 percent of all Germans surveyed said they still used their savings books for investments, even though nominal interest rates were zero and real interest rates were negative even before inflation rates rose.³ Most interestingly, Lehmann-Hasemeyer, Neumayer, and Streb (2023) find that historical savers also reacted to high deflation experiences by reducing their savings. This unusual behavior becomes understandable when we consider that in the second half of the nineteenth century, the decline in consumer prices in the wake of globalization was associated with an increase in nominal wages (Bordo et al. 2004). During this “good deflation,” caused by a supply rather than a monetary shock, the expected increase in real lifetime income probably inspired workers to increase their current consumption at the expense of savings. The last interesting finding of this study is that it was mainly long-term savers with above-average savings balances who adjusted their savings to changing inflation experiences. This observation suggests that financial literacy was a question of both savings experience and the amount of financial assets at risk.

Saving and Financial Institutions: Interest Rate Sensitivity

Every consumer experiences price changes to a greater or lesser extent in the course of his or her life, and this determines his or her inflation expectations. Moreover, even if households hold similar inflation expectations, they differ in their expectations of real interest rates because they hold other assets beyond savings accounts whose real returns are not the same. The portfolio of assets and hence the return differs significantly between individuals and different households within an economy. One cause—and also a result—of this heterogeneity is the difference in the interest sensitivity of savers.

To date, few studies have examined how sensitively historical savers responded to arising opportunities to increase their returns. Wissmann (1960) used aggregate savings bank statistics and questionnaires sent to fifty West German savings banks to answer the question of whether savers were interest-sensitive in the period from the beginning of the nineteenth century to the 1950s. He concluded that while the level of the nominal interest rate does

not affect the total amount of savings, it does determine the individual's choice between saving options. The greater the individual wealth, the stronger this effect. Neumayer and Proettel (2023) use data on annual savings bank deposits and withdrawals for each of the district savings banks (*Oberamtssparkassen*)⁴ in a former southwest German state, the Kingdom of Württemberg, for the period 1887 to 1912.⁵ In this period, in which the typical working-class saver had no alternative investment opportunities,⁶ they also find evidence that banks with higher interest rates attracted more deposits and vice versa. The effect remains significant after the inclusion of control variables such as the level of economic development and the specific characteristics of the savings banks. Even relatively small differences in interest rates seem to have played an important role for savers. However, an additional focus on different classes of savings accounts shows, in line with Wissmann (1960), that the effect was more pronounced for savers with higher deposits. This can be explained by the fact that for these savers, the benefits of switching banks were greater.

In a regional setting with savers sharing similar information, education, and social structure, it is possible to isolate the effect of (real) interest rate sensitivity. This becomes more difficult if we compare saving behavior in different countries in the late twentieth century, when forms of savings and investment opportunities were manifold and the interest rate increasingly depended on portfolio choice. One big puzzle from the “stagflation period” of the 1970s is the different saving behavior of American as opposed to German households. While in the US there was a “savings revolution” (Garon 2012), when American households massively shifted their savings from traditional savings accounts to money market accounts and later to the stock market, in Germany such a revolution did not happen. This difference evolved even though savers in both countries faced a highly volatile macroeconomic environment with high inflation and interest rate levels. The divergence in asset allocation preceded the divergence in the savings rates of both countries; that is, it happened when households in both countries were still saving substantial amounts of their income.

The organizational structure of the banking system offers an explanation and shows that at least in more recent periods, this aspect also matters for the expectation formation of savers (see de Jong, Chapter 19 in this volume). One main difference between the German and US banking systems was the way banks and customers communicated interest rates. In Germany, bank interest rates were deregulated in 1967, before the stagflation period. Subsequently, German banks established a two-tier communication strategy. First, they continued an established practice from the old regulatory regime that had forced the banks to agree on a common benchmark rate for savings deposits, the *Spareckzins*. After deregulation, the practice of setting a quasi-monopoly interest rate on savings was continued in form of a non-binding recommendation announced by the banks' federal associations. Knake (2023a) shows that this practice was highly effective in reducing bank competition for savings deposits and in managing expectations among customers with regard to retail interest rates. Second, most German banks offered special bonus payments to their best informed and wealthiest customers. Knake (forthcoming) examines this practice using two case studies. He finds that 4 percent of the savings accounts of the *Sparkasse Bielefeld*—those that held 20 percent of all savings deposits—received bonus payments at the peak of the 1973–1974 period. For the *Volksbank Rosengarten* at the peak of the 1979–1983 period, the ratio was 2 percent of accounts that held 10 percent of total savings deposits. In both cases, the bonus bridged the difference between the *Spareckzins* and the current interest rate applicable to time deposits. At its peak, the bonus alone reached 7 percent, pushing the combined rate of *Spareckzins* and bonus into double digits. Knake finds that the ability

of German banks to confine these bonus payments to a small group of customers relied on the intransparency of the German money market and the prevalence of exclusive bank-customer relationships. The two-tier communication process contributed largely to preventing official interest rates on savings adjusting to market rates, thereby reducing nominal interest rate volatility and stabilizing the expectations of average German households—at a level well below the actual market prices.

In the US, interest rate regulations were phased out only in the 1980s, with regular savings accounts deregulated as late as 1986. Consequently, real interest rates on savings accounts were highly negative during interest rate peaks in the late 1960s and the 1970s. Since US banks could not offer their customers adequate alternatives, the best-informed savers moved their funds from bank accounts into well-known money market assets like Treasury bills, a phenomenon that contemporaries called *disintermediation*. The experience of disintermediation led regulatory authorities to introduce the Money Market Certificate (MMC) in 1978, a retail savings certificate whose interest rate was tied to six-month Treasury bills and that featured a minimum investment requirement of \$10,000 US dollars. The MMC was designed to enable banks to use money market assets to compete for the funds of well-informed wealthy customers and at the same time to exclude the vast majority of small savers. Thus, the MMC had a similar purpose as the German bonus programs. Yet, in contrast to Germany, US banks failed to restrict information on the MMC to the target group.

The strong increase of money market interest rates during the “Volcker shock”—a fundamental shift in the monetary policy of the Federal Reserve in 1979⁷—moved the MMC interest rate into double digits. Knake (2024) shows how aggressive marketing campaigns promoting the MMC (carried out mainly by savings institutions) provided detailed knowledge of money market rates to retail bank customers. The sudden realization among large parts of the US population of the real opportunity costs of holding money in regular savings accounts led to political demands to lower the minimum investment requirement of the MMC and the creation of an entire new class of deposits and near-deposits, whose rates were all tied to the money market. By 1983, this new asset class had taken over the entire market for retail deposits, while ordinary savings deposits had declined to insignificance. Using local deposit data from across the US, a recent study (Drechsler et al. 2020) found a close link between the introduction of the MMC and the easing of inflationary pressures. Thus, households who had been discouraged to save by the prevalent negative interest rates on available financial assets, started saving again. This renaissance reduced consumption and eventually inflation. The authors even suggest that the introduction of this new class of assets was the reason behind the end of the Great Inflation in the US.

Ultimately, the outcome was a persistent difference between German and American households in terms of asset structure (Heilmann et al. 2014). In Germany, households retained a significant proportion of their financial wealth in bank deposits, while their US counterparts shifted their wealth toward securities. Since the 1980s, nominal (but not real) interest rates have been declining, boosting the real return of securities, while that of bank deposits have stagnated. Thus, the divergence in household portfolios led to a divergence in the household returns on investment and eventually to a divergence in the incentive to save. Consequentially, the stock market boom of the 1990s is found to be a major factor in the decline of the savings rate in the US (Cooper and Dynan 2016). Meanwhile, German households, facing lower real returns, kept on saving at high rates (Albers et al. 2022). In this case, the institutional structure of the banking system explains the difference between

the two countries, but also affected the whole process of expectation formation and saving behavior on the part of customers.

Saving and State Intervention: Between Discretionary and Contractual Saving

Today, saving behavior and household expectations are highly affected by state policy. This relates to the manifold policies to incentivize savings, e.g. to increase home ownership or old-age insurance. In contrast to most societies in the nineteenth century, modern state policy today influences the formation of expectations in a very general sense. The most important feature of this state policy was the introduction of social security schemes in many states, what George Katona (1975) called *contractual saving*. A major question in economic and historical research on household saving behavior is if and how these mandatory savings affected *discretionary saving*, i.e. the voluntary saving of households in a certain period.

This can be explored using the historical example of the introduction of old-age insurance in the late nineteenth century (see Guinnane and Streb, Chapter 24 in this volume). Lehmann-Hasemeyer and Streb (2018) estimated the crowding-out effect of private savings after the introduction of Bismarck's social security reform (with its three pillars of health, accident, and pension insurance). They showed how the introduction of the system changed the economic expectations and decisions of the German workforce by analyzing the development of Prussian savings banks' deposits in the late nineteenth century with the help of a difference-in-difference-like approach. In the Prussian case, social security crowded out private savings considerably. After the introduction of the social security system, income insecurity in old age decreased significantly, which was reflected in a decline in private savings. Saving for retirement obviously lost much of its importance as a saving motive. However, as counterfactual voluntary savings would have been far from sufficient, Bismarck's social insurance system would still have been needed to combat the misery that workers and their families might face in old age or in times of illness; until the pension reform of the late 1950s, social insurance did not provide sufficient cover to make additional saving for retirement obsolete. Only after the reform did it cover most of the financial needs of the elderly. Börsch-Supan et al. (2001) argue that the new generosity of the pension system surprised the generation whose expectations were based on the old system (those born before 1930). Consequently, this generation did not drive down their savings for old age and instead kept on saving. Thus, the failure to update their expectations led them to *oversave*.

In the later twentieth century, when demographic change led to fears of public pension schemes becoming unsustainable, governments in the developed countries aimed at reducing pension benefits. The pension reforms came amid uncertainty about the question of whether households would compensate the cuts in benefits by increasing discretionary savings or if they would *undersave*. Since most reforms aimed at reducing pension benefits have only been implemented since the 1980s, there has as yet been no meaningful historical research on this topic. Research in economics has been mixed on the question of whether savers "fill the pension gap" with increased discretionary savings. In Germany, Börsch-Supan et al. (2015) found no substantial change in the savings rate of German households after the introduction of the pension reforms of the 2000s. However, since German households tended to oversave before, in the aggregate they would be able to compensate the pension gap without changing their saving behavior. But this is not true for the

poorest households: Börsch-Supan et al. (2016) estimated that about a third of households do not save enough to compensate for benefit cuts.

In the US, the question has been subject to an extended debate. Gomes et al. (2020) concluded that American households *undersave*. In an interesting survey, Börsch-Supan et al. (2018) asked US pensioners if they regretted not saving more, earlier in life. Most respondents expressed saving regrets. The study distinguished between two categories of reasons why savings were inadequate: psychological biases and uncertainty. It concluded that people with saving regrets had strongly underestimated the financial impact of negative shocks like unemployment, or illness and strongly overestimated social security payments. Thus, uncertainty had greatly affected expectations and produced a (subjectively) inadequate outcome.

In order to prevent the undersaving scenario, pension reforms are often complemented by voluntary long-term saving plans that represent a mixture of contractual and discretionary saving. The most common explanation behind the practice of voluntary long-term saving is that it represents a *commitment device*. Thus, it supports self-control and shields funds and contributions that are dedicated to long-term saving motives from being redirected toward short-term goals or needs (Laibson 1997; Thaler and Shefrin 1981). From the perspective of expectations, saving contracts are a way to cope with the fundamental uncertainty that permeates long-term expectation formation and decision-making (Wilke 2010). Thus, expectations that play a role in the conclusion of the contract will influence savings flows years, and sometimes decades, into the future. By delegating and habituating savings payments in a long-term saving plan, savers are able to reduce the number of decisions they have to make under uncertainty considerably. However, this (imagined) certainty comes at the costs of under- or oversaving if savers fail to update their plan according to changing expectations.

In the US, the major change to the pension system did not involve social security, but company-based pension plans, which are the main pension component of US households. Starting in the 1980s, companies replaced traditional defined-benefit plans—where benefits depend on years of employment—with defined-contribution plans such as the “401(k)” plans, where benefits depend on the discretionary contributions of employees. Defined-contribution plans benefit from tax advantages and are therefore subsidized by the US government. The shift toward these saving plans made most employees in the US responsible for their own retirement savings. On average, however, employees decided to save too little, and the rise of defined-contribution plans is seen as the major reason for undersaving in US households (Gomes et al. 2020).

Explanations for the tendency to undersave among participants of defined contribution plans have ranged from inadequate financial literacy (Fisch et al. 2020) to various psychological biases (Thaler and Sunstein 2008). Consequently, these plans have become a playground for behavioral economists who try to enhance the saving choices of plan participants. Their most powerful tool has been default-setting, where plan designers utilize the status-quo bias to enhance saving decisions. The most common devices are auto-enrollment (employees have to opt out of a pension plan), auto-escalation (contributions increase automatically over time), and optimizing default investment choices. The majority of later innovations were introduced, however, in response to previously implemented behavioral techniques. Thus, auto-escalation devices were brought in after research showed that auto-enrolled employees did not actively choose their contribution and instead stuck to the (low) default contribution. Many researchers criticize the behavioral optimization of

defined contribution plans on a more general level, because they only simulate free choice for employees while in practice they mandate a saving behavior that is deemed optimal by the plan designers (Bubb and Pildes 2014). Thus, defined-contribution plans in the US do not actually reveal the long-term expectations of employee households, but those of professional investors or even economists.

This insight also sheds new light on a major divergence between the saving behavior of German and US households respectively. The share of US households owning some form of equity increased from 32 percent in 1989 to 52 percent in 2001 and has stayed constant since. Growing participation in the stock market is suggested to be one important cause of the declining savings rate in the US (Lusardi et al. 2001). Yet, this strong increase in equity ownership was almost entirely due to the rise in indirect stock ownership through pension accounts. Within pension accounts, the share of equity doubled from 33 percent to 66 percent from 1989 to 2001 (Wolff 2021). Thus, US-American households hold the majority of their pension savings in equity. Meanwhile, direct stock ownership remains at about 14 percent, which is comparable to the rate prevalent among German households.

To understand asset choices in employer-sponsored defined-contribution plans, it is helpful to look at the historical development of 401(k) plans in the US, where today, these plans are the most important form of retirement savings. A 401(k) plan is sponsored by the employer, but the employee decides how much of his income to dedicate to the plan and the employer usually offers to *match*—which usually means to double—these savings up to a certain limit. In principle, the employee also chooses how his savings are invested, but in practice the employer preselects a limited number of investment choices. While 401(k)s have existed since 1978, the preselection of investment choices was not regulated until 1992. Initially, participants in defined-contribution plans were generally reluctant to invest in risky assets like equity and preferred safe assets like Guaranteed Income Contracts (GIC) that were mainly offered by insurance companies. This employee-led investment pattern contrasted strongly with that of professionally-managed pension funds that invested the capital of the traditional defined-benefit pension plans. Thus, employees invested their pension savings much more conservatively than professional pension funds.⁸

This difference in the investment pattern only disappeared in the 1990s, after the Department of Labor introduced new regulations that required employers to offer at least three investment alternatives that featured a significantly different risk-return profile. This new requirement was explicitly and directly derived from Markowitz's portfolio theory. In practice, the rule required that every plan sponsor had to offer at least a bank account or money market fund, bonds, and equity (Schultz/Baily 1993). The new regulation was widely anticipated by the mutual fund industry, which had struggled to gain a foothold in the market for employer-sponsored pension schemes in the 1980s (ICI 1988). The third ingredient that led to the breakthrough of equity ownership inside pension plans came from the above-mentioned application of behavioral practices to shift the default investment choice toward more risky assets (Thaler and Bernatzi 2004). In this sense, the large share of equity holdings among US households has not been a result of changes in the expectations of households, but of the design of defined-contribution pension plans. Over time, however, some employees started to engage with their pension plan and regularly changed the size of their contributions or their investment choices (Burke et al. 2016). The experience of growth in wealth that was caused by stock market investment via pension plans likely had a long-term impact on expectations of asset return.

The development of defined-contribution plans in the US strongly contrasts with the most popular German subsidized pension plan, the *Riester-Rente*. Introduced in 2001 as part of a major pension reform, it was named after Walter Riester, the then German minister of labor, and aimed at compensating for the simultaneous cuts in the public pension system. Börsch-Supan et al. (2015) found that the introduction of Riester did not close the pension gap faced by low-income households, since uptake of these plans was lowest among low-income households, while high-income households overwhelmingly took advantage of the subsidies. They link this divergence mainly to communication problems. It is not clear if Riester has led to additional savings or if it has mainly displaced other forms of savings.

The main difference to its US counterparts is Riester's investment pattern. Since its introduction in 2001, it has remained dominated by insurance companies, which administer about two thirds of all plans, while fund-based plans make up about 20 percent.⁹ Interestingly, Bode and Wilke (2014) found that the vast majority of German households did not compare different offers regarding Riester pensions, but basically accepted the scheme offered by their own insurance company, i.e. the company with which they had a pre-existing long-term and exclusive relationship. With this choice, households forewent the complexity of a long-term savings decision by relying on an established relationship with a financial advisor (who, as they know, partially acts out of self-interest). Thus, in Germany an implicit preselection mechanism effectively reduced the number of investment choices among households to the number of pre-established relationships to financial institutions. Looking at an earlier government-subsidized defined-contribution scheme—the *Vermögenswirksame Leistungen*, employment benefits encouraging capital formation—Knake (2019) demonstrates the existence of this preselection mechanism since the late 1960s. Here, banks, insurance companies, and building societies used their near-exclusive customer relationships to direct the contributions toward assets most favorable to them. Very few of these institutions favored the sale of equity. Meanwhile, investment companies whose major business was to sell equity funds did not have direct relationships with participants in *Vermögenswirksame Leistungen*, since all large investment funds sold their funds through banks. There is ample evidence that the preselection mechanism impeded the uptake of equity among households in Germany through this scheme in the 1980s, even though it was its prime goal from the reform of this scheme in 1983.¹⁰ Through the successful sale of *fake equity* like *Gewinnobligationen* that were eligible to the subsidies although actually resembling deposits, savings banks and credit unions thwarted all efforts of the Federal Government to promote equity ownership among German households.¹¹

In sum, the involvement of the state in the pension system is due to the insoluble complexity and uncertainty regarding the question of how and how much to save for retirement. The late twentieth-century efforts of governments or employers to return the responsibility for retirement savings (partly) to individual savers has produced largely disappointing results. Despite generous subsidies for voluntary savings, the pension gap remains a reality in many developed countries. Solely the responsibility shifted from collective entities to households.

While saving for retirement is the most prominent case, government intervention in saving decisions extended and still extends to many other saving purposes. One example is saving for housing. From the 1950s, the German government strongly subsidized building society savings contracts in order to raise private capital for housing and thereby reduce the enormous public housing programs that had been introduced to meet the urgent need for dwellings after the war. Thus, building savings contracts are an early example of the

replacement of direct government action by incentives for voluntary discretionary saving. Kohlhase (2012) finds that between 1950 and 1990 in Germany, despite their long-term character, building society contracts were far more greatly affected by the business cycle than savings in general. He points to a trade-off between long-term and short-term expectations during downturns. Thus, in times of crisis, while savers do not give up their dream of their own home, they postpone saving for it in favor of more immediate needs. The structure of the building society contract, however, implies that the postponement of saving also postpones the availability of credit and therefore the time of home ownership. In countries where households do not save up for houses, home ownership is not postponed by the alteration of saving priorities during recessions, although this increases the risk of repossession (Garon 2012). Thus, the business cycle sensitivity of saving for housing in Germany might be contributing to the lower home ownership rates in Germany compared to other developed countries. Generally, the relationship between saving, expectations, and government intervention is not yet well understood and more research is required on this topic.

Saving and Expectations in History—A Closing Remark

The birds-eye perspective on macroeconomics often assumes a clear link between savings and economic development: as national incomes rose in Western societies, so too did household savings rates rise, from less than 5 percent in the early 1950s to 10–15 percent in the 1970s.¹² Other developments, however, such as the divergence in the savings rates of Western countries since the 1980s, are puzzling from a macro-perspective. Zooming into the nature of savings, one can detect important distinctions between nations, social groups, and income levels (see de Jong, Chapter 19 in this volume). These can often be traced back to the nature of individual and household expectations, which are influenced by differences in savings motives and their ranking, as well as differences in sensitivity to changes in economic variables. In addition, different institutional environments, such as the experience of a stable government or optimistic economic prospects, may influence individuals' behavior toward pension savings and future consumption prospects. Government intervention in the savings process may become firmly embedded in the expectations of savers, which makes it difficult to reduce or otherwise change the amount of government involvement. High interest rates may induce some households to extend their savings, while others may reduce them. Some might not even notice significant changes in the nominal or real interest rate, while others do. Different experiences of inflation will lead individuals to make different saving decisions, though the effect might be pronounced in some countries and less so in others. The choice of savings investments can be a simple product of the institutional structure of a country's financial system, but may also reflect different perspectives of individuals and households about the future. Thus, considering the institutional, legal, financial, and not the least cultural circumstances is very important. However, the literature review has made one point clear: the study of the relationship between macroeconomic conditions and the saving behavior of individuals or households in historical episodes proves to be very useful for a closer and deeper understanding of the formation of economic expectations.

Notes

- 1 See for the US Katona (1975, 235); US League of Savings Institutions (1984, 1985, 1987); *American Banking Journal* (1965). For Germany, see *Soll und Haben* 3 (1989); ADIG (1974); Necke and Riedel (1973).

- 2 As part of a research project funded by the German Research Foundation (DFG), several studies were carried out to investigate savings behavior with a focus on the economically emerging medium-sized state of Württemberg in the nineteenth century. The Württemberg region is particularly suitable because Proettel (2020) has already convincingly shown that the decentralised industrial structure benefited significantly from financing through savings banks.
- 3 <https://de.statista.com/statistik/daten/studie/13314/umfrage/aktuell-genutzte-geldanlagen-der-deutschen/> accessed on January 26, 2023.
- 4 The annual savings banks statistics, *Übersicht über den Geschäftsbetrieb und Vermögensstand der öffentlichen Sparkassen im Königreich Württemberg im Jahr* (Overview of company operations and the assets of the public savings banks in the Kingdom of Württemberg for the year) were published in the *Statistisches Handbuch für das Königreich Württemberg* and the *Blätter für das Armenwesen der Zentralleitung für Wohltätigkeit*. Württemberg clearly stands out regarding the data quality. Most other states did not publish continuous annual statistics, or if they did, they published only year-end balances, including interest and compound interest paid. For an introduction to the history of the savings bank in Württemberg see Proettel (2020).
- 5 This project is part of the same DFG-funded research project mentioned in endnote 2.
- 6 In nineteenth-century Germany, depositing one's money in a savings bank was basically the only way for the poorer population and the middle class to accumulate wealth. Although the stock market at the time was already well developed, shares and bonds were too expensive and not affordable for workers (Lehmann-Hasemeyer and Neumayer 2022). The German Stock Corporation Act of 1884 raised the already high minimum value of shares to 1,000 marks, which at that time corresponded to 2.5 times the net national product per capita. The justification for this law explicitly stated that small savings belonged in savings banks and not in risky equity investments (Guinnane 2018, 192).
- 7 The term "Volcker shock" points to a fundamental shift in the monetary policy of the Federal Reserve amid the appointment of Paul Volcker as Chairman of the Board of Governors in 1979. See Clarida, Gali, and Gertler (1999).
- 8 "Are pension funds getting riskier?" *Institutional Investor*, December 1986, 163.
- 9 Bundesministerium der Finanzen, *Statistische Auswertungen zur Riester-Förderung, Auswertungssichttag 15. Mai 2022*. URL: https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Steuern/Steuerliche_Themengebiete/Altersvorsorge/2022-11-15-Statistische-Auswertungen-Riester-Foerderung-bis-2021.html.
- 10 Deutscher Bundestag, Plenarprotokoll 10/247, November 14, 1986, pp. 19167f. Bundestagssprotokolle online, URL: <https://dserv.bundestag.de/btp/10/10247.pdf>; Bundesregierung: 11. Subventionsbericht, Deutscher Bundestag, Drucksache 11/1338, November 25, 1987. Bundestagssprotokolle online: URL: <http://dipbt.bundestag.de/doc/btd/11/013/1101338.pdf>.
- 11 Internal documents of the savings banks federal association reveal the internal strategy amid the introduction of *Gewinnobligationen*. See: Sitzung des Ausschusses für marktorientierte Leistungsangebote, October 4, 1983, pp. 10–16, in: DSGV-Archiv, I.B/28/7. The credit unions also favored the sale of *Gewinnsparbriefen* over the sale of real equity. See: Leitfaden. Vermögensbeteiligungs-gesetz, Teil I, published by Bundesverband der Deutschen Volksbanken und Raiffeisenbanken (BVR) for internal use, Wiesbaden 1984, in: GenoArchiv, WERB.03.06. For the significance of Gewinnobligationen, see: Deutscher Sparkassen- und Giroverband, Jahresbericht 1987, p. 19.
- 12 Comparable international data exists from 1970 among OECD members. Estimates for a number of countries among previous periods can be found at Garon (2012).

References

- ADIG. 1974. *"Status und Chancen von Investment."* Munich and Frankfurt/Main: ADIG.
- Aizenmam, Joshua, Cheung Yin-Wong, and Hiro Ito. 2017. "The Interest Rate Effect on Private Saving: Alternative Perspectives." Asian Development Bank Institute Working Paper 715. URL: <https://www.adb.org/sites/default/files/publication/239546/adbi-wp715.pdf>.
- Albers, Thilo N.H., Charlotte Bartels, and Moritz Schularick. 2022. "Wealth and its Distribution in Germany, 1895–2018." CESifo Working Paper No. 9739. URL: <https://www.cesifo.org/en/wp>.

- Alter, George, Claudia Goldin, and Elyce Rotella. 1994. "The Savings of Ordinary Americans: The Philadelphia Saving Fund Society in the Mid-Nineteenth Century." *The Journal of Economic History* 54, no. 4: 735–767.
- American Banking Journal. "The Outlook for Personal Savings." *American Banking Journal*, April 1965.
- Attanasio, Oratio P., and Guglielmo Weber. 2010. "Consumption and Saving: Models of Intertemporal Allocation and Their Implications for Public Policy." *Journal of Economic Literature* 48, no. 3: 693–751.
- Bachmann, Rüdiger, Tim O. Berg, and Eric R. Sims. 2015. "Inflation Expectations and Readiness to Spend: Cross-Sectional Evidence." *American Economic Journal: Economic Policy* 7, no. 1: 1–35.
- Bode, Ingo, and Felix Wilke. 2014. *Private Vorsorge als Illusion. Rationalitätsprobleme des neuen deutschen Rentenmodells*. Frankfurt/Main: Campus Verlag.
- Bordo, Michael D., John Landon Lane, and Angela Redish. 2004. "Good Versus Bad Deflation: Lessons from the Gold Standard Era." NBER Working Paper Series 10329. URL: <https://www.nber.org/papers/w10329>.
- Börsch-Supan, Axel, Tabea Bucher-Koenen, Michael Coppola, and Bettina Lamla. 2015. "Savings in Times of Demographic Change. Lessons from the German Experience." *Journal of Economic Surveys* 29, no. 4: 807–829.
- Börsch-Supan, Axel, Tabea Bucher-Koenen, Michael D. Hurd, and Susann Rohwedder. 2018. "Saving Regret." NBER Working Paper 25238. URL: <https://www.nber.org/papers/w25238>.
- Börsch-Supan, Axel, Tabea Bucher-Koenen, Irene Ferrari, Vesile Kutlu-Koc, and Johannes Rausch. 2016. "Die Entwicklung der Rentenlücke und das Sparverhalten deutscher Haushalte." MEA Discussion Paper 02_2016. URL: https://www.mpsoc.mpg.de/fileadmin/user_upload/data/MEA/max-planck-institut-mea-rente-studie-entwicklung-rentenluecke-sparverhalten-deutscher-haushalte.pdf.
- Börsch-Supan, Axel, Michaela Coppola, Lothar Essig, Angelika Eymann, and Daniel Schunk. 2009. *The German Save-Study. Design and Results*. 2nd ed. Mannheim: MEA.
- Börsch-Supan, Axel, Anette Reil-Held, and Rald Rodepeter. 2001. "The German Savings Puzzle." *Research in Economics* 55, no. 1: 15–38.
- Browning, Martin, and Annamaria Lusardi. 1996. "Household Saving: Micro Theories and Micro Facts." *Journal of Economic Literature* 34, no. 4: 1797–1855.
- Bubb, Ryan, and Richard H. Pildes. 2014. "How Behavioral Economics Trims Its Sails and Why." *Harvard Law Review* 127: 1593–1618.
- Burke, Jeremy, Angela A. Hung, and Jill E. Luoto. 2016. "Opting out of Retirement Plan Default Settings." RAND Labor & Population Working Paper WR–1162. URL: https://www.rand.org/pubs/working_papers/WR1162.html.
- Burke, Mary A., and Ali Ozdagli. 2013. "Household Inflation Expectations and Consumer Spending: Evidence from Panel Data." Federal Reserve Bank of Boston Working Papers No. 20–15. URL: <https://www.bostonfed.org/publications/research-department-working-paper/2013/household-inflation-expectations-and-consumer-spending-evidence-from-panel-data.aspxfile>.
- Cooper, Daniel, and Karen Dynan. 2016. "Wealth Effects and Macroeconomic Dynamics." *Journal of Economic Surveys* 30, no. 1: 34–55.
- Clarida, Richard, Jordi Gali, and Mark Gertler. 1999. "The Science of Monetary Policy. A New Keynesian Perspective." *Journal of Economic Literature* 37, no. 4: 1661–1707.
- Dräger, Lena, and Giang Nghiem. 2021. "Are Consumers' Spending Decisions in Line with an Euler Equation?" *Review of Economics and Statistics* 103, no. 3: 580–596.
- Drechsler, Itamar, Alexi Savov, and Philipp Schnabl. 2020. "The Financial Origins of the Rise and Fall of American Inflation." NYU Stern School of Business, SSRN Working Paper, February. SSRN: <https://ssrn.com/abstract=3538569>.
- Duesenberry, James S. (1949) 1967. *Income, Saving, and the Theory of Consumer Behavior*. 4th ed. Oxford: Oxford University Press.
- Fisch, Jill E., Annamaria Lusardi, and Andrea Hasler. 2020. "Defined Contribution Plans and the Challenge of Financial Illiteracy." Penn Carey Law: Legal Scholarship Repository 2076. URL: https://scholarship.law.upenn.edu/faculty_scholarship/2076.
- Friedman, Milton A. 1957. *A Theory of the Consumption Function*. Princeton, NJ: Princeton University Press.

- Garon, Sheldon. 2012. *Beyond our Means. Why America Spends While the World Saves*. Princeton, NJ: Princeton University Press.
- Gomes, Francisco, Kenton Hoyem, Wei-Yin Hu, and Enrichetta Ravina. 2020. "Retirement Savings Adequacy in US Defined Contribution Plans." Federal Reserve Bank of Chicago Working Paper No. 2022–40. URL: <https://www.chicagofed.org/publications/working-papers/2022/2022-40>.
- Guinnane, Timothy W. 2018. "German Company Law 1794–1897." In *Research Handbook on the History of Corporate and Company Law*, edited by Harwood Wells, 170–204. Cheltenham: Edward Elgar Publishing.
- Heilmann, Dirk, Rita Lansch, and Bert Rürup. 2014. *Sparverhalten der Deutschen Haushalte—Eine neue Sicht*. Düsseldorf: Handelsblatt Research Institute.
- Institutional Investor*. "Are Pension Funds Getting Riskier?" *Institutional Investor*, December 1986.
- Jappelli, Tullio, and Mario Padula. 2013. "Investment in Financial Literacy and Saving Decisions." *Journal of Banking & Finance* 37, no. 8: 2779–2792.
- Katona, George. 1975. *Psychological Economics*. New York: Elsevier.
- Kelly, Morgan, and Cormac Ó Gráda. 2000. "Market Contagion: Evidence from the Panics of 1854 and 1857." *American Economic Review* 90, no. 5: 1110–1124.
- Knake, Sebastian. 2019. "Moderne Vertriebswege. Die Verbreitung erfolgsorientierter Vergütungsformen im Privatkundengeschäft bei Banken und Versicherungen in Westdeutschland in den 1970er und 1980er Jahren." *Zeitschrift für Unternehmensgeschichte* 64, no. 1: 49–82.
- Knake, Sebastian. 2023a. "The Spareckzins. The Making of Germany's Most Important Price for Household Saving." *Vierteljahrschrift für Wirtschafts- und Sozialgeschichte* 110, no. 1: 30–73.
- Knake, Sebastian. 2023b. "Changing Forecasts—Forecasting Change. The US Market for Savings Deposits in Econometric Models and the Market for Econometric Models among Depository Institutions 1960s to 1980s." DFG Priority Programme 1859 Working Paper no. 41. DOI: 10.18452/26509.
- Knake, Sebastian. 2024. "The Fate of the Passbook. Why it vanished in the US but survived in Germany during the stagflation period (1966–1983)." DFG Priority Programme 1859 Working Paper no. 46. DOI: 10.18452/29307.
- Knake, Sebastian. Forthcoming. "Stupid German Money? Bonus Interest Rate Payments on Passbooks during the Stagflation Period 1967–1984." *Jahrbuch für Wirtschaftsgeschichte/Economic History Yearbook*.
- Kohlhase, Thomas R. 2012. "Die Entwicklung des Bausparwesens in der Bundesrepublik Deutschland in der Zeit zwischen 1949 und 1990. Eine institutionenökonomische Analyse." Doctoral diss., University of Cologne. URN: urn:nbn:de:hbz:38–46517. URL: <https://kups.ub.uni-koeln.de/4651/>.
- Laibson, David. 1997. "Golden Eggs and Hyperbolic Discounting." *Quarterly Journal of Economics* 112, no. 2: 443–477.
- Lehmann-Hasemeyer, Sibylle H., Andreas Neumayer, and Jochen Streb. 2023. "Heterogeneous Inflation and Deflation Experiences and Savings Decisions during German Industrialization." *Journal of Banking & Finance* 154, Art. No. 106978.
- Lehmann-Hasemeyer, Sibylle, and Jochen Streb. 2018. "Does Social Security Crowd Out Private Savings? The Case of Bismarck's System of Social Insurance." *European Review of Economic History* 22, no. 3: 298–321.
- Lehmann-Hasemeyer, Sibylle, and Fabian Wahl. 2021. "The German Bank-Growth Nexus Revisited: Savings Banks and Economic Growth in Prussia." *Economic History Review* 74, no. 1: 204–222.
- Loayza, Norman, Klaus Schmidt-Hebbel, and Luis Servén. 2000. "What Drives Private Savings Across the World?" *Review of Economics and Statistics* 82, no. 2: 165–181.
- Lusardi, Annamaria, Jonathan Skinner, and Steven Venti. 2001. "Saving Puzzles and Saving Policies in the United States." NBER Working Paper 8237. URL: <https://www.nber.org/papers/w8237>.
- Maćkowiak Bartosz, Filip Matějka, and Mirko Wiederholt. 2023. "Rational Inattention: A Review." *Journal of Economic Literature* 61, no. 1: 226–273.
- Malmendier, Ulrike, and Stefan Nagel. 2016. "Learning from Inflation Experiences." *Quarterly Journal of Economics* 131, no. 1: 53–87.
- Masson, Paul R., Tamim Bayoumi, and Hossein Samiei. 1998. "International Evidence on the Determinants of Private Saving." *World Bank Economic Review* 12, no. 3: 483–501.

- Modigliani, Franco, and Richard Brumberg. 1954. "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data." In *Post-Keynesian Economics*, edited by Kenneth K. Kurihara, 388–436. New Brunswick, NJ: Routledge.
- Modigliani, Franco. 1993. "Introduction." In *World Savings. An International Survey*, edited by Arnold Heertje, and Maxwell J. Fry, 1–27. Cambridge, MA: Blackwell.
- Neeb, Philip, and Sebastian Knake. 2019. "Der störrische Bankkunde. Intransparenz und Vertrauensprobleme in der Bank-Kundenbeziehung." *Berliner Journal für Soziologie* 29: 33–60.
- Necke, Barbara, and Wolfgang Riedel. 1973. "Die Veränderung der Sparziele im Lebenszyklus der Privathaushalte." *Sparkasse* 90, no. 6: 67–170.
- Neumayer, Andreas, and Thorsten Proettel. 2023. *Interest Rate Sensitivity of Low to Middle Income Depositors: Analysing Savings Behavior in Württemberg 1887–1912*. Stuttgart: Mimeo.
- Ó Gráda, Cormac, and Eugene N. White. 2003. "The Panics of 1854 and 1857: A View from the Emigrant Industrial Savings Bank." *The Journal of Economic History* 63, no. 1: 213–240.
- Proettel, Thorsten. 2020. *Die Stellung der Sparkassen im Markt für gewerbliche Finanzierungen: Untersuchungen über das Kreditgeschäft der Sparkassen während der Industrialisierung*. Stuttgart: Jan Thorbecke Verlag.
- Schultz, Dale W., and Luke D. Baily. 1993. *How ERISA Section 404(c) Affects You and Your Firm's Retirement Savings Plan*. Emeryville, CA: Dale W. Schultz.
- Spiegel-Verlag. 1989. *Soll und Haben* 3. Hamburg: Spiegel-Verlag.
- Thaler, Richard H., and Shlomo Bernatzi. 2004. "Save More Tomorrow: Using Behavioral Economics to Increase Employee Saving." *Journal of Political Economy* 112, no. 1, pt. 2: 164–187.
- Thaler, Richard H., and Hersch M. Shefrin. 1981. "An Economic Theory of Self-Control." *Journal of Political Economy* 89, no. 2: 392–406.
- Thaler, Richard H., and Cass R. Sunstein. 2008. *Nudge. Improving Decisions about Health, Wealth and Happiness*. New Haven, CT: Penguin.
- US League of Savings Institutions. 1984. *USL Savers Survey*. Chicago, IL: US League of Savings Institutions.
- US League of Savings Institutions. 1985. *USL Savers Survey*. Chicago, IL: US League of Savings Institutions.
- US League of Savings Institutions. 1987. *USL Savers Survey*. Chicago, IL: US League of Savings Institutions.
- Wadhvani, Rohit Daniel. 2002. "Banking from the Bottom Up: The Case of Migrant Savers at the Philadelphia Saving Fund Society During the Late Nineteenth Century." *Financial History Review* 9, no. 1: 41–63.
- Wilke, Felix. 2010. *"Sparen aus Ungewissheit. Der Erhalt von Handlungsoptionen als Antrieb individueller Sparentscheidungen."* Kassel: Kassel University Press.
- Wissmann, Bernhard. 1960. *Die Zinsempfindlichkeit der deutschen Sparer. Untersuchungen über das Spar, Giro und Kreditwesen*. Berlin: Duncker & Humblot.
- Wolff, Edward N. 2021. "Household Wealth Trends in the United States, 1962 to 2019. Median Wealth Rebounds...But Not Enough." NBER Working Paper 28383. URL: <https://www.nber.org/papers/w28383>.

24

DEMOGRAPHIC DECISION-MAKING UNDER UNCERTAINTY

Timothy W. Guinnane and Jochen Streb

In the run-up to the 1957 federal elections in West Germany, Chancellor Konrad Adenauer's governing coalition passed a major pension reform that is believed to have contributed significantly to his successful reelection. Existing old-age pensions were increased by an average of 60 percent and in the future were to be linked to the development of the wages of the actively employed, who were required to finance pensions from taxation on their earned income (Hockerts 1990; Schmähl 2007). Critics of this pay-as-you-earn (PAYE) system argued that Adenauer's exorbitant increase to the old-age pension would lead to a significant decline in fertility, because children were now no longer needed as a form of security for old age. As German society aged, there would be ever more pension recipients and ever fewer contributors. The PAYE system would inevitably fail in the long run in a predictable feedback effect, according to critics from the private sector (Hockerts 1990, 100). Adenauer is said to have brusquely dismissed these concerns with the response, "People always have children."¹

Unlike Adenauer, economists have believed since Malthus (1798) that the (lifetime) income of potential parents decisively influences their fertility choices. While Malthus (1798) thought that there was a positive relationship between income and fertility rates, in that higher wages led people to marry earlier and have more children, economists since Becker and Lewis (1973) have assumed that fertility tends to decline as income rises. There are two important causal channels. The first recognizes that children require a great deal of parental time, and as wages increase, the opportunity cost of child-rearing makes them more and more expensive. The second stresses the increasing importance of human capital since the Second Industrial Revolution (Galor and Weil 2000; Cinnirella and Streb 2017).² To establish children in life, parents need to invest in an excellent education for each child; the resulting financial budget constraints mean parents are likely to have fewer children.

Becker (1960) emphasized that having a child is an irreversible decision with long-term economic consequences for parents.³ Potential parents, in his view, would therefore do well to consider whether their joint income will be sufficient in the future to provide their children with the desired standard of living and a good education. In addition, they need to consider the implications of parenthood for their own lifetime income. For example, the mother's lifetime income may drop significantly if she interrupts her employment for an

extended period of time to care for her young children at home. She may also be unable to resume her previous career thereafter. However, the lifetime income of both parents may increase if they are financially supported by their children in old age, which is of no little importance, especially in societies with underdeveloped social security systems.

While we focus on economic considerations in the decision to have children, the theories we discuss do not exclude other influences. Economic models typically presume a set of preferences that lie outside the scope of the theory. According to the model, and given these exogenous preferences, variations in prices and incomes make it harder or easier to have the desired number of children, just as prices and incomes account for decisions to buy a car or a house. This reasoning lies at the heart of Becker (1960). Many accounts rightly stress the role of religion in fertility decisions, and with this, the role of secularization in the European fertility transition. The famous “Princeton project” elaborated one version of this argument (Coale and Watkins 1986). Religion enters into fertility decisions in several ways, one being for example the admonition to abstain from contraceptives or abortion. Another way reflects the role of women in society. Women’s lost labor market earnings are a large part of the cost of a child, and religious teachings that discourage roles for women outside the home encourage large families because they deprive women of the opportunity to choose earned income over children. While a full discussion of this issue lies beyond the scope of our paper, it is important to note that empirically, religion matters in cross-sectional comparisons (that is, when comparing two different religious groups at a given point in time) and over much longer horizons than we consider. For example, the introduction of social insurance in the 1880s represented a sharp break to people at the time while secularization occurs over a longer timescale.

Economic theories of the relationship between lifetime income and fertility typically assume that couples willing to reproduce are able to form correct expectations about economic variables far into the future. In reality, however, many couples make demographic decisions in situations of great uncertainty, and neglect longer-term consequences. Significant and sudden changes in divorce rates, for example, reflect both uncertainty and unexpected changes in economic and social reality. An illustration might be the brief, sharp spike in divorce rates in the United States in the late 1940s and early 1950s, as couples who married in haste during the Second World War came to regret their decision. A more sustained and dramatic increase in divorce rates occurred in the 1970s. In 1980, the US divorce rate reached 22.6 per 1,000 women, compared to 8 in 1920 and 4.1 in 1900 (Schweizer 2020). Economists and others continue to debate this dramatic change in the US (which has parallels elsewhere) but most agree that an important cause was the changing role of women in work and family life. Marriages sealed in 1960 reflected a set of expectations about the future that turned out to be false.⁴ The influence of uncertainty on demographic decisions, among which we include fertility, marriage, and divorce, will be explored in this essay in three different case studies.

First, we will use the example of German reunification to examine what happens when a fundamental transformation of an economic and social system abruptly devalues people’s previous life experiences. We will discuss whether the East German people fell into a state of irrational demographic shock in the early 1990s or whether, in a more rational process of adjustment, they used the option to postpone demographic decisions into the future. In our second case study, we will turn to the question of whether the post-Second World War (US-American) baby boom can be explained by the reduced uncertainty that characterized the Golden Age of economic growth compared to previous decades (Vonyó 2008). We will

see in this context that, during periods of prolonged uncertainty, short-term responses to economic fluctuations can also lead to long-term changes. Finally, going back further in time, we will discuss whether the introduction of social insurance systems in Germany in the late nineteenth century contributed to the fertility transition that took place at the same time. Doubts about this hypothesis are justified insofar as it places high demands on the rationality and long-term orientation of working families affected by social reform. Our study of German social reform under Bismarck suggests that, in the short term, the introduction of social insurance, affected, if anything, marriage behavior rather than fertility.

Our discussion of fertility stresses decision-making by married couples. For most of European history, the majority of all births were to married women. There were always some births to unmarried women, but illegitimate children were subject to social and legal discrimination. In a few regions (such as much of southern Germany), such children could account for up to 40 percent of all births, but these were exceptions. In most European states in recent decades, the law has abandoned the category of “legitimate.” Single women who bear children today do not find themselves subject to the same social disapproval, and in many societies, the proportion of children born to unmarried mothers has skyrocketed (Klüsner 2015). For the kind of economic reasoning we stress here, the decision to have a child differs little between a married couple and a single woman.

German Reunification: Demographic Shock or “Rational Freezing”?

The fall of the Berlin Wall on November 9, 1989, foreseen by few, initiated the process of German reunification, which via the intermediate goal of monetary union achieved in July 1990 led to the accession of the former GDR to the political system of the Federal Republic of Germany on October 3, 1990. Even though this process was wanted and driven forward by the citizens of the GDR, after reunification the people of the former East Germany fell into demographic paralysis (Figures 24.1–24.3). The average number of children per woman of childbearing age fell by 47 percent between 1989 and 1994, with marriages per 1,000 inhabitants falling by 57 percent between 1989 and 1992, and divorces per 10,000 existing marriages by as much as 74 percent between 1989 and 1991, while West German citizens were largely unimpressed by reunification as measured by their demographic reactions. According to Eberstadt (1994), no comparable collapse in marriage and birth rates can be found in this or any other period of modern economic history, even though similar developments did take place in the other transition countries in the former Soviet sphere of power. Thus, Eberstadt (1994) argues that East German society was facing an existential crisis in the early 1990s, when uncertainty and fear of the future seemed to cause people to cling to the demographic status quo. Under the given circumstances, they seemed to find it better to continue a bad marriage than to face fundamental social and economic change alone. Based on data from the German Socioeconomic Panel, Witte and Wagner (1995) observed that those East German women who stated that they were “very worried” about their personal future refrained from having their first or further children in the post-reunification years.

Conrad et al. (1996), however, interpret the dramatic decline in demographic changes in the former GDR not as an expression of irrational panic but as the result of rational behavior. Looking again at Figures 24.1 and 24.2, it is clear that marriage and birth rates in the GDR had been significantly higher than those in West Germany since the early 1970s. This divergence was due to the GDR’s pronatalist policies. Marrying early and having

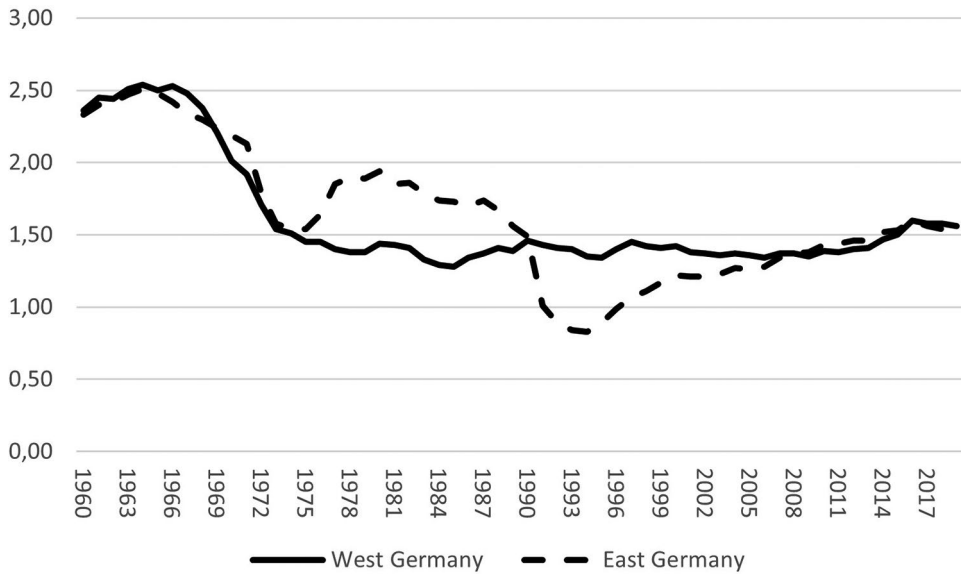


Figure 24.1 Crude birth rate, West and East Germany, 1960–2019.

Source: <https://www.bib.bund.de/DE/Fakten/Fakt/F09-Zusammengefasste-Geburtenziffer-West-Ost-ab-1945.html?nn=9991998>, accessed at January 17, 2022.

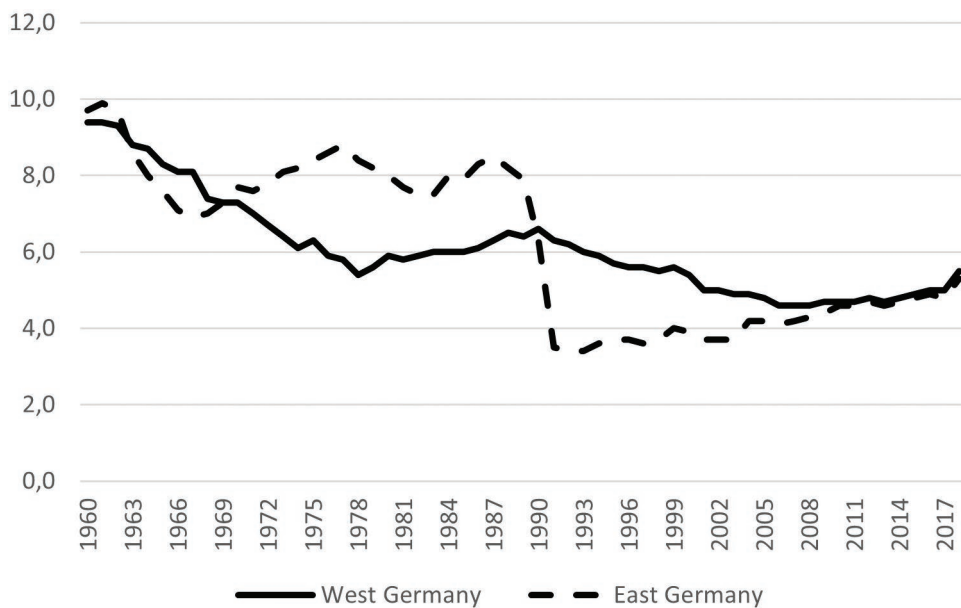


Figure 24.2 Marriages per 1,000 inhabitants, West and East Germany, 1960–2018.

Source: <https://www.bib.bund.de/DE/Fakten/Fakt/L102-Eheschliessungen-West-Ost-ab-1950.html?nn=9994330>, accessed at January 17, 2022.

children enabled young East German couples to get access to housing and, compared to West Germany, carried lower income risks, as the mother received a fully paid “baby year” (*Babyjahr*) and free childcare facilities were available once she returned to work (Cornelius 1990).

In particular, predictable income trends provided young East German couples with a high degree of planning security and therefore with the opportunity to make long-term commitments, such as marriage or having children, early in their life-cycle. The elimination of these benefits alone would have made it likely that East German marriage and birth rates would quickly approach the lower West German level after reunification. The overshooting decline is what Conrad et al. (1996) refer to as “rational freezing.” In view of the fundamental change in their life circumstances after the fall of the Wall, it may have been the most rational option for East German couples to postpone having children and to first gather additional information and experience that would enable them to evaluate their new situation and to form reliable expectations again.⁵

To explain the demographic changes in the Eastern European transition countries, Ranjan (1999) developed a “two period” model in which each couple exists in two consecutive time periods. A couple can fulfill its desire to have a child in either the first or second period but will only want to raise a child in the second period if it will then be in a good economic state rather than a bad state. When there is little uncertainty about its future income (that is, about the state of the second period), it may be reasonable for a couple to have its child already in the first period. However, when this uncertainty increases, as it did after the collapse of the Soviet Union and its satellite states, it is rational to postpone having a child until a couple can observe that a good state has returned in the second period.

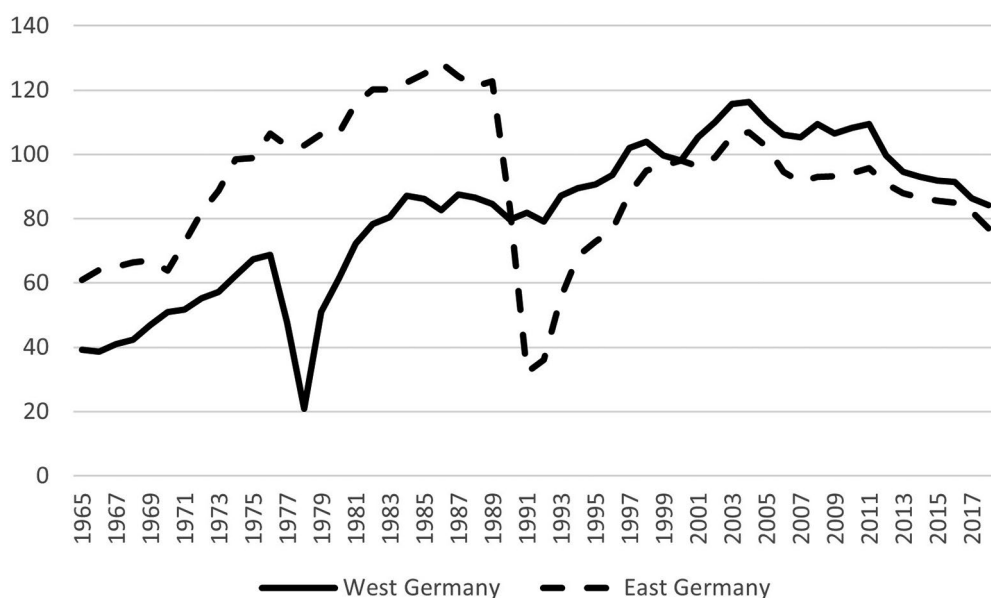


Figure 24.3 Divorces per 10,000 existing marriages, 1965–2018.

Source: <https://www.bib.bund.de/DE/Fakten/Fakt/L129-Scheidungsnummer-Deutschland-West-Ost-ab-1960.html>, accessed at January 17, 2022.

In view of the dramatically increased unemployment risk and other uncertainties that came with reunification, it was reasonable for the citizens of the former GDR to opt to wait, postponing major demographic changes into the future. Continuing with plans made before the 1989 changes would have implied either that the agents were irrational or that they did not much care about the future when planning their lives. Figures 24.1–24.3 show that the demographic behavior of East Germans eventually converged with that of West Germans, even if this adjustment took more than a decade.

Iyer and Velu (2006) also assume that in making economic decisions, the option value of waiting increases with uncertainty.⁶ However, crisis situations and people's reactions to them may differ radically: qualitative studies of German war-time letters and diaries from the 1930s to 1940s, among both non-persecuted and persecuted Germans (Piro 2018, 2022), found that existential crisis, fear of permanent separation, and imminent death may lead people, while considering postponement, to have children instead as a sort of “coping mechanism” in extremely difficult situations, while at the same time being aware of acting irrationally.

Baby Bust and Baby Boom

Since deciding to have children means making a long-term economic commitment, it is reasonable to assume that short-term economic fluctuations, unlike changes in growth trends, do not affect fertility. According to Becker (1960, 227), the long “production time” of children alone rules out an overly close connection between the business cycle and births:

It takes about ten months on average to produce a pregnancy and this period combined with a nine-month pregnancy period gives a total average construction period of nineteen months. This period is sufficiently long to reduce the impact on the demand for children of temporary movements in income.

Contrary to these preliminary considerations, most empirical studies do indeed find a procyclical relationship between macroeconomic aggregates and fertility. Regardless of whether the unemployment rate or GDP is used as an indicator for the business cycle, birth rates increase during economic booms and decrease during recessions (Sobotka et al. 2011; Bellido/Marcén 2019; Schaller et al. 2020). In the view of Buckles et al. (2021), the decline in birth rates can even be interpreted as a reliable early indicator of an economic downturn. The authors thus see clear parallels between family planning and consumption decisions. Just as the decline in consumer confidence at the beginning of a recession leads to a reduction in demand for durable consumer goods, the demand for children also declines.

The observed procyclical effect is rather small in most studies. This may be due to the marital division of labor. In his seminal paper on the economic theory of marriage, Becker (1973) postulated that marriage maximizes the joint (lifetime) utility of the two spouses if one of them focuses on earning market income and the other on producing household goods, which includes cleaning and cooking as well as caring for and raising children. The spouse with the lower wage income should focus on household production; this is/was usually assumed to be the wife. Under these assumptions, there are countervailing demographic effects of business cycle fluctuations. If the male breadwinner's income rises in an economic upswing (or his unemployment becomes less likely), both the incentives to marry and the incentives to have children increase. As long as many couples see marriage as an

important prerequisite for realizing their desire to have children, the increase in the man's wage thus has not only direct but also indirect positive effects on fertility via marriage. By contrast, a cyclical increase in women's wages raises the opportunity costs of housework and child rearing and therefore triggers opposite effects; women with the prospect of rising wages will more often choose not to marry (Schaller 2013) or have children (Butz and Ward 1979).⁷ Following this argument further, in an economic downturn, falling male wages weigh against marriage and children, while falling female wages weigh in favor. The opposing effects of male and female wages in both the upswing and the downswing could explain why the business cycle as a whole has only a small effect on fertility.

All these explanations do not change the argument made at the beginning of this section that short-term fluctuations in the business cycle should not in fact affect the long-term decision whether or not to have children. Gozgor et al. (2021) argue that the decline in fertility observable during a recession should not be attributed to actual changes in income at all, but to increases in uncertainty. While in times of economic upswing workers can expect to keep their jobs for the foreseeable future, so that they can look to the future with optimism and stable expectations, in periods of economic decline they must fear layoffs or wage cuts, so that the gap between possible bad and good states inevitably widens, which is equivalent to an increase in uncertainty (Bloom 2014). Ranjan's (1999) model discussed in the previous section therefore seems applicable not only to periods of major change and crisis. During "ordinary" recessions too, it may be worthwhile for potential parents to rely on the option of waiting and to postpone having children into the future. Especially for young couples at the beginning of their professional careers, during difficult economic times it may seem sensible to focus first on employment and increasing their precautionary savings. Gozgor et al. (2021), using a 126-country sample for the period 1996 to 2015, show that fertility is negatively correlated with uncertainty, the country- and year-specific level of which was measured using an uncertainty index constructed with the help of text mining.

A short-term postponement of childbearing should not have a permanent effect on a woman's completed fertility because a couple can still realize the desired number of children by making up for births postponed during crisis in better economic times. However, Sommer (2016) points out that because both women's and men's biological fertility levels decline with age, voluntarily postponing having children can sometimes lead to an involuntary reduction in a family's total number of children. This risk is magnified if above-average uncertainty persists for several years or occurs with particular frequency in a particular period, or women are having their children so late in life that a modest additional postponement makes it impossible to have children later. These considerations allow a new explanation for the (US-American) baby boom of the Golden Age from the mid-1940s to the mid-1960s.

Most scholars look for the causes of this baby boom in the special conditions of the postwar decades. In the tradition of Becker's work, Butz and Ward (1979) see rising wages for male workers as a strong incentive to marry and have children.⁸ Doepke et al. (2015) argue that in the postwar years, jobs suitable for young women were blocked by older women who had become gainfully employed in large numbers during the Second World War. Younger women who were kept out of the labor market therefore focused on the option of motherhood. Albanesi and Olivetti (2014) state that decreased maternal mortality was another important motive for the increase in fertility rates in the postwar period.

Easterlin (1966) explains the baby boom of the Golden Age by the above-average divergence between expected and realized consumption levels. The starting point of his

argument is the assumption that young people base their expectations on their childhood experiences; that is, they aspire to a standard of living they know from their own parental home. That is why, during the Golden Age, the rapid rise in average incomes positively surprised the younger generation. Young couples found that after satisfying their experience-based consumption demand, they still had some income left over, which, in Easterlin's view, prompted them to expand their number of children beyond their original plan.

Chabé-Ferret and Gobbi (2018) criticize the implicit assumption underlying all these explanations that the special demographic development took place primarily in the decades after the Second World War. A long-term look at the completed fertility of birth cohorts of American women reveals a particularly low number of children for the 1900 to 1925 birth cohorts, which requires at least as much explanation as the higher number of children of the subsequent birth cohorts of the years 1926 to 1935. The former cohorts experienced their fertile years in the first half of the twentieth century; during this time, two wars and the Great Depression (see O'Sullivan, Chapter 27 in this volume) generated long periods of increased uncertainty, so that potential parents might have repeatedly postponed births. This voluntary restriction of fertility then led to a partially unintended reduction in completed fertility through two distinct mechanisms. First, as explained by Sommer (2016), for reasons of biological aging, the fertility of both sexes decreased during the period of prolonged uncertainty, so that, in later life, it was no longer feasible for couples to have all the children they had originally planned. Second, many women had pursued successful professional careers during the waiting period, so that the opportunity costs of childbearing had increased significantly, leading couples to revise downward the total number of children they had intended to have.

Chabé-Ferret and Gobbi's (2018) conclusions apply to the entire industrialized Western world: the baby boom of the Golden Age appears extraordinary mainly because it was preceded by the baby bust of the interwar period. Looking at both periods together, the baby boom can also be interpreted as a return to demographic normality, as the steady economic growth of the Golden Age ended the period of frequent and great economic uncertainty, and married couples were again able to realize the number of children they had envisioned when they married.⁹

Fertility and Social Security

In the last quarter of the nineteenth century, Germany underwent a demographic transition from a society with high birth and mortality rates to one with low birth and mortality rates, with the fertility decline occurring with a time lag (see Figure 24.4). Around the same time, Imperial Chancellor Otto von Bismarck introduced compulsory social insurance for broad segments of the population in the form of health (1883), accident (1884), and disability and old-age insurance (1889). This social reform meant that for the first time in a Western industrialized country, people were comprehensively insured against the existential risks of illness, disability, old age, and death. As economists have been of the opinion since Leibenstein (1957) that people used to have children primarily in the hope of being supported by them in old age, it seems obvious to causally link these two historical events. Fenge and Scheubel (2017) estimate that between 1895 and 1907, about 15 percent of the decline in fertility in the German Empire can be explained by the introduction of Bismarck's disability and old-age insurance.

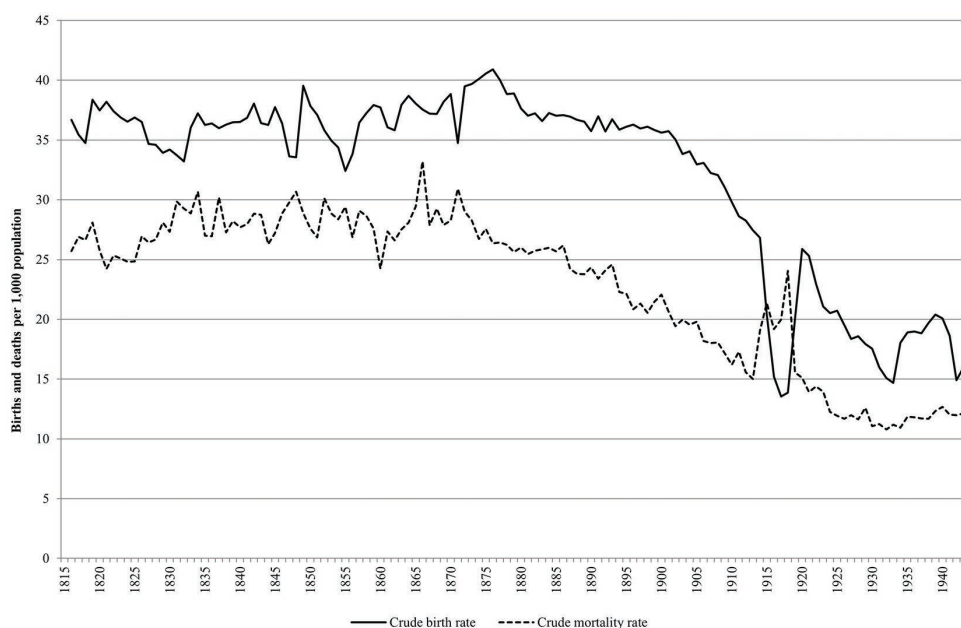


Figure 24.4 The demographic transition in Germany, 1815–1940 (within the borders of 1871).

Source: Jopp and Streb (2023), 224.

Five arguments, however, speak against the hypothesis that Bismarck's social reform contributed significantly to the German fertility transition. First, several European countries like France experienced an earlier decline in birth rates than Germany, although they did not have any mature social security system (Guinnane 2011). Second, Boldrin et al. (2015) argue that the old-age insurance systems of the leading industrialized countries began to significantly change the birth patterns of the insured only after 1945, because it was only at that time that pension payments reached a level that allowed pensioners to maintain their accustomed standard of living in retirement. Indeed, old-age pensions in the German Empire amounted to only about 20 percent of average wages, and it is doubtful that such a low wage replacement was already sufficient to convince lower-class working couples that their children were no longer needed for old-age security. If the generosity of old-age insurance has to exceed a certain financial threshold in order to have a noticeable effect on fertility, the starting signal for the decline in births in Germany might have come no earlier than Adenauer's pension reform in 1957, mentioned at the beginning of this article, which pre-dated the decline after the baby boom by less than a decade.

Third, Galasso et al. (2009) observe that the negative correlation between the generosity of old-age insurance and fertility is weaker in those economies where a mature financial system allows people to make independent financial provision for old age through private savings. An increase in old-age pensions then tends to reduce private savings rather than the planned number of children. Around 1889, Germany already had a nationwide system of savings banks set up specifically for workers. Lehmann-Hasemeyer and Streb (2018) show that there was indeed a crowding-out of private savings after the introduction of Bismarck's

social insurance—which likely dampened the demographic effect of old-age insurance (see Hesse, Knake, and Lehmann-Hasemeyer, Chapter 23 in this volume).

Fourth, people tend to overlook the fact that Bismarck's social insurance system also included health (1883) and accident (1884) insurance, which were much more generous than the old-age insurance (Jopp and Streb 2023) and exerted an independent influence on people's demographic behavior. Because the vast majority of children were born within marriage in the nineteenth and well into the twentieth century (and celibacy was thus one of the most effective methods of contraception), it is particularly important to ask how Bismarck's social insurance system influenced marriage rates. Both health insurance and accident insurance stabilized incomes through wage replacement benefits, free medical care, and accident pensions, respectively. This provided an effective incentive to marry, which contemporaries had already suspected in the context of older miners' social insurance (Guinnane and Streb 2021). A male worker who could reliably provide for his family even if he was (temporarily) unable to work was a more attractive husband. All other things being equal, marrying more often or earlier was associated with a higher birth rate.

The effects of accident insurance on fertility are ambiguous. Wives knew that even after the work-related death of their partner, financial resources in the form of a widow's pension were available to care for them and their children, reducing the costs of bringing up the latter. On the other hand, a generous invalidity pension also reduced the importance of children as old-age insurance, and this possibly induced a reduction in the planned number of children. The net effect of these two opposing influences cannot be determined *a priori*.

In contrast to accident insurance, Bismarck's old-age insurance (before being reformed in 1911) did not provide pension rights for the survivors of the actual policyholder. Therefore, the introduction of old-age insurance may have encouraged women to build up their own pension entitlements through gainful employment. In the German Empire, most insured workers were initially male, but the proportion of insured women increased over time. Increasing female labor force participation increased the opportunity costs of childcare, which may have actually reinforced the commonly assumed negative effect of old-age insurance on birth rates.

Fifth, it is important to keep in mind that we do not know how long it took German working-class couples to change their expectations and adapt their marriage and fertility patterns to the changing institutional environment. Scholars such as Fenge and Scheubel (2017) who claim that this adjustment took place within a few years, assume that workers understood immediately how the various pillars of social insurance worked and, moreover, trusted from the beginning in their practical implementation. Most nineteenth-century Germans had not yet had any experience with the payment reliability of a state-organized insurance system. Given the resulting uncertainty, we think it makes sense to assume that they initially maintained their traditional demographic behavior until, after a prolonged period of observation, they had convinced themselves that the social insurance organizations actually delivered on their promises. But even with sufficient confidence in the social security system, a young married couple would have accomplished no small feat by adjusting their contraceptive efforts to reflect an old-age pension promised in about 50 years' time. Given the notorious problem of individuals underestimating future needs, economists should not assume a higher degree of financial literacy, foresight, and discipline in contraceptive matters among young working-class couples in the German Empire than they give people credit for today.

It is possible that over the course of a century, Germans have learned to rely on old-age insurance to meet their needs in old age. It may even be true that this is why they have so few children today—which further implies that old-age provision is the dominant motive for family planning. None of this means, however, that it was the introduction of Bismarck's social insurance that accelerated the decline in fertility during the late nineteenth century.

The question of the demographic effects of social security can only be answered by empirical studies. Guinnane and Streb (2021) find that the introduction of Bismarck's social insurance system promoted marriage to a small extent but had no direct effect on marital fertility in Prussian counties between 1880 and 1910. In particular, health and accident insurance created incentives to marry, thereby at least partially offsetting the birth-reducing effect of old-age insurance.¹⁰

Conclusion

Economists are often accused of reducing people, even in matters of marriage and children, to pure utility maximizers guided by income and relative prices but not by love and affection. We think the problem lies elsewhere. Getting married and having children are decisions that create long-term economic consequences. Standard economic models of marriage and fertility implicitly assume that people can form correct expectations about the long-term effects of their demographic choices. In reality, this is not the case (see Eusepi and Preston, Chapter 3 in this volume). Demographic decisions are made in situations of considerable uncertainty, which can increase well beyond normal levels in times of crisis. Our historical examples suggest that people often respond to this increased uncertainty by postponing demographic decisions. Using the option of waiting is, in our view, not an irrational shock reaction, but a rational behavior that the social scientist must acknowledge if she aims to understand demographic behavior in interesting (historical) situations.

Notes

- 1 <https://www.bundestag.de/dokumente/textarchiv/2017/kw03-kalenderblatt-rentenreform-488538>. Accessed January 20, 2022.
- 2 Mühlhoff (2022) argues that high rates of uncontrollable child mortality create selective advantages for families with many offspring, while low exogenous child mortality favors families in which parents invest carefully in the well-being of fewer children.
- 3 Becker's model abstracts from the uncertainty surrounding pregnancy and contraception. Improvements in contraceptive technology mean that it is easier for women to become pregnant only when they want to. The introduction of the contraceptive pill in the 1960s is often referred to in this context. However, we have clear evidence that shows the widespread use and efficacy of earlier methods such as condoms. See Guinnane (2011). In this chapter we stress uncertainty that would inform the decision to have a child; improvements in contraceptive methods would make it easier to convert such decisions into reality.
- 4 Even Becker et al. (1977) admit that high divorce rates must be explained by the fact that, at the time of marriage, spouses are not able to correctly forecast the future development of their joint utility.
- 5 Rindfuss et al. (1978) show a related phenomenon in the United States. Twelve months after the Supreme Court's ruling on May 17, 1954, declaring the segregation of public schools unconstitutional, the birth rate of the white population in the former Confederate states declined. According to the authors, this decline in births may have been caused by the increased uncertainty that resulted from the unexpected end of an "established way of life."

- 6 Bloom (2014) discusses how rising uncertainty during recessions affects the option value of waiting for businesses and households.
- 7 Shore (2010) argues that marriage can be used as insurance against income risk. Joint income can be stabilized by having the spouses work in different industries and offsetting a cyclical loss of income for one with extra work by the other.
- 8 Consistently, Butz and Ward (1979) explain the subsequent baby bust of the 1960s with the sharply rising wages of women. On the role played by the introduction of the contraceptive pill, see Bailey (2006).
- 9 See also Becker and Barro (1988), 15.
- 10 Unlike Fenge and Scheubel (2017), Guinnane and Streb (2021) consider the endogeneity of the two explanatory variables of marriage behavior and child mortality.

References

- Albanesi, Stefania, and Claudia Olivetti. 2014. "Maternal Health and the Baby Boom." *Quantitative Economics* 5, no. 2: 225–269. DOI: 10.3982/QE315.
- Bailey, Martha J. 2006. "More Power to the Pill: The Impact of Contraceptive Freedom on Women's Life Cycle Labor Supply." *Quarterly Journal of Economics* 121, no. 1: 289–320. DOI: 10.1093/qje/121.1.289.
- Becker, Gary S. 1960. "An Economic Analysis of Fertility." In *Demographic and Economic Change in Developed Countries*, edited by the National Bureau of Economic Research, 209–231. New York: Columbia University Press.
- Becker, Gary S. 1973. "A Theory of Marriage: Part 1." *Journal of Political Economy* 81, no. 4: 813–846. DOI: 10.1086/260084.
- Becker, Gary S., and Robert J. Barro. 1988. "A Reformulation of the Economic Theory of Fertility." *Quarterly Journal of Economics* 103, no. 1: 1–25. DOI: 10.2307/1882640.
- Becker, Gary S., Elisabeth M. Landes, and Robert T. Michael. 1977. "An Economic Analysis of Marital Instability." *Journal of Political Economy* 85, no. 6: 1141–1187. DOI: 10.1086/260631.
- Becker, Gary S., and H. Gregg Lewis. 1973. "On the Interaction between the Quantity and the Quality of Children." *Journal of Political Economy* 81, no. 2: S279–S288. DOI: 10.1086/260166.
- Bellido, Héctor, and Miriam Marcén. 2019. "Fertility and the Business Cycle: The European Case." *Review of Economics of the Household* 17: 1289–1319. DOI: 10.1007/s11150-019-09449-y.
- Bloom, Nicholas. 2014. "Fluctuating in Uncertainty." *Journal of Economic Perspectives* 28, no. 2: 153–175. DOI: 10.1257/jep.28.2.153.
- Boldrin, Michele, Mariacristina de Nardi, and Larry E. Jones. 2015. "Fertility and Social Security." *Journal of Demographic Economics* 81, no. 3: 261–299. DOI: 10.1017/dem.2014.14.
- Buckles, Kasey, Daniel Hungerman, and Steven Lugauer. 2021. "Is Fertility a Leading Economic Indicator?" *Economic Journal* 131, no. 634: 541–565. DOI: 10.1093/ej/ueaa068.
- Butz, William P., and Michael P. Ward. 1979. "The Emergence of Countercyclical U.S. Fertility." *American Economic Review* 69, no. 3: 318–328.
- Chabé-Ferret, Bastien, and Paula E. Gobbi. 2018. "Economic Uncertainty and Fertility Cycles: The Case of the Post-WW2 Baby Boom." CEPR Discussion Paper 13374. URL: <https://cepr.org/publications/dp13374>.
- Cinnirella, Francesco, and Jochen Streb. 2017. "The Role of Human Capital and Innovation in Economic Development: Evidence from Prussia." *Journal of Economic Growth* 22, no. 2: 193–227. DOI: 10.1007/s10887-017-9141-3.
- Coale, Ansley Johnson, and Susan Watkins, eds. 1986. *The Decline of Fertility in Europe*. Princeton, NJ: Princeton University Press.
- Conrad, Christoph, Michael Lechner, and Welf Werner. 1996. "East German Fertility after Unification: Crisis or Adaptation?" *Population and Development Review* 22, no. 2: 331–358. DOI: 10.2307/2137438.
- Cornelius, Ivar. 1990. "Familien- und Bevölkerungspolitik in der DDR. Ein Beitrag zur Bestandsaufnahme und Analyse." *Arbeit und Sozialpolitik* 44, no. 8/9: 308–316.
- Doepke, Matthias, Moshe Hazan, and Yishay D. Maoz. 2015. "The Baby Boom and World War II. A Macroeconomic Analysis." *Review of Economic Studies* 82, no. 3: 1031–1073. DOI: 10.1093/restud/rdv010.

- Easterlin, Richard A. 1966. "On the Relation of Economic Factors to Recent and Projected Fertility Changes." *Demography* 3, no. 1: 131–153. DOI: 10.2307/2060068.
- Eberstadt, Nicholas. 1994. "Demographic Shocks after Communism: Eastern Germany, 1989–1993." *Population and Development Review* 20, no. 1: 137–152.
- Fenge, Robert, and Beatrice Scheubel. 2017. "Pensions and Fertility: Back to the Roots." *Journal of Population Economics* 30, no. 1: 93–139. DOI: 10.1007/s00148-016-0608-x.
- Galasso, Vincenzo, Roberta Gatti, and Paola Profeta. 2009. "Investing for the Old Age: Pensions, Children and Savings." *International Tax and Public Finance* 16, no. 4: 538–559. DOI: 10.1007/s10797-009-9104-5.
- Galor, Oded, and David N. Weil. 2000. "Population, Technology, and Growth: From Malthusian Stagnation to the Demographic Transition and Beyond." *American Economic Review* 90, no. 4: 806–828. DOI: 10.1257/aer.90.4.806.
- Gozgor, Giray, Mehmet Huseyin Bilgin, and Peter Rangazas. 2021. "Economic Uncertainty and Fertility." CESifo Working Paper No. 9025. URL: <https://www.cesifo.org/en/publications/2021/working-paper/economic-uncertainty-and-fertility>.
- Guinnane, Timothy W. 2011. "The Historical Fertility Transition: A Guide for Economists." *Journal of Economic Literature* 49, no. 3: 589–614. DOI: 10.1257/jel.49.3.589.
- Guinnane, Timothy W., and Jochen Streb. 2021. "The Introduction of Bismarck's Social Security System and its Effects on Marriage and Fertility in Prussia." *Population and Development Review* 47, no. 3: 749–780. DOI: 10.1111/padr.12426.
- Hockerts, Hans Günter. 1990. "Die Rentenreform 1957." In *Handbuch der gesetzlichen Rentenversicherung*, edited by Franz Ruland, 93–104. Neuwied: Luchterhand.
- Iyer, Sriya, and Chander Velu. 2006. "Real Options and Demographic Decisions." *Journal of Development Economics* 80: 39–58. DOI: 10.1016/j.jdeveco.2005.02.005.
- Jopp, Tobias A., and Jochen Streb. 2023. "Social Insurance and its Consequences for Workers' Living Conditions." In *An Economic History of the First German Unification: State Formation and Economic Development in a European Perspective*, edited by Ulrich Pfister, and Nikolaus Wolf, 217–235. London: Routledge.
- Klüsener, Sebastian. 2015. "Spatial Variation in Non-marital Fertility across Europe in the Twentieth and Twenty-First Centuries: Recent Trends, Persistence of the Past, and Potential Future Pathways." *The History of the Family* 20, no. 4: 593–628. DOI: 10.1080/1081602X.2015.1099112.
- Lehmann-Hasemeyer, Sibylle, and Jochen Streb. 2018. "Does Social Security Crowd Out Private Savings? The Case of Bismarck's System of Social Insurance." *European Review of Economic History* 22, no. 3: 298–321. DOI: 10.1093/ereh/hex022.
- Leibenstein, Harvey. 1957. *Economic Backwardness and Economic Growth*. New York: John Wiley.
- Malthus, Thomas Robert. 1798. *An Essay on the Principle of Population*. London: J. Johnson.
- Mühlhoff, Katharina. 2022. "Darwin Beats Malthus: Evolutionary Anthropology, Human Capital and the Demographic Transition." *Cliometrica* 16, no. 3: 575–614. DOI: 10.1007/s11698-021-00234-5.
- Piro, Katerina. 2018. "Kinderwunsch im Krieg: Kriegserfahrung und Fertilität in Deutschland im Zweiten Weltkrieg." *Jahrbuch für Wirtschaftsgeschichte* 59, no. 2: 471–506. DOI: 10.1515/jbwg-2018-0016.
- Piro, Katerina. 2022. "Familie als Krisenbewältigung. Eine Mikrogeschichte aus den 1930er und 1940er Jahren." In *Kindheiten in gesellschaftlichen Umbrüchen*, edited by Claudia Dreke, and Beatrice Hungerland, 121–136. Weinheim: Beltz.
- Ranjan, Priya. 1999. "Fertility Behaviour under Income Uncertainty." *European Journal of Population* 15, no. 1: 25–43.
- Rindfuss, Ronald R., John S. Reed, and Craig St. John. 1978. "A Fertility Reaction to a Historical Event: Southern White Birthrates and the 1954 Desegregation Ruling." *Science* 201, no. 4351: 178–180. DOI: 10.1126/science.351806.
- Schaller, Jessamyn. 2013. "For Richer, If Not for Poorer? Marriage and Divorce over the Business Cycle." *Journal of Population Economics* 26, no. 3: 1007–1033. DOI: 10.1007/s00148-012-0413-0.
- Schaller, Jessamyn, Price Fishback, and Kelli Marquardt. 2020. "Local Economic Conditions and Fertility from the Great Depression through the Great Recession." *AEA Papers and Proceedings* 110: 236–240. DOI: 10.1257/pandp.20201109.

- Schmähl, Winfried. 2007. "Die Einführung der 'dynamischen Rente' 1957: Gründe, Ziele und Maßnahmen; Versuch einer Bilanz." ZeS-Arbeitspapier 3/2007. Bremen: Universität Bremen, Zentrum für Sozialpolitik. URL: <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-109145>.
- Schweizer, Valerie J. 2020. "Divorce: More than a Century of Change, 1900–2018." FP-20–22, *Family Profiles* 22. DOI: 10.25035/ncfmr/fp-20–22.
- Shore, Stephen H. 2010. "For Better, for Worse: Intrahousehold Risk-Sharing over the Business Cycle." *Review of Economics and Statistics* 92, no. 3: 536–548. DOI: 10.1162/REST_a_00009.
- Sobotka, Tomáš, Vegard Skirbekk, and Dimiter Philipov. 2011. "Economic Recession and Fertility in the Developed World." *Population and Development Review* 37, no. 2: 267–306. DOI: 10.1111/j.1728–4457.2011.00411.x.
- Sommer, Kamila. 2016. "Fertility Choice in a Life Cycle Model with Idiosyncratic Uninsurable Earnings Risk." *Journal of Monetary Economics* 83, no. C: 27–38. DOI: 10.1016/j.jmoneco.2016.08.002.
- Vonyó, Tamás. 2008. "Post-war Reconstruction and the Golden Age of Economic Growth." *European Review of Economic History* 12, no. 2: 221–241. DOI: 10.1017/S1361491608002244.
- Witte, James C., and Gert G. Wagner. 1995. "Declining Fertility in East Germany after Unification: A Demographic Response to Socioeconomic Change." *Population and Development Review* 21, no. 2: 387–397. DOI: 10.2307/2137500.

25

ENTREPRENEURIAL EXPECTATIONS IN COLONIAL AND POSTCOLONIAL CONTEXTS

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Entrepreneurial expectations, as the driving force behind innovative ventures and economic growth, played a pivotal role in shaping the economic landscape of both colonial and postcolonial societies throughout the late nineteenth and twentieth centuries (see Ochonu, Chapter 26 in this volume).¹ This chapter examines the complex interplay between expectations, opportunities, and challenges faced by entrepreneurs and managers in colonial and postcolonial contexts, and how the economic and political environments of these eras influenced entrepreneurial behavior. By examining entrepreneurial expectations related to “the promise of infrastructure” (Anand et al. 2018) in these distinct historical periods, this chapter aims to explore the uncertainty that came from political instability, dependency on external rulers or external capital, and economic underdevelopment, as well as the hopes and predictions for development and growth. One important contribution of this chapter is to highlight the multiple actors who were involved in processes of expectation formation. We show how imperial politics, geared toward extracting resources and underpinned by racist worldviews, and the repercussions following independence from colonial rule and the large-scale transformation that ensued, provided a context for business operations in which state and business actions were particularly close and intertwined.

Using two case studies—railway construction in colonial German East Africa and Cameroon, and (multi)national airlines and aviation in postcolonial francophone West Africa—we show that entrepreneurial expectations in colonial and postcolonial settings were increasingly directed toward the political situation as well as toward rapid technological modernization and innovation. Further, we show that many actors expected that past successes of certain regions could be transferred to another region and repeated. In the absence of more extensive information, predictions about the future development of a particular market or business in African countries were made based on prior experiences in US and European contexts.

These experience-based expectations were challenged in colonial and postcolonial contexts over time. Moreover, expectations expanded in space, touched upon different regions, cultures, and communities and went beyond colonial borders, toward emerging markets

around the globe. Case studies like the ones presented here are particularly valuable in gaining a better understanding of expectation formation (which must take economic, technological, and political contingencies into consideration), and to gain a deeper insight into how ideas about the future are generated in an unfamiliar or only partially familiar operating environment. (Post-)colonial contexts were shaped by specific political as well as legal circumstances. They were to some extent extraordinary situations for companies, and shaped the latter's processes of decision-making. These could be compared to business situations and decision-making in wartime; on the one hand, companies faced situations of high political risk, such as constant fear of uprisings and revolution, but on the other, the regulation of labor markets, property rights, and/or extensive subsidies played out favorably for the businesses involved. These regulations thus created secure spaces for companies but at the same time were the source for (more) insecurity for local actors (Stuchtey and Wiegeshoff 2018, 322).

Studying business history in a (post-)colonial context requires the re-examination of assumptions about modern corporate forms and behavior. A growing body of scholarship has examined the role of business and corporations in late and postcolonial state-building and associated nationalist politics in recent years (Decker 2018, 2022; Raianu 2021; Lubinski 2023). The European and North American concept of the "modern corporation" quickly reached its limits in a context of global entrepreneurship where companies often operated differently to the established patterns of their home economies (Scranton and Fridenson 2013, 47–50; Gardner and Roy 2020, 147–150). As state-business connections were pivotal in both colonial and postcolonial settings, examining political-social developments alongside corporate operations and organizations is essential, and the findings often provide an alternative perspective to dominant corporate narratives (Gallagher and Robinson 1953; Decker 2005).

"Colonialism," closely related to "imperialism," covers a wide range of definitions and meanings (cf. Osterhammel 2005; Burbank and Cooper 2010). In the context of the presented African case studies, colonialism, as a practice of domination, can be defined as "the rule that a colonial metropole exerts over another society" (Glasman 2023, 4). Above all, this definition also refers to a specific power relationship characterized by dualistic, racist legal systems and financial and economic institutions as part of colonial rule (Koddenbrock 2020). The result was a sharp separation between colonizers and colonized (Glasman 2023, 6). This theoretical and practical dichotomy had tangible consequences for business ventures which continued beyond the phase of formal colonization.

In their 2021 edited volume, Dimier and Stockwell provide a framework for analyzing development from a business perspective, with a focus on managerial decisions, managers as main actors, and business operations. They argue that the decolonization context in Africa created a particularly ideological or utopian decision-making culture among economic agents in business and politics alike. During liberation struggles and in the first years after independence, decolonization and development were intertwined political projects (Cooper 2012; Bamba 2016; Young 2018). State enterprises were enabled by private investment and foreign aid from industrialized countries. The political instrumentalization of companies and even entire industries during decolonization and nation-building was widespread, as seen in studies on imported Dutch gin in West Africa and Unilever's operations in Nigeria and Ghana (van den Bersselaars 2007, 2011), Barclays' Africanization strategies in Nigeria after 1945 (Decker 2005), and British corporate decolonization policies in Ghana (Stockwell 2007).

Development discourses and practices date back to the first half of the twentieth or even the nineteenth century, and are part and parcel of the history of colonialism and decolonization. Yet in historiography, which is dominated by thinkers and perspectives from countries of the global north, they have often been subsumed under the general idea of modernity and progress, ignoring a long-term perspective on economic development (Akyeampong et al. 2014; Ndlovu-Gatsheni 2020, 91–95). In the middle of the twentieth century, however, “development” emerged as a central expectation term: it promised a path into the future that did not rely on experience (Kosellek 1989, 371–374). During a time of rapid change, when empires crumbled, and the old economic and political world order had failed, *as-if* assumptions about empirical reality became increasingly central in economic theories (Beckert 2016, 249, 250).

Development theories that centered the relevance of state-led economic planning, and the politics that they informed, promised a controllable, manageable future to all actors in the economy, a future that was fundamentally different from the past (Alacevich 2018). What was new after the Second World War was not the idea of economic progress but the “almost universal acceptance of the view that the countries that had hitherto been left behind in this process should seek to participate in it and be assisted in doing so” (Arndt [1987] 2015, 9). The “growth fictions” (Jerven et al. 2011) of development and modernization, based not on statistical calculations but rather on the experiences of US and European industrialization, were readily adapted not just by scholars and policy makers within internationalist expert networks, but also by politicians and the aspiring elites and middle classes in many developing countries (Mehmet 2002; Jerven et al. 2011; Alacevich 2018).

The Colonial Context: Entrepreneurial Expectations and Challenges

Colonial Development and Exploitation

The phase of formal German colonialism (ca. 1884–1914/1918) was characterized by expectations of resources as well as colonial markets. It was built on French and British experiences and role models (e.g. Wehler 1995; Conrad 2012, 54–61; Speitkamp 2014, 73–90). European political and economic expectations went hand in hand and were publicly negotiated, most strikingly at the Berlin Conference in 1883–1884. The German historian Hans-Ulrich Wehler concluded that in this process, the British principle of “pegging out claims for the future” (1995, 984) was adopted by many leading German actors. However, Imperial Chancellor Bismarck was rather skeptical about the value (in terms of raw materials and markets as well as settlement areas) of the colonies in the short and medium term (Speitkamp 2013, 61–65). Nevertheless, politicians as well as entrepreneurs insisted that it was important to stay competitive in the race of nations. For the newly founded German Empire, colonial exploitation was part and parcel of imperial ideology and its claims for a “place in the sun” (Kleinöder 2020).

Many of the so-called “colonial agitators” (mostly merchants, missionaries, and industrialists) called for formal colonization as a foundation for successful economic exploitation. They primarily argued from a long-term perspective, especially emphasizing the beneficial effects of colonization for the German economy in the future (e.g. Soénus 1992). Political aspirations for colonial projects, however, were dominated by a more reluctant position on state activity. They envisaged that economic development should first be realized via private business actors. Their line of argumentation mostly followed the model of

a new generation of (southern) African “chartered companies” (such as that led by Cecil Rhodes) in the late nineteenth century, where colonial exploitation and development were to be outsourced to private actors (Phillips and Sharman 2020). These private actors were meant to exert control over “new” territories via exploitation, covering the development of infrastructures, administrative tasks, and executive control. Following Phillips and Sharman, these institutions shared similarities with former generations of charter companies, but they now were a “co-mingling of new imperialist geopolitical ambitions with a hunger for profit among private investors, and a government keen for colonial possessions paid for by someone else” (Phillips and Sharman 2020, 176). As a result “the nineteenth-century states wanted extra-European empires for a mix of strategic, commercial and prestige concerns, [but] they also wanted them on the cheap” (Phillips and Sharman 2020, 154).

A second key characteristic of economic expectations in this era was that they were highly focused on the discovery and extraction of raw materials. The numerous “expeditions” that took place are evidence of continuing hope that new resources would be discovered, as had been the case in southern Africa. These expeditions enjoyed both state and corporate funding. Interconnected political, ideological, and economic interests were reflected in several colonial associations, such as the *Deutscher Kolonialverein*, and quickly took off in the 1880s (Soénus 1992; Barth 1995). In a general reading, economic and political aims and aspirations overlapped and were, to some extent, characterized by a close entanglement between public and entrepreneurial actors, to the point where some of these actors were themselves active in both spheres (Kleinöder 2022a).

The history of German formal colonization in Africa is finally a story of “disappointed expectations” (Denzel 2017). In retrospect, there were neither discoveries of new resources, nor successful extraction. Moreover, the export statistics of the German Empire into the new colonies do not show any excessive colonial sales markets beyond the markets for alcohol, weapons, and railway material (Schinzinger 1984; Denzel 2017).

Overall, how the Germans became “latecomers” to high imperialism in the 1880s is highly interesting (Conrad 2012; Osterhammel and Jansen 2012; Speitkamp 2014). German imperialism built on British and French examples and these two countries’ experiences of both formal and informal colonization. Initially, Bismarck’s policy followed examples of informal rule, changing to formal colonial rule at the turn of the century (Todzi 2021). On the one hand it was accompanied by growing state control and institutionalization in the 1890s and 1900s. On the other, in the phase of the “first globalization,” business actors in trade or transportation businesses pursued their own agenda of internationalization, looking far beyond the imperial borders of “their” nation-states (O’Rourke and Williamson 1999; Hungerland and Lampe 2021). For these entrepreneurial projects, the calculation of future (risky or safe) fields of action and markets in relation to colonial “development” became paramount. They hoped for sales markets for their (industrial) products, for raw materials, and as a springboard to other world regions (Fitzgerald 2016, 24–155; see for the construction industry in particular Linder 1994). The practical dimension of colonization, however, was mostly a trial-and-error process, one of dynamic and reciprocal selection and adjustment, in which the relevance of information-based expectations declined, and expectations became increasingly and more immediately experience-based (van Laak 2004b; Nützenadel and Streb 2024). Expectations were also significant in a broader context of the internationalization of companies, where specific “colonial,” experienced-based expectations were projected onto other regions of the world (for example, “tropical” experiences in Africa projected for “tropical” Latin America; see Kleinöder 2022b).

Infrastructural Development

The specific case of railway-building connects entrepreneurial expectations regarding colonial development with the exploitation of resources and markets (colonial capitalism). It demonstrates how political debates were intertwined, but also competed with economic expectations. In some cases, state expectations of private actor initiatives were the driving force, while in other cases companies actively tried to convince state agencies to connect to and finance a railway line. Railway projects were generally driven by the prioritization of resources and market development in what was arguably the most intense phase of the “scramble for Africa” in the age of high imperialism. Here, the strategic role of railway construction in the integration and control of the new colonies became central (Davis et al. 1991; van Laak 2004a). On the one hand, there remained much uncertainty due to numerous factors: unknown terrain, natural and climatic conditions, the often remote location of construction sites from the metropolis, unclear ownership, political pressure, and the permanent fear of uprisings and wars (for an overview on uncertainty and (in)security in business history see Jakob and Kleinöder 2021; on political risk and nationalism Lubinski 2023, 8–11). On the other, railway projects became increasingly attractive to construction firms when they were remunerated on the basis of specific fixed price contracts between construction companies and state clients (Baltzer 1916, 292–302; Kleinöder 2020; Rösler 2023; Rösler 2024).

Moreover, different perspectives and expectations stood in opposition to each other. While German politicians favored private investments, banks and construction firms struggled with the management of various risks in unknown terrain. African experiences and expectations, on the other hand, varied from alignment with colonial development and asserting themselves as active players between the different imperial powers (“protection contracts,” Michels 2013) to the protection of their own enterprises and trading systems against European domination in the “hinterland” (cf. Duala as “middlemen” in the Cameroon hinterland, Austen 1983). The construction of the railways had both direct and indirect consequences for Africans. Their experiences ranged from geographic division and (dramatic) transformations of the landscape, economy, and society (Decker 2020) to questions of free and unfree labor and experiences of violence (e.g. Schömann 1965; Koponen 1995; Zimmerer 2001; Oestermann 2022). But it is also possible to observe elements of (unintentional) appropriation of the new transport possibilities, for example through the establishment of new markets and trading centers (for the example of Togo see Sebald 1988).

Railway Construction Before 1900

The first phase of railway construction illuminates the gap between political expectations in the German Foreign Office of development and securing colonial sovereignty on the one hand, and entrepreneurial reservations and perception of risk on the other.

State officials had the feeling that they could make very safe predictions. Government construction officers at the Colonial Office were still articulating this confidence in 1916. Their arguments ranged from economic goals and exports from the colonies (e.g. a market in the metropolis for agricultural products), the predicted market potential of the colonies in terms of trade and the sale of consumer goods from the Reich, to questions of the expansion of administrative and military power and control (Baltzer 1916). Overall, there were

medium- to long-term goals of securing returns from the operation of the railways and gaining future investment capital, building on the experiences of former speculation in European and American railway construction, as well as the Anatolian, and later the Baghdad railroads (Barth 1995, 74–87, 120–138; Fuhrmann 2013; Plumpe 2020, 89–98). These experience-based expectations (see Nützenadel and Streb, Chapter 8 in this volume) were transferred to the “new” colonial contexts. As a result, the colonial administration not only depended on the experience and know-how of construction companies, but at the same time anticipated a genuine private interest in colonial investments. Expectations were high; inter-imperial comparisons led administrative officials to believe that private investment was of particular importance, because the political and administrative colonial actors themselves had only limited resources.

Yet in practice, the construction of the first colonial German railway lagged, and private investors like Deutsche Bank at first showed little interest in the colonial undertakings in Africa. Moreover, initial experiences with the Usambara Railway in East Africa seemed discouraging and risky; the construction project itself was badly managed, and the local European employees were overwhelmed by the colonial situation, vulnerable to tropical diseases and widespread alcoholism. Further, the project was generally significantly underfinanced (Barth 1995, 305). These first experiences, like much of the other news from the German colonies, was hardly likely to trigger public or private interest in further investment.

Only when the available information and the operational safety in relation to the “new” terrain increased did Deutsche Bank develop an interest in colonial projects as new investments. This new interest was additionally triggered by the bank’s close political ties (the members of the supervisory board included politicians) and by new information obtained at first hand, which increasingly supported the idea of a central railway in East Africa. This especially aroused the personal interest of Georg von Siemens, a member of Deutsche Bank’s directorate.

From 1895 onward, the interest of private investors in the new colonies slowly increased, and bankers joined the planning and exploration committee. Siemens was eager but initially skeptical after his experiences with the financing of the Northern Pacific Railway in North America. He was well aware of the risk of unpredictable problems and setbacks in unknown terrain and was not willing to pursue this project as a private investment of Deutsche Bank only. Other actors, such as the banker Karl von der Heydt, favored the extension of the existing Usambara Railway, not least due to his individual investment in the corporation (Barth 1995, 306). Eventually, Deutsche Bank, with the support of trading companies from Hamburg, was willing to invest one third of the costs of preliminary undertakings and projecting the future railway and a first “expedition” was conducted in 1895. Georg von Siemens took his experience from Deutsche Bank’s North American business and transferred his expectations—mainly that the construction of a new railway had the potential to open future markets—to the African colonies (Helfferich 1923, 277–278; Barth 1995, 305–308).

Political as well as economic members of the planning and exploration committee aimed at creating a magnet for follow-up investments; they clearly hoped for long-lasting effects from the colonial “development” and “exploitation” of East Africa. At the same time, both sides predicted political as well as economic risks. When bankers argued that subsidies were necessary, they simultaneously stressed the fact that they should strategically be only temporary, to appease public interest and mitigate costs. However, a concrete profitability calculation still proved elusive due to the absence of detailed information. Profitability was

clearly expected, but only once the project was completed (Scharlach I and II, 1906; Baltzer 1916, 45–56; Barth 1995; Faust 2014).

After long negotiations, and as a result of changed political constellations, extensive debates in the Reichstag, and a rising pro-colonialist atmosphere, the concession for the Central Railway was finally awarded in 1904, on the basis of extensive interest rate guarantees and state subsidies. These were the final catalysts, and the railroad finally became an investment case for Deutsche Bank in the following years (Baltzer 1916, 45–56; Barth 1995, 306–307; Faust 2014; Plumpe 2020, 90). In sum, the question of profitability and (the lack of) state subsidies played a significant role in the decision-making process, with entrepreneurial risk assessments (preliminary studies and expeditions; systematic project work, distribution of risks via consortium) prevailing over political will and expectations. These findings are in line with broader research on the link between business and empire: until governments were willing to “help[] firms to manage risks” via concessions, guaranteed profits, subsidized contracts, or monopolies, “the firms themselves had to devise ways to manage risk” (Gardner and Roy 2020, 147). In consequence, public and private actors tended to shy away from larger investments in the colonies.

Railway Construction after the Turn of the Century

The situation of German colonial railway construction in Africa changed dramatically with the “Dernburg Reform” (1908–1912), when a systematic public subsidy program was implemented. Not least as a consequence of the colonial wars, the German state administration turned to an active colonial and investment policy. The state successfully enforced the expansion of railways in the African colonies and railway kilometers soon multiplied (Baltzer 1916, 29). The new head of the Colonial Office Bernhard Dernburg, came from a banking background and introduced a new management style in colonial affairs. Building on his experiences in North America, “he had the reputation of being a specialist in the rehabilitation of difficult cases” (Barth 1995, 308, our translation). Consequently, and from the entrepreneurial point of view, private risks were continuously minimized in colonial railway projects and externalized as public risks. Moreover, expectations of mid-term effects from colonization, as discussed above, finally seemed to materialize with the finding of diamonds in Lüderitz (Namibia) in 1908, promoting (private) colonial aspirations even more (Barth 1995, 307–308; Kleinöder 2020; Rudolph 2024).

This was also the period when the actors themselves began to draw their first conclusions. Julius Scharlach, a colonial politician and entrepreneur (Oestermann 2022, 265–267), formulated expectations for further expansion in West Africa on the basis of the experiences with colonial railway construction in East and South West Africa. In his view, it was the reluctance to invest and “fearful financiers” that had slowed down development so far. It was a matter of overcoming this “bitter punishment,” also in view of the costs of the colonial wars, and “[in] Cameroon we will hopefully be spared the same experiences” (Scharlach I 1906, 200). In fact, the colonial gaze increasingly turned to the colony of Cameroon in the context of a sharp increase in demand for rubber from the turn of the century.

The initial debate about the potential exploitation and development of southeastern Cameroon was caused by trans-imperial competition in rubber cultivation and the rubber trade. From the colonial administration’s perspective, it was a matter of urgency that the border region of southeastern Cameroon and the Congo be opened up for exploitation. Since the 1890s, German politicians and the colonial administration had observed with

suspicion that the economic and political control of the region was slipping away from them; Belgian and Dutch Congo businesses had entered the cross-border production and trade. In the eyes of the colonial administration, profits and customs duties from the rubber trade should fall to the underfinanced colonial state of Cameroon rather than ending up in other European hands. What was the reaction?

Conscious of former experiences of private investor reluctance, the German colonial administration decided to create a more attractive framework through concessions in order to entice investors that up until then had shied away (Oestermann 2022, 268). The pressure to act unfolded through trans-imperial competition and concern about losing influence in the region on the one hand; on the other, the colonial administration had high expectations of the expanding Congo businesses and wanted to finally profit from the colony's resources and colonial exploitation. However, these expectations were highly speculative and mostly fictional; even Jesko von Puttkamer, the then governor of Cameroon, had no local knowledge, but at the same time called the region "the 'most valuable' part of Cameroon" (cited after Oestermann 2022, 271). In practice, the implemented concession system was adopted on the basis of experiences in the colony of German South West Africa, where corporate enterprises (in contrast to the international Congo concession system) were granted large territorial concessions (including railway construction). The goal again was to outsource costly "exploration and development" (Oestermann 2022, 271; see also Drechsler 1996).

But colonial firms also actively argued for their own and (in their view) better railway connections. The idea of a southern line in Cameroon from Kribi to Ebolowa (see Baltzer 1916, 77), for example, drew strongly on the interest of German trading companies in the coastal region of Batanga. A southern line would compete with an existing "middle land" railway connection and once again, expectations of public and private actors were in conflict. Trading firms on the Batanga coast wanted a railway link to Kribi in order to uphold their influence on the southern rubber trade. The expansion of the line played a central role here, not least to push back the local African portage system on which the European traders were still largely dependent and in order to save costs (Oestermann 2022). The Batanga firms painted a bleak picture of the consequences if the railway were not built, from financial losses to government tariff shortfalls, and even adopted former state arguments regarding the military safety of railway buildings. Politicians and military agents, by contrast, questioned whether the railway would contribute to this goal (Schömann 1965, 128–141). On the eve of the First World War, the debated and projected alternative southern railway was never built. However, from an administrative perspective, the colony of Cameroon continued to be the colony with the most promising future, once it was "completely and organically developed" (Baltzer 1916, 78).

Overall, this case study illustrates the complexities and challenges of entrepreneurial expectations in the context of colonial railway construction. The interplay of political and economic expectations, competing actors, and various risks, often led to delays or sometimes even the (temporary) abandonment of projects, despite the generally strong political will for the development of railways infrastructures in the imperial race. Plans and projects were justified by arguments of strategic and economic exploitation and development. The state actors anticipated a geopolitical and economic opportunity in the new colonies, but were dependent on the expertise and capital of the companies and banks. The (metropolitan) companies, on the other hand, were mostly hesitant due to former experiences of unforeseen problems and costs, while (some) colonial firms on the ground actively pushed for railway development projects. With state subsidies, however, entrepreneurial actors and

investors increasingly interpreted the colonies as “emerging markets” to which they hoped not only to gain initial access, but also to use them as a springboard to the further “periphery” of the “first globalisation” (Kleinöder 2022a).

The Postcolonial Context: Entrepreneurial Expectations in Newly Independent African Nations

Under colonialism, imperial powers dominated high-value transactions and limited indigenous African participation in trade and industry, and infrastructure focused on extractive needs rather than unlocking internal commerce (Austin 2005; Gardner 2012). Discriminatory laws constrained local enterprise, and capital and credit access were extremely limited. Yet some colonial subjects became traders, transporters, retailers, and small manufacturers, navigating restrictions. Women played key roles as market intermediaries and in small businesses (Osirim 2009; Frederick 2020; Puddu 2021).

During the transition from colonial rule to independence across Africa in the 1950s to 1960s, new uncertainties emerged, as colonial business models were contested, and dreams of rapid development took hold. Core questions arose around economic sovereignty, integrating into the global economy, and utilizing new technologies for “catch-up” growth. This analysis highlights expectations around a pioneering African airline, and the following sections explore how aspirations, uncertainties, and constraints interacted to drive business decisions.

State-Led Development Models

After independence, many new governments sought to spur industrialization, substitute imports, and create state-owned companies. Political leaders and economic planners in newly independent African nations shared a sense of momentous opportunity but also immense responsibility. However, continuity with colonial trade patterns partly persisted, and expatriate businesses remained influential in sectors like mining, plantations, and banking (Tignor 1998; Stockwell 2007; Verhoef 2018). Postcolonial nation-building in this period was characterized by ambitious economic planning and faith in the state management of economies and using public companies to drive industrialization; these tendencies embraced a variety of different ideological currents including African socialism, Marxism-Leninism, and liberal pro-market approaches (Huber and Keese 2022). The predominant view was that colonialism had left Africa undeveloped and dependent. Consequently, in this view, post-independence hopes were directed toward the state apparatus and its potential to mobilize capital from external donors, set investment priorities, provide infrastructure, and correct distorted colonial patterns. State enterprises were considered key tools for economic planning, and to assert control over foreign-dominated sectors (Amin 1973; Rodney 1981). The specific stakeholder dynamics, with politicians and state administrators in entrepreneurial roles, mean that postcolonial state enterprises can serve as insightful case studies for analyzing entrepreneurial expectation formation.

As Abou Bamba (2016, 87–89) has observed for Côte d’Ivoire, this state-led development created a context where stakeholders in state enterprises made decisions based on future visions that were often far removed from realities on the ground. Economic planners as well as administrators in management positions believed they had an experiential understanding of the potential of modernization theory, particularly the “stages-of-growth”

version promoted by Walt W. Rostow (1961). They saw themselves as heirs to late colonial developmentalism and the Marshall Plan's economic recovery programs, and conceived of their projects as further demonstrations of how effective this type of modernization theory could be in practice.

Aviation Aspirations

Air transport held a particularly strong promise and symbolism for many within and outside Africa. Given Africa's vast size and diversity, it was seen as crucial for linking fragmented or disrupted economies and societies. Pre-independence, colonial interests, and connecting the colonies to the metropolis, dominated regional flying, but thereafter aviation was seen as integral for facilitating trade and enabling mobility. State airlines projected modernity and progress. These flag-carriers were seen as potential national champions, while hopes for Pan-African cooperation influenced several regional, multinational ventures in East and West Africa (Allmann 2013; Pirie 2014; Button et al. 2018).

The multinational airline Air Afrique, which brought together eleven francophone countries (all of them former French colonies in West Africa), shines a light on how these prevalent expectations of the future in newly independent nations played out in practice and at an operational level. Air Afrique's decision-makers faced continued uncertainty about the new political environment and anticipated economic growth. The majority of them were members of the political leadership and elites of the newly independent countries. They had risen to power during the late colonial period, benefiting from colonial education politics and institution-building. Nonetheless, the situation they faced in government, emancipated from colonial rule, on a national and regional level, was unprecedented (Smith 2017; Boukari-Yabara and Tchuisseu 2021). Additionally, the airline industry had been undergoing rapid change since the advent of jet engines in the late 1950s. Three key areas for predictions about the future of the airline can be identified: the viability of Pan-African cooperation as a foundation for the airline, the large potential for market growth in air transport across Africa, and the availability of sufficient capital to fund operations within the framework of development cooperation (through close ties with France and negotiations with the USA). These three areas delineate the different groups of actors involved in the decision-making for the airline: French administrators from the Secrétariat Foccart (the French government's Africa department, named after its influential director) and the French air transport sector; African politicians, the heads of states or ministers of transport of the member states; and a majority of French and a few selected African high-level bureaucrats and experts who were in charge of the airline's operational management.

Pan-African Ambitions

Launched in 1961, Air Afrique exemplified the Pan-African ambitions of the first generation of post-colonial leaders in the Francophone states of West Africa. The airline aimed to pool resources and air rights to offer regional and international flights. According to the founding treaty (the Treaty of Yaoundé), the French Company for the Development of Air Transport in Africa (*Société pour le Développement du Transport Aérien en Afrique*, SODETRAF) would own 34 percent and the African member nations would own 66 percent of the capital. For its member states, Air Afrique also represented hopes for a clearly mapped out path toward collective self-reliance after colonialism. It was envisaged that the

French shares would be transferred toward new member states that would successively join the agreement. Several of the speeches given at the inauguration of the company's headquarters in Abidjan, Côte d'Ivoire, emphasized the ambition to serve as a model for African cooperation and advancement, which was perhaps best encapsulated in the poignant slogan *Air Afrique unit Africa par Jet DC-8* ("Air Afrique unites Africa with DC-8 jets") which was advertised on one of their posters in the 1960s, after the first jets—two DC-8s—were acquired.² From the French point of view, this constellation promised to secure continued control over a unified air space, helping to maintain military infrastructure and influence in the region.³

Consequently, a large part of the expectations for Air Afrique's business development centered on Pan-Africanism, economic integration, and cooperation. The last of these, however, proved to be difficult (Bernard 2012, 82–86). From the beginning, it was evident that Pan-African cooperation was not established enough to permanently reconcile varied interests of member states, especially vis-à-vis the French shareholding, as well as the different levels of national economic capacities.⁴ When it came to financing, the airline's unity was threatened not just by the ongoing requirement for wealthier countries to make up for poor payment discipline on the part of less prosperous member states, but also by the continued reliance on France.⁵ This angered advocates who wanted to quickly Africanize the airline's shareholding and staff, eventually resulting in the departure of two member states, Cameroon and Togo. Africanizing the public and private sectors, especially filling executive and expert roles with Black Africans, was a key concern for African governments post-independence. Cameroon was among the states which rigorously implemented policies such as using quotas for filling positions across all ranks and training programs to increase Cameroonian staff. A 1968 review revealed only slow progress at Air Afrique; out of eight senior positions only three were held by Africans, mostly in administrative roles, and just 14 of 223 pilots were African. In terms of shares, the French-owned company SODETRAF still owned 28 percent of Air Afrique, limiting African control. For Cameroon, this contradicted national policy and prompted the decision to leave the multinational alliance (Tesi 2017, 135–141).

Market Optimism and Tourism's Promise

Expectations of market growth and technological development in the air transport sector were shared globally during the 1960s. Based on the US-American experience since the 1930s, industry experts predicted a continual expansion of air transport, although not without sketching out the caveats, such as the necessity of mobilizing government subsidies (ICAO/UNECA 1964, 30–32). For many experts, it seemed possible that air transport would be at the forefront of the much-desired catch-up growth in Africa. Given the low coverage of air routes on the continent, demand was expected to be very strong during this period, with predicted annual growth rates of at least 15 percent for the whole of Africa (ICAO/UNECA 1964, 28). Air Afrique seemed to be in a particularly good position to deliver on these predictions: the airline had taken over existing route networks and traffic from French airlines Air France and UTA. This made the airline the second largest African airline after South African Airways. After concluding an agreement to gradually take over more and more routes, the airline's management predicted a rapid increase in the traffic between France and West Africa. This was supported by data presented by the Paris airport

authorities in the early days of the airline, which foresaw a 14-fold increase in passengers over just five years.⁶

An important focus of business development for Air Afrique was tourism, following the French colonial model on the one hand, and a key trend of development planning in developing countries worldwide on the other (Pearson 2021; Huber 2022). Hotel chains expanded across newly independent African countries, hoping to cater to an expected surge in foreign visitors. Air Afrique managed tourism enterprises across West Africa through its subsidiary HOTAFRIC, aiming to promote tourism abroad and domestically (Air Afrique 1975; Adam 1977, 82). It was thought that these visitors would come mainly on business or government travel, and it was anticipated that they would expect a certain standard of hospitality (Ouma 1970; Popovic 1972). Officials and consultancies often predicted the benefits of tourism for employment and increasing foreign exchange earnings, as well as for stimulating the economy, as for example with the 1969 Ethiopian Tourist Development Plan; it was hoped that within just eight years, the planned investment in tourism would have generated benefits equal to the full amount invested. Furthermore, it was predicted that an initial investment of 92 million Ethiopian dollars would result in a total profit of 450 million Ethiopian dollars after 13 years. The indirect economic benefits to Ethiopia were estimated to be worth four times the original investment amount (Ianus 1969). This aligned with the United Nations promotion of tourism for earning foreign exchange. These policies and the growth estimates they contained are best characterized as aspirations, especially in relation to hopes for growing intra-African travel (Christie et. al. 2014). But they significantly influenced business decisions, even when earnings from tourism remained minute compared with receipts from raw materials exports (Kadt [1979] 1984).

*Cold War Capital: Investments between (Geo) Political Interests
and Visions of Technology-Driven Progress*

After the advent of jet engines for commercial aviation in the late 1950s, the belief in rapid technological progress as an apolitical driving force for social and economic transformation was rampant in the industry (Zaidi 2021). Another sector where this was especially pertinent was power generation and distribution. Post-independence, governments emphasized access to modern energy as integral to unlocking growth. Hydroelectric mega-projects like the Akosombo Dam in Ghana and the Kariba Dam in Zambia/Zimbabwe aimed to catalyze industry (Tischler 2013). Entrepreneurial expectations around energy were colored by the idea of an imminent “power revolution” rapidly transforming Africa. State utilities were expected to expand electricity networks for development’s sake, not just on the basis of commercial logic. Planners and politicians alike frequently downplayed uncertainties around costs, demand, and infrastructure (Degani 2022).

In a speech given for the ten-year anniversary of Air Afrique, at the second congress of the Union of Producers, Transporters, and Distributors of Electrical Energy in Africa (UPDEA, now Association of Power Utilities of Africa, APUA) in 1971, Air Afrique’s president, Cheikh Fall, drew parallels between the two sectors, citing exponential growth statistics and the leading transformative power of both electricity and aviation. Citing the French poet and philosopher Paul Valéry, he argued this context required to “understand what has never been” and investment in uncertain futures, based on faith in continued technological and social progress (*Air Afrique petit jubilé*, 3).

In addition to these visions, geopolitical interests and Cold War competition were used to justify high-risk investments by leading aeronautical powers, especially the US, in African countries (and elsewhere in the developing world) (Van Vleck 2013; Švík 2020). This played out favorably for Air Afrique in relation to the procurement of long- and medium-distance aircraft. Soon after Cheikh Fall had secured financing through the US Export-Import Bank (EXIM Bank) for two DC-8 long-range aircraft in 1963, Douglas Aircraft Company made a bid to sell its new medium-range DC-9 to African countries. France viewed this with suspicion: French manufacturer Sud Aviation marketed its own medium-range aircraft, the Caravelle, to African leaders, and French officials feared that the US government would intervene on behalf of Douglas if Air Afrique signed a contract with Sud Aviation.⁷ After lengthy negotiations, Air Afrique's management found a solution that enabled the company to finance the purchase of two Caravelles and bypass loan restrictions originally imposed by the EXIM Bank. To secure a presence of French-built planes on West African air routes was considered an important step toward gaining a foothold in the growing African market for planes. Because of this strategic interest, the French government agreed to provide financing in such a way as to defer any payments by Air Afrique until after the DC-8 loan matured.⁸

Lasting Achievements and Disappointments

The case of Air Afrique showcases how the high hopes for rapid transformation and prosperity after independence often remained unfulfilled. Originally, the French Air Transport Directorate expected costs to outpace revenues but considered Air Afrique necessary to maintain influence.⁹ While the administrators and politicians operating Air Afrique's business may have underestimated the challenges of delivering socio-economic benefits beyond commercial viability, over the first 20 years the company's profits and the network expansion matched their ambitions. Between 1963 and 1981, revenues grew from 8.4 billion CFA francs in 1963 to 96 billion CFA francs in 1981 (Bernard 2012, 295).

Although the numbers showed an impressive business performance, at least in terms of revenue growth, this performance hid internal financial difficulties. This disparity can be traced to internal discussions and decisions that had already taken place in the first decade of operations. From the late 1960s on, Air Afrique increasingly relied on financial support (in the form of loans and other concessions) from French and other foreign institutions and enterprises, such as SODETRAF, the French shareholder in Air Afrique, and its parent company UTA (*Union de Transports Aériens*) to cover its growing expenses. These mounting debts, including unpaid "administrative receivables," led to escalating financial troubles for the airline.¹⁰ Efforts to implement reforms to improve its financial situation seem to have been limited by the fear that major changes would destabilize operations and lead to the company's collapse. French executives worried that if Air Afrique shut down, SODETRAF and others would forfeit repayment on their loans. So, despite the need for reforms, they opted to maintain the status quo and provide ongoing subsidies to keep Air Afrique afloat.¹¹ This constant quasi-subsidization then contributed to a cycle of rising debts and avoidance of any changes that might jeopardize the company. The interplay of these dynamics prevented meaningful change and led Air Afrique to continue granting administrative loans to the member states, which endangered its liquidity position given that it had to repay its aircraft loans, as well. This illustrates how expectations and financial realities intertwined in ways that restricted the airline's ability to rectify its trajectory.

Despite these tensions, Air Afrique continued to take out large loans to buy new aircraft, based on overly optimistic projections. The decades of reckless lending by France and the US EXIM Bank, in combination with the impact of the first oil crisis and corruption (especially among African executives of the airline) and with the effects of the devaluation of the Franc CFA in 1994, led to an impasse that was impossible to overcome, and the airline went bankrupt in 2002 (Amankwah-Amoah 2014; Roland-Billecart 2018; Fualdes 2021). African air transport infrastructure has yet to reach the potential predicted in the 1950s. The complex legacy of dependency on European carriers, financing, and expertise, as well as the challenge of regional economic integration continues to shape the air transport business landscape on the continent until today (Schlumberger 2010).

In air transport as well as in other state-led sectors, as political imperatives and a strong belief in technology-driven progress overrode commercial viability, planners, entrepreneurs, and managers alike underestimated the challenges of new nation-building and overestimated capabilities. In many sectors, their ambitious hopes and technocratic beliefs met with serious setbacks. White elephant projects like the Ajaokuta steel factory in Nigeria or the Lake Turkana fish processing plant in Kenya are examples of the spectacular failure that would come to dominate the international perception of the public sector in many African countries. However, this was not universally true. For example, despite initial losses, Ethiopian Airlines expanded successfully over time (Huber 2022). Large infrastructure projects like the Akosombo Dam made substantial economic contributions despite shortfalls (Medhane 2006; Miescher 2014).

Conclusion

The above case studies enrich our understanding of expectation formation in several ways. First, they stress the need and potential of multi-perspectivity in expectation formation (“whose expectations?”). They clearly demonstrate the close entanglement between state and business interests that existed in colonial and postcolonial contexts. The presence or absence of state support substantially influenced both the expectations formed by entrepreneurs and managers and the entire expectation formation process. These actors, in both the colonial and post-colonial context, made very different risk assessments based on whether they had a state actor supporting their endeavors. This close relationship also affected the content of expectations, shifting focus beyond pure market considerations to encompass political and technological dimensions as well. Political or ideological expectations and imperial rivalry did not automatically align with business rationality and risk perception.

Second, this interplay between state and business actors led to an increased alignment of their interests and expectations over time, as evidenced by the ongoing concessions made by the French government to Air Afrique management and member states. However, while reliance on the state provided more stability initially, it also introduced additional uncertainties in the long run as state and business became interdependent.

Third, the need to legitimize long-term engagement in the (post)colonial territories led to inflated expectations on the part of both state and business actors. As political expectations grew regarding the future, so did demands for resources and business growth. Any reduction of these unrealistic political expectations then created new uncertainty on both sides as some stakeholders faced potential losses. Neither the German Empire’s railway policies nor the French government’s support of Air Afrique proved sustainable in meeting their own or businesses’ high expectations in the long run.

More generally speaking, a challenge arises when political and economic affairs become more entangled over time, as can be observed distinctly in (post)colonial contexts of exceptionally high uncertainty. As business actors cannot independently stabilize their environment, their expectations of political actors intensify. A reciprocal dynamic emerges where each political intervention begets expectations of further intervention, while withdrawal risks high costs (e.g. loss of transport infrastructure).

Dependency on the (ex-) colonial power, political instability, and economic underdevelopment distinguish economic expectations in colonial and postcolonial contexts. While dependencies on the (ex-) colonial power tend to stabilize economic expectations, political risk and economic underdevelopment destabilize them. This combination shifts the focus to political actors, particularly the (ex-) colonial power. Their intervention is seen as indispensable for providing political stability and economic development enabling activity (state-building subsidies and infant industry protection). When local political actors lack necessary resources, they also appeal to the (ex-) colonial power.

Overall, we can observe three types of expectation formation in these case studies. The first (type 1) describes generalized and vague expectations of unlimited growth through industrialization and globalization, achieved through meticulous control and planning. The second and third types of expectation formation are both experience-based: one (type 2) arises out of distant experiences and events that occurred in other regions and times (such as earlier experiences of developing US transport infrastructures), while the other (type 3) formation arises from immediate local events on the ground. Type 3 expectations differ from former expectations and alter them in return.

While reliance on political actors may have provided short-term stability, it increased uncertainty in the long run by introducing additional contingencies. Instability and underdevelopment necessitated wider political intervention, further entangling state and businesses. Expectations had to validate continued engagement, widening the gap between imaginings and realistic resource limitations. After the Second World War, the ubiquitous state-led development models resulted in grandiose expectations, which demanded greater resources, inflating business actors' hopes. Tempering these ambitions risked a backlash if support vanished. In our first case study, Germany's colonial dreams exceeded its means and its business actors' needs despite subsidy programs. In the second case study, post-independence, abandoning Air Afrique was politically untenable despite ballooning costs, as the company buttressed France's legitimacy and broader African aspirations. Over time, idealistic predictions and pragmatic realities diverged, and the politically-backed ventures bred interdependence and unrealistic hopes, destabilizing the colonial/postcolonial landscape. Overall, infrastructures in Africa have long blended public and private motivations, as a result of both colonial legacies and the challenges of newly independent nations. High expectations often built on experience and experienced-based information, but were just as often disappointed.

Moving forward, analyzing the entanglements of state and business in colonial and postcolonial contexts points to several fruitful areas for future research. Examining a wider range of case studies could shed further light on the diverse organizational forms and behaviors that emerged under these distinct conditions and between multiple actors. Comparative studies of how companies adapted expectations and operations across different colonial administrations and postcolonial transitions may reveal commonalities as well as unique creative innovations tailored to specific settings. Additionally, more work is needed to understand the long-term co-evolution of state and business interests, and how path dependencies from the colonial era continue to shape development trajectories.

Postcolonial archival sources can provide alternative perspectives to dominant corporate narratives. Finally, critiques of Eurocentric concepts like the “modern corporation” through grounded empirical research can drive theoretical advances, spurring the formation of new frameworks that incorporate diversity while maintaining analytical rigor. By investigating the richness of colonial and postcolonial business history, scholars can move toward more pluralistic, contextualized understandings of global enterprise.

Notes

- 1 This chapter is based on research funded by the German Research Foundation (Deutsche Forschungsgemeinschaft DFG), within the Priority Programme 1859 “Experience & Expectation” and the Collaborative Research Centre 138 “Dynamics of Security.”
- 2 n.n., “Inauguration de la Maison d’Air Afrique” 1966.
- 3 Copy of note, “Infrastructure de manoeuvre en Afrique de l’Ouest,” February 27, 1961, AG/5(1)/2701, Archives de Charles de Gaulle, Président de la République (1959–1969), Archives nationales.
- 4 Note, “Problèmes d’Air Afrique” by J. P. Hadengue, n.d., AG/5(F)/2959/1962, Fonds Élysée, Mission économique et financière (1958–1974), Télécommunications et transports, Archives nationales.
- 5 Minutes, “Compte rendu du conseil d’administration d’Air Afrique tenu à Abidjan le 24 avril 1965,” April 26, 1965, 19760041/19, Transport; Direction générale de l’aviation civile; Service rattaché au Directeur; Cabinet du Directeur (1916–1969), Archives nationales.
- 6 Note, “Au sujet d’Air-Afrique” by D.T.A./E, February 5, 1964; Note, “Choix de l’aéroport d’escale à Paris de la compagnie Air Afrique” by Aéroport de Paris, July 5, 1963; both in 19760041/19, Transport; Direction générale de l’aviation civile; Service rattaché au Directeur; Cabinet du Directeur (1916–1969), Archives nationales. 14-fold increase based on the authors’ calculations.
- 7 Draft of a telegram to the Secretariat of the French Community and the French Ambassadors in the States of the French Community, n.d.; Note, “Financement de l’achat éventuel de Caravelles par UTA,” April 3, 1964; both in 19760041/19, Transport; Direction générale de l’aviation civile; Service rattaché au Directeur; Cabinet du Directeur (1916–1969), Archives nationales.
- 8 Copy of correspondence from Raymond Triboulet to the President of Air Afrique, September 1, 1965, 19760041/19, Transport; Direction générale de l’aviation civile; Service rattaché au Directeur; Cabinet du Directeur (1916–1969), Archives nationales.
- 9 Correspondence from the Office of Statistics and Finance (Air Transport Directorate) to the State Secretary for Relations with the Member States of the French Community, March 6, 1961, 19760041/19, Transport; Direction générale de l’aviation civile; Service rattaché au Directeur; Cabinet du Directeur (1916–1969), Archives nationales.
- 10 Administrative receivables were claims held by Air Afrique against the governments of its member states. They arose when public sector employees of the member states used Air Afrique’s services, that is, they purchased plane tickets, promising to pay at a future date.
- 11 Note, “Difficultés d’Air Afrique” by the Directorate of the Treasury (Ministry of the Economy and Finance), March 21, 1972; “Note sur la situation financière d’Air Afrique,” April 1972; Correspondance from Francis C. Fabre (UTA) to Robert Galley (Minister of Transport), August 9, 1972; Report, “Engagements pris par l’UTA en vue de permettre le développement du transport aérien en Afrique francophone” by U.T.A., April 15, 1969; all in AG/5(F)/2960, Fonds Élysée, Mission économique et financière (1958–1974), Télécommunications et transports, Archives nationales.

Archival Sources

Archives nationales, Pierrefitte-sur-Seine, France:

- Archives de Charles de Gaulle, Président de la République (1959–1969)
- Fonds Élysée, Mission économique et financière (1958–1974), Télécommunications et transports
- Transport; Direction générale de l’aviation civile; Service rattaché au Directeur; Cabinet du Directeur (1916–1969)

References

- Adam, Henri T. 1977. *Les Organismes Internationaux Spécialisés*. Vol. 4. Paris: Pichon & Durand-Auzias.
- Akyeampong, Emmanuel, Robert H. Bates, Nathan Nunn, and James A. Robinson, eds. 2014. *Africa's Development in Historical Perspective*. New York: Cambridge University Press.
- Amin, Samir. 1973. *Neo-Colonialism in West Africa*. Translated by Frances McDonagh. New York and London: Monthly Review Press.
- Alacevich, Michele. 2018. "The Birth of Development Economics: Theories and Institutions." *History of Political Economy* 50: 114–132. DOI: 10.1215/00182702-7033884.
- Allman, Jean. 2013. "Phantoms of the Archive: Kwame Nkrumah, a Nazi Pilot Named Hanna, and the Contingencies of Postcolonial History-Writing." *The American Historical Review* 118, no. 1: 104–129. DOI: 10.1093/ahr/118.1.104.
- Amankwah-Amoah, Joseph, and Yaw A. Debrah. 2014. "Air Afrique: The Demise of a Continental Icon." *Business History* 56: 517–546.
- Anand, Nikhil, Akhil Gupta, and Hannah Appel, eds. 2018. *The Promise of Infrastructure*. Durham, NC: Duke University Press.
- Arndt, H. W. 2015. *Economic Development: The History of an Idea*. Chicago, IL: University of Chicago Press.
- Austen, Ralph A. 1983. "The Metamorphosis of Middlemen: The Duala, Europeans and the Cameroonian Hinterland, ca. 1800–ca. 1960." *International Journal of African Historical Studies* 16, no. 1: 1–24.
- Austin, Gareth. 2005. *Labour, Land, and Capital in Ghana: From Slavery to Free Labour in Asante, 1807–1956*. Woodbridge: Boydell & Brewer.
- Baltzer, Franz. 1916. *Die Kolonialbahnen mit besonderer Berücksichtigung Afrikas*. Berlin and Leipzig: Walter de Gruyter.
- Bamba, Abou B. 2016. *African Miracle, African Mirage: Transnational Politics and the Paradox of Modernization in Ivory Coast*. Athens: Ohio University Press.
- Barth, Boris. 1995. *Die deutsche Hochfinanz und die Imperialismen. Banken und Aussenpolitik vor 1914*. Stuttgart: Franz Steiner.
- Beckert, Jens. 2016. *Imagined Futures: Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Bernard, Koffi Loukou. 2012. "Histoire de la compagnie arienne multinationale Air Afrique (1961–2002)." Doctoral diss., Université Felix Houphouët Boigny Cocody-Abidjan.
- Boukari-Yabara, Amzat, and Ghislain Youdji Tchuisseu. 2021. "Au service de la 'modernisation' coloniale: la fabrique des nouvelles élites africaines." In *L'empire qui ne veut pas mourir—Une histoire de la Françafrique*, edited by Thomas Borrel, Amzat Boukari-Yabara, Benoit Collombat, and Thomas Deltombe, 109–120. Paris: Éditions du Seuil.
- Burbank, Jane, and Frederick Cooper. 2010. *Empires in World History: Power and the Politics of Difference*. Princeton, NJ: Princeton University Press.
- Button, Kenneth John, Gianmaria Martini, and Davide Scotti, eds. 2018. *The Economics and Political Economy of African Air Transport*. London: Routledge.
- Christie, Iain T., Eneida Fernandes, Hannah Messerli, and Louise Twining-Ward. 2014. *Tourism in Africa: Harnessing Tourism for Growth and Improved Livelihoods. Africa Development Forum Series*. Washington, DC: The World Bank.
- Conrad, Sebastian. 2012. *Deutsche Kolonialgeschichte*. Munich: C. H. Beck.
- Cooper, Frederick. 2012. *Decolonization and Citizenship: Africa between Empires and a World of Nations*. Leiden: KITLV. DOI: 10.1163/9789004260443_005.
- Davis, Clarence B., Kenneth E. Wilburn, and Ronald E. Robinson, eds. 1991. *Railway Imperialism*. New York: Greenwood Press.
- Decker, Stephanie. 2005. "Decolonising Barclays Bank DCO? Corporate Africanisation in Nigeria, 1945–69." *The Journal of Imperial and Commonwealth History* 33, no. 3: 419–440. DOI: 10.1080/03086530500185894.
- Decker, Stephanie. 2018. "Less than an Empire and More than British: Foreign Investor Competition in Ghana and Nigeria in the 1960s." In *Imagining Britain's Economic Future, c.1800–1975*, edited

- by David Thackeray, Andrew Thompson, and Richard Toye, 183–203. Cham: Palgrave Macmillan. DOI: 10.1007/978-3-319-71297-0_9.
- Decker, Julio. 2020. “Lines in the Sand: Railways and the Archipelago of Colonial Territorialization in German Southwest Africa, 1897–1914.” *Journal of Historical Geography* 70: 74–87. DOI: 10.1016/j.jhg.2020.09.002.
- Decker, Stephanie. 2022. *Postcolonial Transition and Global Business History: British Multinational Companies in Ghana and Nigeria*. New York: Taylor & Francis.
- Degani, Michael. 2022. *The City Electric: Infrastructure and Ingenuity in Postsocialist Tanzania*. Durham, NC: Duke University Press. DOI: 10.1215/9781478023777.
- Denzel, Markus A. 2017. “Die wirtschaftliche Bilanz des deutschen Kolonialreiches.” In *Die Deutschen und Ihre Kolonien*, edited by Horst Gründer, and Hermann Hiery, 144–160. Berlin: be.bra.
- Dimier, Véronique, and Sarah Stockwell. 2021. *The Business of Development in Post-Colonial Africa*. Cham: Palgrave Macmillan. URL: <https://link.springer.com/10.1007/978-3-030-51106-7>.
- Drechsler, Horst. 1996. *Südwestafrika unter deutscher Kolonialherrschaft. Die großen Land- und Minengesellschaften (1885–1914)*. Stuttgart: Steiner.
- Faust, Julian. 2014. “Ein ‘deutsches Indien in Afrika’? Investitionen in koloniale Eisenbahnen in Indien und Deutsch-Ostafrika vor dem Ersten Weltkrieg.” Master’s thesis, University of Göttingen.
- Fitzgerald, Robert. 2016. *The Rise of the Global Company: Multinationals and the Making of the Modern World*. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9781139029209.
- Frederick, Katharine. 2020. *Twilight of an Industry in East Africa: Textile Manufacturing, 1830–1940*. Palgrave Studies in Economic History. Cham: Palgrave Macmillan. DOI: 10.1007/978-3-030-43920-0.
- Fualdes, Nelly. 2021. “Qui a tué Air Afrique?” *Jeune Afrique*, March 31, 2021. URL: <https://www.jeuneafrique.com/1131024/economie-entreprises/qui-a-tue-air-afrique-4-6/>.
- Fuhrmann, Malte. 2013. “Die Bagdadbahn.” In *Kein Platz an der Sonne: Erinnerungsorte der deutschen Kolonialgeschichte*, edited by Jürgen Zimmerer, 190–207. Frankfurt/Main: Campus Verlag.
- Gallagher, John, and Ronald Robinson. 1953. “The Imperialism of Free Trade.” *The Economic History Review* 6, no. 1: 1–15. DOI: 10.2307/2591017.
- Gardner, Leigh A. 2012. *Taxing Colonial Africa: The Political Economy of British Imperialism*. Oxford Historical Monographs. Oxford: Oxford University Press.
- Gardner, Leigh, and Tirthankar Roy. 2020. *Economic History of Colonialism*. Bristol: Bristol University Press.
- Glasman, Joël. 2023. “Was war Kolonialismus? Zur Vergangenheit der globalen Gegenwart. Einsichten und Perspektiven.” *Bayerische Zeitschrift für Politik und Geschichte* 2: 4–18.
- Helfferich, Karl. 1923. *Georg von Siemens: Ein Lebensbild aus Deutschlands großer Zeit*. Vol. 2. Berlin: Julius Springer.
- Huber, Marie. 2022a. “Creating Destinations for a Better Tomorrow: UN Development Aid for Cultural Tourism in the 1960s.” *Journal of Contemporary History* 57, no. 2: 317–340. DOI: 10.1177/0022009420974765.
- Huber, Marie. 2022b. “State-Owned Success in the Air: Ethiopian Airlines and the Multinational Air Afrique in the 1960s and 1970s.” *Zeitschrift für Unternehmensgeschichte* 67, no. 2: 271–292. DOI: 10.1515/zug-2022-0017.
- Hungerland, Wolf-Fabian, and Lampe, Markus. 2021. “Globalisierung und Außenhandel.” In *Deutschland 1871. Die Nationalstaatsbildung und der Weg in die moderne Wirtschaft*, edited by Ulrich Pfister et al., 335–358. Tübingen: Mohr Siebeck.
- Ianus (Organizzazione per gli studi e le ricerche di economia applicata), S. p. A. 1969. *Ethiopian Tourist Development Plan*. Milan: F. Angeli.
- Jakob, Mark, and Nina Kleinöder. 2021. “The Security and Insecurity of Enterprises: Constructing and Negotiating Dangers, Hazards, and Threats in Business History.” In *Security and Insecurity in Business History. Case Studies in the Perception and Negotiation of Threats*, edited by Mark Jakob, Nina Kleinöder, and Christian Kleinschmidt, 9–26. Baden-Baden: Nomos.
- Jerven, Morten, Béatrice Hibou, and Boris Samuel. 2011. “Un demi-siècle de fictions de croissance en Afrique.” Translated by Rozenn Diallo. *Politique africaine* 124, no. 4: 29–42. DOI: 10.3917/polaf.124.0029.

- Kadt, Emanuel de. (1979) 1984. *Tourism: Passport to Development? Perspectives on the Social and Cultural Effects of Tourism in Developing Countries (English)*. Washington, DC: World Bank Group. URL: <https://documents.worldbank.org/curated/en/223271468141894689/Tourism-passport-to-development-Perspectives-on-the-social-and-cultural-effects-of-tourism-on-developing-countries>.
- Keese, Alexander, and Marie Huber. 2022. "Introduction: State Enterprises in Africa: A Postcolonial History." *Zeitschrift für Unternehmensgeschichte* 67, no. 2: 167–187. DOI: 10.1515/zug-2022–0030.
- Kleinöder, Nina. 2020. "A 'Place in the Sun'? German Rails and Sleepers in Colonial Railway Building in Africa, 1905 to 1914." *Zeitschrift für Unternehmensgeschichte* 65, no. 1: 9–31. DOI: 10.1515/zug-2019-0017.
- Kleinöder, Nina. 2022a. "Eine rheinische Schwebobahn in Afrika. Rheinisch-westfälische Zulieferer im deutschen Kolonialbahnbau." In *Nordrhein-Westfalen und der Imperialismus*, edited by Marianne Bechhaus-Gerst et al., 90–109. Berlin: Metropol-Verlag.
- Kleinöder, Nina. 2022b. "Kolonialwirtschaft ohne Kolonien?" In 1919—*Der Versailler Vertrag und die Deutschen Unternehmen*, edited by Dieter Ziegler, and Jan-Otmar Hesse, 311–342. Boston, MA and Berlin: De Gruyter Oldenbourg.
- Koddenbrock, Kai. 2020. "Hierarchical Multiplicity in the International Monetary System: From the Slave Trade to the Franc CFA in West Africa". *Globalizations* 17, no. 3: 516–531. DOI: 10.1080/14747731.2019.1671111.
- Koponen, Juhani. 1995. *Development for Exploitation: German Colonial Policies in Mainland Tanzania 1884–1914*. Munster and Hamburg: LIT.
- Linder, Marc. 1994. *Projecting Capitalism: A History of the Internationalization of the Construction Industry*. Westport, CT and London: Greenwood Press.
- Lubinski, Christina. 2023. *Navigating Nationalism in Global Enterprise: A Century of Indo-German Business Relations*. Cambridge: Cambridge University Press.
- Medhane, Semret. 2006. *National Air Carriers as Catalysts for Development: The Case of Ethiopian Airlines (ET)*. IGTK Consultation Paper Series 5. Addis Ababa: Forum for Social Studies.
- Mehmet, Ozay. 2002. *Westernizing the Third World: The Eurocentricity of Economic Development Theories*. London and New York: Routledge.
- Michels, Stefanie. 2013. "Schutzherrschaft revisited. Kolonialismus aus afrikanischer Perspektive." In *Die Vielfalt normativer Ordnungen. Ethnologische und historische Perspektiven*, edited by Andreas Fahrmeier, and Annette Imhausen, 243–274. Frankfurt/Main: Campus Verlag.
- Miescher, Stephan. 2014. "'Nkrumah's Baby': The Akosombo Dam and the Dream of Development in Ghana, 1952–1966." *Water History* 6, no. 4: 341–366. DOI: 10.1007/s12685-014-0112–8.
- Ndlovu-Gatsheni, Sabelo J. 2020. *Decolonization, Development and Knowledge in Africa: Turning Over a New Leaf*. New York: Routledge.
- n.n. 1971. *Air Afrique petit jubilé 1961–1971*. Imprimerie de la Cote d'Ivoire.
- n.n. 1966. "Inauguration de la Maison d'Air Afrique." *Air Afrique Information* 4: 4–11.
- O'Rourke, Kevin H., and Jeffrey G. Williamson. 1999. *Globalization and History. The Evolution of a Nineteenth-Century Atlantic Economy*. Cambridge, MA: MIT Press.
- Oestermann, Tristan. 2022. *Kautschuk und Arbeit in Kamerun unter deutscher Kolonialherrschaft 1880–1913*. Göttingen: Böhlau.
- Osirim, Mary Johnson. 2009. *Enterprising Women in Urban Zimbabwe: Gender, Microbusiness, and Globalization*. Washington, DC: Woodrow Wilson Center Press.
- Osterhammel, Jürgen. 2005. *Colonialism. A Theoretical Overview*. Princeton, NJ: Markus Wiener Publishing Inc.
- Osterhammel, Jürgen, and Jan C. Jansen. 2012. *Kolonialismus: Geschichte, Formen, Folgen*. Munich: C.H. Beck.
- Ouma, Joseph P. B. M. 1970. *Evolution of Tourism in East Africa (1900–2000)*. Nairobi: East African Literature Bureau.
- Pearson, Jessica Lynne. 2021. "Internationalists in Flight? Tourism, Propaganda and the Making of Air France's Global Empire." In *Internationalists in European History*, edited by Jessica Reinisch, and David Brydan, 231–246. London: Bloomsbury Academic.
- Phillips, Andrew, and Jason C. Sharman. 2020. *Outsourcing Empire. How Company-States Made the Modern World*. Princeton, NJ and Oxford: Princeton University Press.

- Pirie, Gordon. 2014. "Geographies of Air Transport in Africa: Aviation's 'Last Frontier'." In *The Geographies of Air Transport*, edited by Andrew R. Goetz, and Lucy Budd, 247–266. Farnham: Ashgate.
- Plumpe, Werner. 2020. "Im Zeitalter der ersten Globalisierung 1870–1914." In *Deutsche Bank. Die globale Hausbank 1970–2020*, edited by Werner Plumpe, Alexander Nützenadel, and Catherine R. Schenk, 1–231. Berlin: Ullstein.
- Popovic, Vojislav. 1972. *Tourism in Eastern Africa*. Munich: Weltforum.
- Puddu, Luca. 2021. "A Contested Financial Frontier: Banking and Empire Building in Eritrea, c.1952–73." *Africa* 91, no. 5: 852–873. DOI: 10.1017/S0001972021000619.
- Raianu, Mircea. 2021. *Tata: The Global Corporation That Built Indian Capitalism*. Cambridge, MA: Harvard University Press.
- Rodney, Walter. 1981. *How Europe Underdeveloped Africa*. Rev. ed. Washington, DC: Howard University Press.
- Roland-Billecart, Yves. 2018. *Une vie vouée au développement: mémoires*. Paris: Agence française de développement.
- Rösser, Michael. 2023. "Von Afrika nach Eurasien? Deutsche Unternehmen zwischen kolonialen Eisenbahnbau und geopolitischer Planungsphantasie während des Ersten Weltkrieges." *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* 110, no. 2: 183–204. DOI: 10.25162/vswg-2023–0005.
- Rösser, Michael. 2024. *Prisms of Work. Labour, Recruitment and Command in German East Africa*. Berlin and Boston: De Gruyter Oldenbourg. DOI: 10.1515/9783111218090.
- Rostow, Walt W. 1961. *The Stages of Economic Growth: A Non-Communist Manifesto*. Cambridge: Cambridge University Press.
- Rudolph, Mona. 2025. *Globale Diamanten. Warenwege aus dem kolonialen Namibia, 1908–1929*. Stuttgart: Franz Steiner Verlag.
- Scharlach, Julius. 1906. "Unsere Banken und die Kolonien I." *Bank-Archiv* 17: 195–200.
- Scharlach, Julius. 1906. "Unsere Banken und die Kolonien II." *Bank-Archiv* 18: 209–212.
- Schlumberger, Charles E. 2010. *Open Skies for Africa: Implementing the Yamoussoukro Decision*. Washington, DC: The World Bank. DOI: 10.1596/978-0-8213-8205-9.
- Schömann, Hartmut. 1965. "Der Eisenbahnbau in Kamerun unter deutscher Kolonialherrschaft." Doctoral diss., Humboldt-Universität zu Berlin. URL: <https://publikationen.ub.uni-frankfurt.de/frontdoor/index/index/docId/39591>.
- Schinzinger, Francesca. 1984. *Die Kolonien und das Deutsche Reich. Die wirtschaftliche Bedeutung der deutschen Besitzungen in Übersee*. Stuttgart: Steiner Verlag.
- Sebald, Peter. 1988. *Togo 1884–1914*. Berlin: Akademie-Verlag.
- Smith, Andrew W.M. 2017. "Future Imperfect: Colonial Futures, Contingencies and the End of French Empire." In *Britain, France and the Decolonization of Africa: Future Imperfect?* edited by Andrew W. M. Smith, and Chris Jeppesen, 87–110. London: UCL Press. DOI: 10.2307/j.ctt1mtz521.9.
- Soénus, Ulrich S. 1992. *Koloniale Begeisterung im Rheinland während des Kaiserreichs*. Cologne: Rheinisch-Westfälisches Wirtschaftsarchiv.
- Speitkamp, Winfried. 2013. "Otto von Bismarck und die Kolonialpolitik—ein Ausweg aus der Wirtschaftskrise?" In *Otto von Bismarck und die Wirtschaft*, edited by Michael Epkenhans, and Ulrich von Hehl, 59–76. Paderborn: Schöningh.
- Speitkamp, Winfried. 2014. *Deutsche Kolonialgeschichte*. Stuttgart: Reclam.
- Stockwell, Sarah. 2007. *The Business of Decolonization: British Business Strategies in the Gold Coast*. Oxford and New York: Clarendon Press.
- Stuchtey, Benedikt, and Andrea Wiegeshoff. 2018. "(In-) Securities across European Empires and Beyond. Mapping a New Research Field." *Journal of Modern European History* 16, no. 3: 321–334.
- Švik, Peter. 2020. *Civil Aviation and the Globalization of the Cold War. Security, Conflict and Cooperation in the Contemporary World*. Cham: Palgrave Macmillan.
- Tesi, Moses K. 2017. *Balancing Sovereignty and Development in International Affairs: Cameroon's Post-Independence Relations with France, Africa, and the World*. Lanham, MD: Lexington Books.
- Tignor, Robert L. 1998. *Capitalism and Nationalism at the End of Empire: State and Business in Decolonizing Egypt, Nigeria, and Kenya, 1945–1963*. Princeton, NJ: Princeton University Press.

- Tischler, Julia. 2013. *Light and Power for a Multiracial Nation: The Kariba Dam Scheme in the Central African Federation*. Cambridge Imperial and Post-Colonial Studies Series. London: Palgrave Macmillan.
- Todzi, Kim Sebastian. 2021. "Der Imperialismus des Freihandels: Die Handelskammer Hamburg als (post-) kolonialer Erinnerungsort." In *Hamburg: Tor zur kolonialen Welt: Erinnerungsorte der (post-) kolonialen Globalisierung*, edited by Jürgen Zimmerer, and Kim Sebastian Todzi, 31–47. Göttingen: Wallstein.
- Van Laak, Dirk. 2004a. *Imperiale Infrastruktur: Deutsche Planungen für eine Erschließung Afrikas 1880 bis 1960*. Paderborn: Schöningh.
- Van Laak, Dirk. 2004b. "Kolonien als 'Laboratorien der Moderne'?" In *Das Kaiserreich transnational: Deutschland in der Welt 1871–1914*, edited by Sebastian Conrad, and Jürgen Osterhammel, 257–279. Göttingen: Vandenhoeck & Ruprecht.
- Van Vleck, Jenifer. 2013. *Empire of the Air: Aviation and the American Ascendancy*. Cambridge, MA: Harvard University Press.
- Verhoef, Grietjie. 2018. *The Power of Your Life: The Sanlam Century of Insurance Empowerment, 1918–2018*. Oxford: Oxford University Press. DOI: 10.1093/oso/9780198817758.001.0001.
- Wehler, Hans-Ulrich. 1995. *Deutsche Gesellschaftsgeschichte*. Vol. 3, *Von der "Deutschen Doppelrevolution" bis zum Beginn des Ersten Weltkrieges 1849–1914*. Munich: C. H. Beck.
- Young, Alden. 2018. *Transforming Sudan: Decolonization, Economic Development, and State Formation*. African Studies Series. Cambridge: Cambridge University Press.
- Zaidi, Waqar H. 2021. *Technological Internationalism and World Order: Aviation, Atomic Energy, and the Search for International Peace, 1920–1950*. Cambridge: Cambridge University Press.
- Zimmerer, Jürgen. 2001. *Deutsche Herrschaft über Afrikaner: Staatlicher Machtanspruch und Wirklichkeit im kolonialen Namibia*. Hamburg: LIT.

AFRICAN ENTREPRENEURS AND THE ECONOMIC EXPECTATION QUESTION

A Transhistorical Survey

Moses E. Ochonu

Studies of African entrepreneurship across times and places have given us a sense of the long history of how Africans formulated plans to mitigate the harm of uncertainty, anticipate opportunity, and produce or innovate to meet needs and fulfil their own and others' economic expectations (Dike 1956; Northrup 1978; Sheriff 1987; Falola 1991; Lydon 2009; Nwokeji 2010; Ochonu 2018). The dominant preoccupation in this scholarship has been to demonstrate that many Africans were enterprising before and during their encounters with external economic interlocutors, that their entrepreneurial histories can be recovered and located within larger economic systems and shifts, and that African businesspeople were independently capable of forging and pursuing clearly formulated expectations and priorities in a dynamic world of internal and external pressures.

However, the scholarly search for African entrepreneurial agency, which was in part a response to postcolonial African economic dysfunction, led to a veneration of individual African business acumen and the neglect of the larger structural forces and networks that often propel or hamstring entrepreneurs, saddling them with pressures that alternately constrain and enable their own carefully curated expectations. This chapter transcends the individualized focus on African entrepreneurs and their economic decision-making as a stand-alone, autonomous zone of action, and situates their expectations formation and the pursuit of those expectations in a wider social matrix of values, needs, and moral economies.

Claims about the closed internal logics of economic decision-making and the entrepreneur's central position within those logics are not unique to Africa. As Mark Granovetter (1985, 482) articulates it, such views have been applied to other parts of the world and take "the economy as an increasingly separate, differentiated sphere in modern society, with economic transactions defined no longer by the social or kinship obligations of those transacting but by rational calculations of individual gain." The challenge is to recognize and analyze the social obligations that underpin or catalyze individuals' economic transactions and aspirations while also understanding these individuals' universe of expectations, represented by their balancing of the unknowns of business, their preparation for those unknowns, and their aspirational projections.

Granovetter is right to critique literature that exaggerates the extent to which modern market logics and calculations have displaced social structures in shaping economic behaviors. He is also correct to assert that the entrepreneur's embeddedness in their society's social institutions, values, and expectations never receded as rational economic liberalism spread, and that it only fluctuated or evolved as new economic systems rose and declined, its consequences modulated or amplified in correspondence to this dynamic. In the case of Africa, two additional points are worth noting. Much of the academic literature, whether it is supporting or critiquing the influence of market institutions and prescriptions in Africa, assumes that the market was either replacing or should replace the social norms that historically foregrounded business and economic practices.¹

Secondly, in the African case, there was a convergence on the notion that both individuals and firms either lacked market orientation or had been totally reoriented into market imperatives. The former polemic corresponds to neoliberal and neoclassical economic perspectives, the latter to radical critiques of market fundamentalism in Africa, which exaggerates the penetration of market rationalities or downplays the mitigation of the market by sociocultural expectations emanating from societal consensus on notions of wellbeing, the management of uncertainty, and profit-making. Both perspectives reify rational individualism in evaluating African entrepreneurship and pay scant attention to the productive and symbiotic interaction and tension between individual economic expectations and societal ones, although both exert pressures on the African entrepreneur's behavior and choices (see Huber, Kleinöder, and Krautter, Chapter 25 in this volume). This chapter analyzes the catalytic entwinement of these intersecting factors in birthing new economic expectations among entrepreneurs. The way in which the dynamic interaction between the entrepreneur's economic goals and societal push and pull factors shaped the choices, projections, plans, and techniques of African entrepreneurs is the overarching focus of this chapter. In demonstrating this multifactorial African entrepreneurial repertoire, the analysis below is framed in the moral economy of Ubuntu, the multipurpose utilitarian value system that has manifested in various iterations across Africa in different periods.

I begin with two sections of precolonial historical exploration, in which the Wangara long-distance merchants of West Africa and other precolonial entrepreneurs developed a robust and eclectic set of economic expectations that combined starkly economic factors with sociocultural and political realities beyond their individual circumstances and narrow business considerations. These African entrepreneurial forebears demonstrated a versatility and nimbleness that anticipated multivalent vagaries and uncertainties on both a personal and societal level, using informational resources from both spheres to plan and to set expectations for the immediate and distant future.

The Precolonial Scene

In precolonial Africa, entrepreneurship was not a narrow, economically bounded vocation. Instead, entrepreneurship inhered in particular ways of doing things, and in any organized activity that promised personal and communal rewards. In this broad definitional universe, even enterprising warriors were entrepreneurs. They transformed the art of warfare from a regimented, sporadic activity to one with its own routines, uncertain trajectories, and protocols. Historian Uyulawa Usuanlele rightly argues for a recognition of the entrepreneurial ingenuity of Benin warlords, spiritual consultants, priests, and religious purveyors, whose repertoire included the professionalization and deft organization of multiple social

vocations into a sustainably lucrative venture. Their sophisticated endeavor, Usuanlele demonstrates, entailed the adoption of business management principles that we today associate with entrepreneurs (Usuanlele 2018).

Such enterprising warriors were motivated by the promise of booty and profits, and the economic expectations of warrior-entrepreneurs were shaped in part by the allure of war spoils that could be converted to tradable and liquid assets. But as a profit-oriented business activity, war-making depended on and was sustained by the authorization of the leaders or the aristocracy of the society to which the warrior belonged. Such authorization, in turn, was founded on calculations of communal benefit — expansion, self-preservation, societal economic prosperity, and the propagation of a communal or collective ideal. Here, one sees how the individual profit-making expectation of the entrepreneurial warrior was modulated and legitimized by the larger, overarching expectations of society. An enterprising warrior who did not help safeguard or improve society had no legitimate right to set, let alone pursue, his own personal economic expectations. On the other hand, the realization of societal expectations in the sphere of war-making depended on the ingenuity and choices of enterprising warriors and warrior guild leaders. Warriors thus knew how to set their personal expectations to resonate with and complement those of the larger society or at least those of the ruling aristocracy, curators, and custodians of the community's interests and aspirations.

Warrior guilds, whether in precolonial Ibadan, Asante, Dahomey, Buganda, or Zulu, were sites of entrepreneurship governed by calculations based on known, predictable, and manageable risks and rewards, as well as uncertainties and projections about how all these variables could be managed to the extent possible. When systematized and conceptualized as a professional business venture, as it was in many precolonial African kingdoms, warring involved planning, management, delegation, tasks, goals, deliverables, compensation, the creation of value in the form of war spoils, the distribution of dividends, and reinvestment in processes that improved war-making and birthed more efficient processes. War-making entailed post-operational accounting, the calculation of profits, and periodic stocktaking—in other words, elaborate formal and informal bookkeeping. It was a business, and the guilds, warrior cults, and military training programs of precolonial African kingdoms were business schools of sorts.

I have chosen this unlikely historical example to illustrate my point that in Africa, entrepreneurial pursuits were not and are still not wholly shaped by the narrow permutations of combining the forces of production—capital, labor, and knowledge—to produce a profit or fill a gap or need, and that this imperative does not exclusively determine the expectation-setting routine of entrepreneurs. Professional warring is not a venture entirely determined by rational rules of economic self-interest, moreover, since the fast-shifting uncertainties and opportunities of a fluid battlefield, the tactical demands of warfare, and changing political alliances all play a role in the expectation-setting calculations of warrior-entrepreneurs. The profit motive is not always central to entrepreneurial pursuits in the African context, although profit is an expected outcome of entrepreneurial endeavors.

This is of course not a uniquely African phenomenon, but, given the late and uneven penetration of modern capitalist relations on the continent, Africa is a place where the interaction between the Schumpeterian catalytic profile of the entrepreneur and his entanglements in sociopolitical systems is more fully visible. Furthermore, where present and clearly discernible as the primary catalyst in an enterprise, individualized profit and instrumentality are articulated in less narrow terms than in classical and neoliberal economic thought.

As a vocational enterprise, warring was a volatile and potentially self-destructive business to engage in. An entrepreneurial warrior whose economic expectations were grounded exclusively in rational economic logics and aspirations, who was obsessed only with avoiding loss and making a profit, would have risked pursuing war even when peacemaking made more economic sense and had better potential to promote the warrior's own long-term self-interest and preserve the society he used as a base for his warring activities. Furthermore, in those cases where warring was reduced to a purely economic endeavor underwritten by rational economic expectations, the familiar risks and fluid uncertainties of warfare often caught up with the warrior-entrepreneur, consuming him and his war-making infrastructure and capacity. If economic expectations were set too narrowly, too economically, they jeopardized the long-term prospects of the entire enterprise regardless of past and present success. This temptation to reduce warfare to its economic dimension was the reason that, in many precolonial African polities, entrepreneurial war-making was subsumed under political and social regimes that constrained the choices of warriors and warrior guilds.

The uncertainties of warfare are harder to control, model, anticipate, and thus use as a basis for expectation formation than are those of other entrepreneurial pursuits. Therefore, in many parts of historical Africa, successful warfare entrepreneurs were those who set broad-based expectations that combined economic and social aspirations and priorities. Conversely, many warrior-entrepreneurs were ultimately consumed by their own activities when they set their expectations exclusively on what economists would term rational economic aspirations: the pursuit of profits and other measurable self-interests without regard for the social and political ramifications of unbridled and undisciplined warfare.

The Wangara Mercantile Network

Another empirical illustration of the eclectic economic expectations of African peoples is the famed Wangara trading network of West Africa. The Wangara people were not a single, coherent ethnolinguistic unit. Instead, Wangara was a broad ethnic identity that included speakers of the Mande languages (mainly Malinke and Bambara) as well as speakers of the Azer dialect, a Soninke-derived "commercial lingua franca in Western Sudan" (Lydon 2009, 64). Medieval sources attest to the Wangara's early mercantile preoccupations, which would later come to define and distinguish them. Beginning with early Arab travelers' accounts in the twelfth century through the mid-fourteenth century, descriptions of the Wangara associated them with the supply of gold from the medieval gold mines of Bure and Bambuk in the kingdom of Mali to areas both north and south of the Sahelian base of the kingdom (Wilks 1982).

Gold was both a store and standard of value in medieval West Africa. The value of other products was measured against the relatively stable value of gold. The Wangara's control of gold gave them leverage to dominate the trade in another valuable product: salt. Gold was the ultimate capital in medieval West African economies, and salt complemented its value. In that sense, the Wangara enjoyed the advantages conferred by membership in a geopolitical entity possessing resource wealth. Gold was exchanged for salt mined at the edge of the Sahara and salt brought by Arab, Berber, and Jewish traders (Lydon 2009). The Wangara then sold the salt, which was valued as both a seasoning ingredient and a form of currency in several parts of West Africa. The Wangara mobilized camel caravans that transported the salt from the Saharan mines to Timbuktu, a major Wangara distribution hub where much

of the logistics for the Wangara's wholesale operations was based. Here Wangara bulk purchasers purchased blocks of salt to be caravanned to other West African commercial centers, where the product would then be retailed across vast hinterlands. The Wangara's salt distribution zone included a vast area in the kingdom of Mali, Mossi country in present-day Burkina Faso, the Guinea basin, and the Senegambia region.

The Wangara positioned themselves as the first link in the trade chain that transported West African gold to North Africa and distributed salt from Sahel and North African salt-producing areas to many parts of West Africa. They were the commercial vanguard of a new regional economy, a regional trade "globalization." The new trans-West African trade relay began with them. This status conferred exclusive advantages on the Wangara, giving them the ability to shape the trajectory and structure of the network they were building. This early Wangara trade network was a *de facto* monopoly. The Wangara reaped the rewards of this monopolistic market, which helped them to consolidate their investments and seek new markets and commercial territories. The Wangara also established themselves as trade brokers between different points and actors in the emerging Western African trade system. With this early, dominant involvement in commerce, the term "Wangara" quickly became synonymous with "trader" or "long-distance trader" and vice versa in much of West Africa. The process of mastering this trans-West African trade took time, but the spread of Wangara commercial influence from medieval Mali to other parts of West Africa was inevitable, given the importance of gold and salt to the economies of several polities in West Africa.

Beginning probably in the late twelfth century, the Wangara began to expand their trading network to the Senegambia and Guinea, and southwest to modern-day Ghana, the Ivory Coast, and eventually modern-day Nigeria. Some of the Wangara hired porters who carried the salt on their heads; others relied on the familiar camel caravan system. After about 20 days of travel, they would arrive in either the forest states of modern-day Ghana or in Senegambia (Bovill 1929). As they made their way south, they would sell some of the salt to defray expenses and buy trade goods from communities on the trade routes. Over the next three centuries the Wangara perfected this trading system and not only opened up a set of recognized trade routes connecting the Sahara to multiple West African hinterlands, but also established permanent trading centers in the regions of West Africa with which they conducted trade.

The Wangara in the Senegambia

To the west of the Wangara's Malian heartland lay the vast territory comprising the modern states of Senegal, the Gambia, Guinea, and Guinea-Bissau. The Wangara were very active here given the contiguity of this region to Mali, and set up the social, political, and economic infrastructures to support their lucrative commercial activities. Many Wangara migrated to this region, helping to found small city-states and to consolidate kingdoms like Kaabu (Giesing and Vydrine 2007, 161–162). Some of the Wangara migrants were warriors and clerics who became astute political leaders in their own right. Many others continued as itinerant traders, carrying goods back and forth between east (Mali) and west.

In the Senegambia region the effect of this commercial and political influence of the "Wangara Diaspora," as historian Paul Lovejoy calls the Wangara commercial communities across West Africa, was that over time Wangara warriors and clerics, some of them part-time merchants, provided a politically conducive religious and commercial environment

for sedentary and itinerant Wangara traders to conduct their commercial activities without interference or security concerns (Lovejoy 1978). Even more valuable were the kinship networks that resulted, producing ever-expanding circuits of confidence that facilitated business transactions and credit (see de Jong, Chapter 19 in this volume).

Furthermore, some of the Wangara traders who settled permanently in the Senegambia region took up artisan pursuits, becoming cobblers and blacksmiths and manufacturing and supplying footwear, accessories, sacred objects, and weapons to Wangara and non-Wangara warriors, political leaders, priests, and long-distance traders. This group of Wangara artisans became valuable auxiliaries in the expanding trading system (Giesing and Vydrine 2007, 173). The trade system in turn sustained the Wangara artisans by keeping them employed. This diversification of the Wangara's commercial empire in the Senegambia region increased their forward (to the consumer or retail chain) and backward (to the supply chain) linkages as well as their ability to move from one node of the supply and manufacturing chain to the other. This meant that their operations encompassed both distribution and retail on the forward side and production and supply on the backward side. A small number of the Wangara may have also invested in agriculture, the products of which catered to the commercial, priestly, and political classes, and supplied long-distance traders with specially preserved foods (Giesing and Vydrine 2007, 242). By catering to the commercial and spiritual demands of many communities in this region, the Wangara drew several non-Wangara peoples into the emerging Wangara economy.

The exchange of information regarding trade and commercial opportunity within the Wangara network was crucial to the ability of traders to spot demand, markets, and niches and move to satisfy them with goods and services (Giesing and Vydrine 2007, 174; see also Huang and Spoerer, Chapter 20 in this volume on a similar exchange of information in pre-industrial European trade). Information came through political contacts and insiders, and through participation in the politics of host communities. The Wangara were adept at this. The *Tarikh Bijini*, a Wangara text, tells of a wealthy Wangara merchant who exemplified the versatile mercantile disposition of the Wangara. It states that he was a skillful caravan trader and a master commercial dealmaker, but also a gifted political mediator who routinely intervened in political matters along his trade routes in order to settle disputes that could affect trading. He was skillful at currying political favors that would be beneficial to trade (Giesing and Vydrine 2007, 230). This legendary Wangara merchant is a composite of the Wangara merchant class, his story an allegory for the ideal Wangara mercantile repertoire.

The Wangara traders established several rest stations (*ribats*) along their trade routes. The ribats later morphed into vibrant commercial centers "to which visitors flocked from all sides" (Giesing and Vydrine 2007, 230), and which served as links to other commercial and mining centers in Mali, Fouta Djallon, and as far as Casamance in modern-day southern Senegal. One of the most prominent of these Wangara trade outposts in the Senegambia was Bijini, which evolved into an active commercial center whose legend lived on in popular lore long after its decline.

In the late sixteenth and throughout the seventeenth century, the Wangara's trading activities spread even further to the north of the Gambia River and probably all the way to the Lower Guinea coast. This was probably due to increased Wangara out-migration as a result of the decline and eventual collapse of the Songhai Empire. Contemporaneous Portuguese accounts from the Lower Guinea basin state that during this period the Wangara began to broker trade in European-manufactured goods between the Portuguese and

Africans, and to sell gold to the Portuguese in exchange for manufactured goods (D'Almada [1594] 1964). These Wangara traders were said to trade seasonally with caravans, "conducting their business under the protection of fortified villages (*tata*) of the local *Sooninkee* chiefs" (Giesing and Vydrine 2007, 231).

The influence of the Mande-speaking merchants was so great that the Mande language became a commercial lingua franca in this region, enabling commercial communication and connections between a network of local markets and trading stations through which the Wangara traders conducted their operations (Giesing and Vydrine 2007, 232). The Wangara created commercial hubs such as Badoora, Biafada, and Balanta, using these towns as platforms for long-distance trade in textiles, ivory, kola nuts, hides and skin, and salt, a commercial relay system that eventually reached as far as Sierra Leone. The Wangara traders from the Gambia and Sierra Leone met at Badoora to exchange kola nuts, cotton, and fabrics, which each group then distributed throughout its commercial territorial sphere.

Portuguese traders seeking trade with local African communities in this region often went through the Wangara because the latter were revered and trusted as merchants, political mediators, and spiritual counselors. By combining a mastery of the private entrepreneurial sphere with an ability to work the political system through lobbying, the Wangara eliminated the familiar frictions that resulted from interactions between the realm of politics and the realm of commerce. Realizing the crucial interconnections between politics and business, the Wangara traders stationed political lobbyists "who served as ambassadors in many nations, and do this to make commerce" (Alvares [1615] 1990). In the process they built what one could call an early example of an African private-public partnership in the interest of commercial prosperity. The Wangara trade consuls supervised trade, smoothed over political challenges to trade, and helped resolve commercial disputes.

By pleasing political leaders and strategically inserting themselves in the political process, the Wangara not only secured their trade but also gave a stake to political leaders in the host communities of a growing West African trade diaspora. This ability to make private enterprise a compelling public interest and to reward political actors who bought into this vision ensured the Wangara's dominance in the growing Atlantic commerce between Africans and Europeans in this period. The Portuguese came to the Senegambia and the Upper Guinea coast in the fifteenth century to tap into the gold trade but found this trade already controlled by the Wangara. In the sixteenth century the Wangara continued to dominate and displace the aggressive European traders in this part of West Africa (Giesing and Vydrine 2007, 245–246). Their trading activities reached a peak in the mid-seventeenth century and then began to decline. This was probably due to the fact that as the political turmoil associated with the monarchical infighting and decline of Songhai engulfed much of the Middle Niger region—the trading base of the Wangara—they began to develop "new outlets for their trade in the far Western regions where the authority of the Malian king was still relatively intact" (Wilks 1982).

A final strategy of commercial penetration deployed by the Wangara in the Senegambia region was the building of a Mande merchant brand. As the Mande commercial empire flourished and expanded from the Sahel to the Gambia River and to the Atlantic, connecting Sahelian and hinterland West African peoples to the markets of North Africa and to European Atlantic products, Mande became a brand that ambitious commercial investors who were not ethnic Mande came to embrace in an honorary capacity in order to tap into the economic, social, and political capital of the Mande-speaking traders. In this process, a pan-West Africa merchant brand emerged, attracting many and further extending the

frontiers of the Wangara commercial monopolies and trading networks. In a multiethnic region, the Wangara trading network created “a common [commercial] identity which transcended mere parochial interests” and gave everyone—host or settler, sedentary or nomadic—a stake in the commercial prosperity of the region (Lovejoy 1978, 173).

Understanding Wangara Socioeconomic Expectations

The Wangara operated their wide-ranging economic system efficiently by setting expectations that anticipated economic volatility and opportunities on many levels and in multiple realms but were also constrained by the uncertainties of a dynamic precolonial socioeconomic and political landscape. Their versatile economic profile, which included footholds in manufacturing, logistics, arbitrage, brokerage, religious service provision, political consultancy, and diplomacy, ensured that the Wangara had a vast informational resource at their disposal. This informational asset enabled them to intelligently observe trends, anticipate political, economic, and social uncertainties, and shift and shuffle both human and material capital to respond to situations as they arose. They set and adjusted their economic expectations accordingly.

The Wangara formed and acted on their economic expectations by spreading their risks around in cases where the probability distribution of future outcomes was known or knowable, by creating multiple, overlapping value chains, and by integrating their operations backward and forward (Knight [1921] 2006).² The Wangara anticipated some risks through the predictive insight of experience, but they also prepared for uncertainties, or the unknown, because of the unpredictably diverse and dynamic political and socioeconomic realities of the many different polities in which they operated. They pursued the economies of scale through expansion to create or capture new markets. This behavior is consistent with the consensus in contemporary economic literature on expectation formation. However, uncertainty alone did not define the Wangara’s economic aspirations. The search for new opportunities, and the quest for pioneer status drove several of their investments and activities. More crucially, the Wangara subscribed to the moral economy of Islam and its prescriptions governing trade, constraining profit-making, and regulating the “rational” economic conducts and aspirations of merchants. The Wangara believed in sanctifying long distance trade by invoking divine and supernatural powers to mitigate known risks and to divine uncertainty. Indeed, in several of the West African communities in which they operated, they were known as peddlers of amulets and other religious goods, skills, and services, in addition to their primary vocations in manufacturing, trading, logistics, and craftsmanship.

The other aspect of the Wangara’s expectation formation strategy stemmed from their multivalent understanding of uncertainty, the realm of the unknown and unpredictable, as a factor in entrepreneurship. In much of the current economic literature on economic expectations, risk, as a tractable probability of future outcome, is quantitatively and qualitatively advanced and understood primarily as an economic variable in business. The behavior and strategy of economic actors are thus analyzed in terms of how those actors respond to various deterministic economic factors. For the Wangara, risk was often coterminous with uncertainty. This realization that legible risks could converge with uncertainty grew as the Wangara’s trade network expanded into many West African polities which possessed a bewildering diversity of institutions, values, politics, and social constraints. The Wangara came to believe that political and social factors had a greater capacity to

intrude into business than economic ones, some of which they had mastered from centuries of monopolistic and oligopolistic control over the long-distance commerce of West Africa. The biggest threat to Wangara trade was not the difficulty of anticipating and mitigating economic downturns but the unpredictability of politics, political leadership, political turnovers, and sociopolitical turmoil.

The Wangara's main challenge as they formed their economic expectations was how to stay ahead of and above the vagaries of West Africa's volatile political environments across many polities with different political systems and succession traditions. This was the reason the Wangara devoted much of their energy and resources to currying political favors, forging alliances and diplomatic ties with political elites in many kingdoms, and, in some cases, dabbling in the local politics of host communities. The Wangara saw political contingency as bad for present and future business and sought to make themselves useful if not indispensable to political elites. This provided relative insulation from and insurance against the inevitable changes in political structures and the new state economic policies that these changes tended to produce. For the Wangara, managing and understanding both the risks and uncertainties of politics was the bedrock of economic expectation formation and not the other way round. This departs from the Western entrepreneurial expectation formation model in which the realm of politics, though considered potentially disruptive of business plans and goals, is subordinated to a mastery over economic variables and vagaries, which are considered, in the Western liberal economic tradition, to possess their own internal logics and laws.

The Wangara's economic expectation philosophy departed from the standard economic expectations literature in another way. In accounting for the behavior of economic actors in a rational economic scenario as defined by liberal economic assumptions, diversification as both a risk- and uncertainty-mitigation strategy is emphasized. But specialization is also considered an advantageous asset in the quest to maximize profits and minimize risk. In contrast, for the Wangara, specialization was a burden and not an asset. Since they enjoyed a *de facto* monopoly in several sectors and were not struggling to establish comparative advantage in trade, specialization or over-specialization was a potential pitfall of trade. The Wangara avoided specialization and self-consciously cultivated versatility. This seemingly "irrational" economic behavior in long distance import and export transactions was an alternative economic rationality upon which the Wangara's economic expectations were founded. Versatility and the avoidance of specialization was seen as a bulwark against both uncertainty and intelligible risk, and a guarantor of profits even in the worst business situation. Specialization was regarded as a narrow, short-term strategy. Versatility was a hedge against future challenges.

As Muslim merchants, the Wangara's sense of economic uncertainty stemmed from and was modulated by a belief that the unpredictability of economic and business cycles was ordained by God. Mortals, no matter how skilled they may be in the art of anticipation, planning, prediction, and the maximization of opportunity, could never quite fully prepare for the vagaries of business or expect to implement a seamless program of risk mitigation and self-insulation against uncertainty. Therefore, for the Wangara, versatility was the first step in managing the known and unknown probabilities of business and ensuring that set expectations were met. The next step was to rely on their instruments and skills of religious intercession, which was part of their mercantile repertoire. They used their facility in the production and use of amulets, in specialized prayer practices, and in Islamic intercessory arts to invoke divine favor and protection. Expectation-setting for the Wangara therefore

combined the secular, rational, even quantitative evaluation of past, present, and future economic trends with a mediated reliance on providential intervention.

At the same time, the benefits the Wangara sought to extract from their economic endeavor were tangible—material rewards that they hoped would enhance their secular and religious status claims in the eyes of the West African communities they encountered and traded with. In other words, the Wangara deployed their religious dexterity in strategic, entrepreneurial ways to mitigate the variables of business and enhance their capacity and the likelihood of success while at the same time leveraging the material outcomes of business success to invest in non-material, religious transactions. The Wangara thus illustrate the precolonial entwinement of the secular and the divine—the material and the spiritual—in a single economic vision, in an eclectic continuum of economic expectation. The Wangara long-distance mercantile network further demonstrates the ways in which subsisting African values and understandings of the societal obligations of an entrepreneur underwrote economic expectations.

Ubuntu and Economic Expectations in Africa

What do we mean when we assert that there are societal expectations that intrude into the individual economic expectations of entrepreneurs in Africa? The most significant aspect of this assertion is the existence of a set of cultural and political understandings about how entrepreneurs should behave, conduct themselves, and respond to societal needs. For an entrepreneur socialized into this value system and its expectational universe, the question is not merely about whether or to what extent these values inflect their own individual projections and motivations but how they reconcile their experiences and aspirations with the constraints and opportunities such a value system imposes on entrepreneurial members of society (Abubakre, Faik, and Mkansi 2021). But, first, what does an African societal expectation look like in broad terms, and what set of values informs and sustains it?

Central to the traditional scholarly notion of economic expectations as it relates to the motivations and behaviors of economic agents are notions of uncertainty, experience, and strategic decision-making. The behavior of economic actors in response to these factors culminates in what economists theorize as economic expectation. Scholars in the Western economic tradition have studied how such expectations form and become discernible in the actions of economic agents (Kenyes 1936). One element of the economic expectations theoretical debates is the claim that individual experience is paramount and is a core factor in an individual economic agent's decision-making; that both risk and uncertainty are encountered and managed primarily by individual economic agents who are rational and sovereign actors; that a formula of rational self-interested conduct undergirds the formation of economic expectations; and that the aspirations which emanate from these considerations should be understood at the level of the rational economic agent. In this analytic frame, communal, societal, and social constraints and stimuli play a complementary rather than deterministic role in the economic expectation formation process.

For the most part, in African socioeconomic cosmology, the probable and improbable dimensions of business and the mechanisms for managing them are largely communal, dictated by collective societal anxieties and goals. A subset of those anxieties are of course personal to each member of the society, including entrepreneurs who have to make critical decisions about how, where, or when to render service or produce and market goods. However, the multipurpose African life-governing philosophy of Ubuntu, which manifests

in different forms across Africa, asserts that an individual's relationship with both risk and uncertainty cannot be separated from that of the community and that expectations of personal economic advancement are set in symbiosis with those of others in the community. Nor can the decisions that the individual makes to anticipate and mitigate or profit from risks, where known, and uncertainties, where unforeseen events present opportunities, be entirely extricated from societal knowledge and wisdom (Venter 2008; Kinyanjui 2019).

Experience anchors projections of future trends, which in turn generate aspirational values to produce expectations and decisions designed to accomplish them. This is the way experience is understood in the Western economic literature on expectation formation. In the Ubuntu African system, experience is both communal and personal, and symbiotically so. As the axiomatic philosophical wisdom of Ubuntu dictates, a person is a person through other people. This is a sophisticated statement about the experiential and aspirational interconnectedness of individual and society, a philosophy of coeval and coextensive processes of economic self-making and community-building. Personal economic experience amounts to little when not aligned with the economic anxieties and goals of the larger society. Thus, while the experience of African entrepreneurs can contribute to the pool of knowledge that guides them to ways of both preparing for uncertainty and possibly profiting from it, the totality of societal experience and, more crucially, the cultural understanding of that experience and what it portends for the future, largely shape the decision that the entrepreneur makes. Consistent with the principle of Ubuntu, each entrepreneur does not make decisions and projections for him- or herself alone. Each entrepreneur takes into account the prevailing societal understandings of the anxieties and uncertainties the society is wrestling with as well as society's expectations regarding what is to come and how individual members of society can contribute their skills and innovative aptitudes to prepare for and respond to challenges and needs as they emerge.

This is a logical segue into a discussion of rationality and the individual-society symbiotic dyad. Similar to what scholars have increasingly noted on how supposedly irrational impulses and decisions can coexist with rational ones in the formation of economic expectations, in the African business calculus, the rationality of what entrepreneurs and their societal interlocutors expect and of how they arrive at those expectations cannot be taken for granted. As the case studies discussed in this chapter demonstrate, in precolonial, colonial, and contemporary times, alternative African socioeconomic rationalities that do not register in the analytic frames of economists have inflected the "rational" calculations and plans of entrepreneurs.

Furthermore, in the African milieu, every entrepreneur is, at least in theory and by the terms of Ubuntu, socially constituted and inclined to social problem-solving. The term "social entrepreneurship" is thus somewhat redundant in the African context. The implication of this in relation to economic expectations is that entrepreneurs set and adjust their expectations, and calibrate their innovative interventions and their decision-making to enhance the communal, corporate wellbeing of the society of which they are a part. Many African entrepreneurs operate outside this value system, but this is an aberration and not the ideal. The visibility of this aberration authorizes regular critiques of those African entrepreneurs who are perceived to have deviated from the expectations formulated as non-binding but powerful guideposts for existing and aspiring innovators, craftspeople, traders, merchants, enterprising politicians, and others.

In the Islamic regions of Africa, the moral economy of Islam modulated and constrained the economic expectations of African entrepreneurs, supplying an additional layer of

consideration in entrepreneurial decision making (Tripp 2006). In the case of the Wangara, discussed above, facility—real and perceived—in the Islamic arts and in the mercantile prescriptions and prohibitions of Islam enabled them to read sociopolitical and economic trends with additional religious lenses and to parlay the knowledge collated into intelligent decision making, brand-building, and expansion initiatives.

The Limit of Individualized Expectations

Scholarly interest on African entrepreneurship has exploded in the last three decades outside the traditional quantitative disciplines of economics and business studies. This is traceable to the global ascent of neoliberal capitalism, which has drawn remote corners of the world into global webs of capital and substituted self-help entrepreneurship for state-directed ameliorative economic projects. Humanists and qualitative social scientists have brought much-needed critical perspectives to bear on the study of entrepreneurs and entrepreneurship.

One of the legacies of this humanization of entrepreneurship studies is the extension of the observational and analytical lens to Africa, a region of the world simultaneously regarded as a place dominated by a poverty-incubating pre-capitalist communal ethos and a fertile ground for recruiting new entrepreneurs. In so far as the emphasis on producing indigenous entrepreneurship emanates from an assumption that Africa lacks capitalism and capitalist relations of production or a homegrown entrepreneurship tradition—an assumption that Horman Chitonge (2017) has debunked—there is a need to deconstruct paradigmatic understandings of not just capitalism but also of entrepreneurship, the supposed means to capitalism in Africa (Chitonge 2017). Such a deconstructive understanding is necessary for establishing the point that in African settings, economic expectations are informed by and in turn inform cultural ones, and that the expectations that individual entrepreneurs set for themselves are often in dialogue and productive conflict with societal ones.

Africa has been the center of two crosscutting processes, one focused on the alleged prevalence of pre-capitalist or socialistic poverty, the other on producing entrepreneurs to combat that poverty. The escalation of poverty in Africa from the 1980s, itself partly a product of neoliberal reforms, ironically opened the door to the neoliberal veneration of entrepreneurship as a remedy for mass poverty. Many anti-poverty interventions in Africa today seek to remake Africans into rural and urban entrepreneurs through instruments such as microfinance, revolving credit, and cooperative lending.

The proliferation of entrepreneurial projects in Africa in the neoliberal moment inspired unprecedented Africanist scholarly interest in entrepreneurship, enterprise, innovation, African capitalism or Africapitalism, and the culture of economic self-help (Edozien 2017; Idemudia and Amaeshi 2019). As new groups of entrepreneurs emerged on the continent and engaged in a variety of capitalist, wealth-creating activities, Africanist scholars from a variety of fields began to develop new vocabularies and concepts to explain this entrepreneurial wave. This scholarly corpus has been illuminating. But it has also been plagued by conceptual narrowness, the mark of which is the failure to recognize the ways in which what society expects of the entrepreneur and what entrepreneurs expect for themselves are in constant tensile and productive interaction.

The problem was that the Africanist entrepreneurial perspective that emerged had elisions that were imposed by dominant formulations developed to understand entrepreneurial

cultures in Euro-American contexts. Studies of African entrepreneurship have been plagued by the deployment of notions and definitions derived from the dominant Schumpeterian perspective on entrepreneurship. Joseph Schumpeter's major contribution to the study of entrepreneurship lies in going beyond understanding the entrepreneur as one who had the skill to "combine the factors of production" and situating the entrepreneur in a more ambitious project of disrupting the process of value-creation (Schumpeter 1942, 82; Schumpeter 1947; Jones and Wadhvani 2006). But there is, in the literature, a somewhat reductive distillation of Schumpeter's intellectual legacy on entrepreneurship in Africa to the notion that entrepreneurs are lone catalytic geniuses of wealth creation or a vanguard of economic innovation (Akinyoade, Dietz, and Uche 2017). Understood in this frame, the African entrepreneur is sometimes posited as someone who is able to formulate rational and disruptive economic expectations outside the wider socioeconomic ecosystem in which they exist and operate. This version of Schumpeter's postulation seems to have produced a crude individualization of African entrepreneurial expectation-setting.

Schumpeter saw the entrepreneur not just in personal terms but also in terms of corporate agency, of the aggregate transformative impact of multiple, simultaneous, or successive entrepreneurial initiatives. Unlike other theorists, Schumpeter saw the entrepreneur not as a manager but as a catalyst, an innovator. Innovation is fundamentally a catalytic social activity, conceived and inspired by individual aspirations and societal needs and expectations. Clearly, the empirical setting of Schumpeter's theorization is a European industrial one, giving his postulations a decidedly Eurocentric flavor. Nonetheless, even though the extent to which Schumpeter's entrepreneur's expectations were shaped by society remains debatable, it is reasonable to surmise that even Schumpeter would acknowledge that the entrepreneur's perception of risks, opportunities, and achievable goals were rooted in the economic trends and realities of that society.

In the African setting, the entrepreneur is a manager of multiple, intersecting interests, pressures, and impulses. He or she is not merely an innovative catalyst; innovation and catalytic action are only part of an eclectic set of expectations that define him or her. African entrepreneurs, like the European entrepreneurs in Schumpeter's formulation, are saddled with the question of how their innovative value creation and problem-solving mitigate the inscrutable probabilities of socioeconomic life or expand opportunities for all of society. The ways in which African entrepreneurs historically reconciled their own individual anxieties and aspirations with societal needs and expectations shaped their sense of their enterprise and its delicate mix of opportunities and risks. But economic expectation-setting by entrepreneurs was, ultimately, a product of the multivalent positioning of the entrepreneur in African society.

The Parallel Rationality of African Entrepreneurs' Economic Expectations

Historically, African entrepreneurs occupied multiple positions and professions in society; entrepreneurship was only one of their several constitutive elements. This meant that, as individuals and groups, they occupied multiple positions and vocations in society, all of which shaped their expectations formation and the way they behaved in realizing those expectations. The lives of most African entrepreneurs often unfolded in symbiosis with the demands, responsibilities, and ethics of the wider culture and sociopolitical dynamics. Given this reality of multiple entrepreneurial trajectories and entwinements, it is perhaps more productive to speak of "entrepreneurial Africans"—a formulation at odds

with the restrictive definitional criteria in normative capitalist thought—than of “African entrepreneurs.”

The term “African entrepreneurs” assumes a consistent, permanent occupational identity of people whose lives were consumed and defined solely by their entrepreneurial engagements. “Entrepreneurial Africans” advances a premise of entrepreneurial possibilities in multiple endeavors and professions. It also allows us to explore the many factors outside the strict realm of economic rationality that inform the behaviors and aspirations of entrepreneurs in the African context.

This complex picture is further compounded by the existence of several “non-capitalist” systems and spheres of production as well as the prevalence of hybrid practices in which self-interested capitalist rationalities coexisted with other traditional ethos of value and reward. If a reductively individual-centered interpretation of the paradigmatic Schumpeterian entrepreneurial model and its derivative modes of analysis are applied uncritically to African entrepreneurial formations, they raise the question of whether, for instance, entrepreneurs could emerge and thrive outside capitalist relations in a communal African economic setting and if so whether the relationship between capitalism and entrepreneurship, which we have long taken for granted, can be sustained in the African context. Sociologist Elisio Macamo insightfully makes a similar argument in regard to the concept of capitalism and its conceptual work in African social science scholarship (Macamo 2016). A more consequential implication of applying a restrictive, if influential, definition of entrepreneurship to African entrepreneurial actors is that it could close off the chance to interrogate the assumptions made in the social science literature about how economic expectations form, evolve, and at times unravel.

Polly Hill was an economic anthropologist who explored the ways that West African communities encouraged and subsidized the emergence of individuated wealth and the inexorable rural socioeconomic inequality that followed from it, but her overarching contention is that rural agricultural entrepreneurship was ultimately embedded in household economies and in the concentric obligations that connected ambitious farmers to a wider network of familial and kinship responsibilities. These wider social networks were the ultimate economic insulation that anchored economic expectations. They influenced and were in turn influenced by starkly rational processes of responding to uncertainties and weighing risks against opportunities.

In *Studies in Rural Capitalism*, Hill argues that wealthy cocoa farmers in northwestern Akwapim region of Ghana were both distinguished and socially burdened by their ownership and control of certain capital goods (Hill 1970). In her seminal work, *Rural Hausa: a Village and a Setting*, Hill again underscores not just the existence of neocapitalist economic differentiation in a rural, agricultural community marked by an uneven incorporation into the colonial cash crop economy, but also the prevalence of webs of social obligations, kinship reciprocities, and household patterns of production and consumption that helped produce wealth while also modulating the uncertain threats of poverty and inequality (Hill 1972). Individual and household economies made rational economic calculations and choices based as much on these societal variables as on their own economic aspirations and anxieties. This is yet another example of how, in the landscape covered by Africanist scholars, the dichotomy that is often assumed about “rational” and “non-rational” responses to both risk and uncertainty is rarely borne out by the evidence.

In precolonial and colonial times, African entrepreneurs operated at the intersection of profit and power, commerce and culture. Profitmaking was coextensive with social

obligations. Entrepreneurs were mindful of societal expectations placed on them. Society, in turn, recognized that entrepreneurs had special gifts that had to be nurtured and partially liberated from the sociopolitical routines of quotidian life. Entrepreneurial pursuits were for-profit endeavors for the most part but profits and service to society were coterminous, as Gloria Chuku, Marta Musso, Martin Shanguhya, and Chambi Chachage demonstrate in their respective works (Chachage 2018; Chuku 2018; Musso 2018; Shanguhya 2018).

The final section of this chapter supplies more historical and contemporary examples of how African entrepreneurs of various vocational specializations set coterminous personal and group economic expectations from a vast informational repertoire underwritten by societal values, understandings, anxieties, and aspirations. It analyzes these examples in the overarching framework of this chapter: the foundational pluralist origins of the economic expectations that African entrepreneurs set and pursued. The African expectation culture that the stories below instantiate is dynamic and not static, but the elements discussed above both align it with and mark it out from factors privileged in Western academic discourses on economic expectation-setting.

From Precolonial to Modern Entrepreneurial Expectation Formation

Throughout African history, political power holders cultivated entrepreneurs and were entrepreneurs in their own rights. Entrepreneurs, for their part, accessed the protective, logistical, and spiritual resources deposited in the political realm. The idea that individual profitmaking could and should coexist with the provision of societal benefit and that entrepreneurial projects should catalyze society's economic potentials was an unwritten but well understood rule of business. The Wangara perfected the integration of political information gathering and political participation into economic decision making and expectation formation. Across West Africa's precolonial polities, there was a recognition that economic uncertainties had political implications and vice versa and thus required a multidimensional strategy to de-escalate the probability of unprofitable outcomes and establish realistic economic expectations.

To speak of a political economy of entrepreneurship or an entrepreneurial political economy is to signal an African iteration of entrepreneurship in which the political and mercantile realms were and are in conversation and symbiotic cooperation. The case of the precolonial Wangara mercantile network in West Africa is an example of the entwinement of value creation and political power (Ochonu 2018). But there is a discernible modern analogue of this reality. The most consequential and successful African entrepreneurs of today, such as Aliko Dangote, Strive Masiyiwa, Patrice Motsepe, Tony Elumelu, and others, have direct or indirect tentacles to the realm of power and politics. Their business empires relate with host governments and political formations in ways that complicate ideas about the separation of business and politics but that are consistent with how precolonial entrepreneurial actors behaved. Modern African entrepreneurs recognize the weight of societal expectations on their enterprise and seek, in various degrees, to anticipate and respond to these expectations by aligning their business modeling and plans with the society's expectation that they act to produce profits and value not just for themselves but also for society, a symbiotic business practice that Nigerian businessman, Tony Elumelu, calls Africapitalism (Edozien 2017; Idemudia and Amaeshi 2019).

An African entrepreneur may shun the most profitable trajectory of a particular business, for instance, to focus on the path with the best potential to create the highest number

of jobs, thus altering the priorities and expectations that such an entrepreneur is expected to uphold if evaluated on the basis of what economists theorize as profit-oriented economic rationality. Nigerian Airline entrepreneur and owner of West Africa's largest airline, Chief Allen Onyema, stated in a vlog interview in 2021 that he rejected a more profitable, less risky charter airline business to establish a more risky, less profitable commercial airline because his main purpose of going into the aviation business was to create as many jobs as possible, not necessarily to make the most amount of money possible.³ This was of course a piece of self-serving public relations rhetoric on his part, but it is analytically significant. Chief Onyema was speaking strategically and self-interestedly into an ideological space he knew was already saturated by understandings of the role of the entrepreneur as a societal actor. He knew that his audience would thus be receptive to his rhetoric, no matter how contrived it was. He knew that his audience had been socialized into an entrepreneurial consciousness in which the entrepreneur is expected to carry and help fulfil the socioeconomic and political needs of society.

On the face of it, the import of Onyema's claim is indistinguishable from the neoliberal veneration of entrepreneurs as job creators and guardians of the economy, who should be celebrated, protected, and rewarded for creating wealth that purportedly trickles down to everyone.⁴ But that would be a reductive assessment. Onyema was neither speaking in the gimmicky language of corporate social responsibility nor gesturing toward a Western supply-side economic ideological claim of the businessman as an unacknowledged social benefactor. Instead, he was plugging himself and his investments into a time-worn African tradition of doing business and setting expectations for such business from both a personal experiential and social script.

Historian Gloria Chuku (2018) supplies an illuminating example from colonial Eastern Nigeria that underscores this point. Between 1890 and her death in 1919, Nwanyiemelie Nwonaku ("The Triumphant Woman") was considered a successful businesswoman and is today a legend of rare African entrepreneurial breakthrough in colonial times (Chuku 2018). Much of this legendary status comes from her ability to leverage her mercantile wealth to build a vast extended family rather than her ability to transition her operations to a stand-alone firm as would be expected of a successful sole proprietorship business.

As told by Chuku, Nwonaku used her wealth to marry many wives, becoming a female husband to them. The women had children who belonged to Nwonaku's lineage by Igbo tradition, thus populating her clan and enriching the kinship network she had been born into. She was building what in today's lingo is called human capital and social capital, which she knew could be leveraged for other kinds of capital if and when needed. Additionally, this subversively rare act provided immense social and material benefits to many of the women who came into Nwonaku's orbit, a form of social provisioning traditionally associated with masculine vocational success. If we were to posthumously analyze Nwonaku's expectation formation logics, we might find that she considered the building of a kinship human capital bank for her lineage and immediate community a more strategic and desirable mechanism for minimizing the effects of both uncertainty and risk in a colonial economy riddled with racist restrictions, volatility, and sudden convulsions.

The initiative of channeling her wealth into "wealth-in-people" investments and into kinship building not only was an investment in itself, it assured Nwonaku and her descendants of a place in history and in the pantheon of successful men and women in southeastern Nigeria (Guyer 1995). Nwonaku's trading empire never acquired the formal structures of a firm. It depended on and revolved around her connections, charisma,

and talent for negotiation and deal-making. The business did not outlive her, but that is largely because, in forming her expectations, establishing what she wanted out of her business endeavors, and determining how she wanted to prepare for an uncertain future, familial and status anxieties and aspirations trumped the stark materiality of wealth accumulation and business longevity. Nonetheless, and consistent with the dominance of an economic expectation that was informed by social concerns and priorities, across Igboland Nwonaku is regarded as one of a few indigenous entrepreneurial successes of the colonial era. Her fame comes largely from her ability to do what other women had not been able to do, her firstness in building a harem of wives and, in so doing, significantly expanding the size of her clan, a key measure of success in Igbo land whose value cannot be quantifiably analyzed in a rational economic system of mechanically determined choices and behaviors founded on uncertainties, incentives, and opportunities. Nwonaku's contemporary renown has less to do with her business and trading acumen, although she possessed both in abundance.

Conclusion

I have analyzed the ways in which a study of African entrepreneurship and of entrepreneurs' behaviors can enrich, but also challenge our understandings of how economic expectations form and evolve. The empirical examples discussed here and the accompanying analysis demonstrate that the elastic nature of African entrepreneurship, and the burdens and incentives that African entrepreneurs grappled with historically, have helped to condition the ways they have behaved, planned, strategized, and formed economic expectations. Along with rational calculations of profit-making and risk management, these sociopolitical forces and factors in society have informed the way African entrepreneurs organized their businesses, established their aspirations, understood and managed uncertainties, and projected into the future. The precolonial, colonial, and contemporary landscapes of entrepreneurship in Africa are connected by the influence of societal structures, expectations, and considerations of entrepreneurs' expectation formation logics.

Notes

- 1 On the neoclassical side, works like A.G Hopkins' *Economic History of West Africa* (1975), established a tradition of emphasizing the catalytic role of the market and of market dynamics. On the radical side, Charles van Onselen's *The Seed is Mine: The Life of Kas Maine, a South African Sharecropper, 1894–1985* (1997); Paul Zeleza's *A Modern Economic History of Africa. Volume I: The Nineteenth Century* (1993), Walter Rodney's *How Europe Underdeveloped Africa* ([1972] 2018) and Jean Suret-Canale's *French Colonialism in Tropical Africa 1900–1945* (1971) associated market rationality and individualized production coercive and non-coercive incentives as harmful to African livelihoods and enterprise.
- 2 Frank Knight makes the important distinction between risk and uncertainty, the distinction turning on the knowability or otherwise of the probability of future outcomes of business investments. Risk, by this seminal distinction and definition, is more manageable than uncertainty.
- 3 See Maya (2001): "How a Nigerian Established West Africa's Biggest Airline (Airpeace)." <https://www.youtube.com/watch?v=AGmh8bdiGfI&t=1386s> (accessed February 19, 2023).
- 4 Milton Friedman, the economic theorist, disavowed the notion that entrepreneurs and corporations have a social responsibility to society. See Friedman (1970). However, neoliberal economists and policymakers who believe in his supply-side economic philosophy have reinterpreted his idea of corporate prosperity as an ultimate public good, arguing that when corporations and entrepreneurs are empowered through tax cuts and other measures to do well, all of society does well.

References

- Abubakre, Mumin, Isam Faik, and Marcia Mkansi. 2021. "Digital Entrepreneurship and Indigenous Value System: An Ubuntu Perspective." *Information Systems Journal* 31, no. 6: 838–862.
- Akinyoade, Akinyinka, Ton Dietz, and Chibuike Uche. 2017. "Introduction." In *Entrepreneurship in Africa*, edited by Akinyinka Akinyoade, Ton Dietz, and Chibuike Uche, 1–22. Leiden: Brill.
- Alvares, Manuel Padre. (1615) 1990. "An interim translation of Manuel Álvares S.J., 'Etiópia Menor e descrição geográfica da Província da Serra Leoa' [c.1615] (*Ethiopia Minor and a Geographical Account of the Province of Sierra Leone (c. 1615)*)," transcription from an unpublished manuscript by the late Avelino Teixeira da Mota and Luís da Matos on behalf of the Centro de Estudos de Cartografia Antiga de Lisbon, translation and introduction by P.E.H. Hair. Department of History, University of Liverpool.
- Bovill, Edward William. 1929. "The Silent Trade of Wangara." *Journal of the Royal African Society* 29, no. 113: 27–38.
- Chachage, Chambi. 2018. "Globalization and the Making of East Africa's Asian Entrepreneurship Networks." In *Entrepreneurship in Africa: A Historical Approach*, edited by Moses Ochonu, 31–52. Bloomington, IN: Indiana University Press.
- Chitonge, Herman. 2017. "Capitalism in Africa: The Old and the New Lyrics." *Review of African Political Economy* (blog). URL: <https://roape.net/2017/01/12/capitalism-africa-old-new-lyrics/>.
- Chuku, Gloria. 2018. "Women Entrepreneurs, Gender, Traditions, and the Negotiation of Power Relations in Colonial Nigeria." In *Entrepreneurship in Africa: A Historical Approach*, edited by Moses Ochonu, 83–112. Bloomington, IN: Indiana University Press.
- D'Almada, Andre Alvares. (1594) 1964. *Tratado Breve dos Rios de Guine do Cabo Verde*. Edited with an introduction and notes by Antonio Brasio. Lisbon: Edotial L.I.A.M.
- Dike, Onwuka K. 1956. *Trade and Politics in the Niger Delta, 1830–1885*. Oxford: Oxford University Press.
- Edozien, Rita Kiki. 2017. *"Pan" Africa Rising: The Cultural Political Economy of Nigeria's Africapitalism and South Africa's Ubuntu Business*. New York: Palgrave MacMillan.
- Falola, Toyin. 1991. "The Yoruba Caravan System of the Nineteenth Century." *International Journal of African Historical Studies* 24, no. 1: 111–132.
- Friedman, Milton. 1970. "The Social Responsibility of Business Is to Increase its Profits." *New York Times Magazine*, September 13, 1970. URL: <https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html>.
- Giesing, Cornelia, and Valentine Vydrine, eds. 2007. *Tarikh Mandinka de Bijini/La Mémoire des Madinka et des Sooninkee du Kaabu*. Leiden and Boston: Brill.
- Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91, no. 3: 481–510.
- Guyer, Jane. 1995. "Introduction: Wealth in People, Wealth in Things." *The Journal of African History* 36, no. 1: 83–90.
- Hill, Polly. 1970. *Studies in Rural Capitalism in West Africa*. Cambridge: Cambridge University Press.
- Hill, Polly. 1972. *Rural Hausa: A Village and a Setting*. Cambridge: Cambridge University Press.
- Hopkins, A.G. 1975. *Economic History of West Africa*. London: Longman.
- Idemudia, Uwafiokun, and Kenneth Amaeshi, eds. 2019. *Africapitalism: Sustainable Business and Development in Africa*. London: Routledge.
- Jones, Geoffrey G., and Dan Wadhvani. 2006. "Schumpeter's Plea: Rediscovering History and Relevance in the Study of Entrepreneurship." Harvard Business School Working Papers Series. URL: <https://hbswk.hbs.edu/item/schumpeters-plea-rediscovering-history-and-relevance-in-the-study-of-entrepreneurship>.
- Keynes, John Maynard. 1936. *The General Theory of Employment, Interest and Money*. London: Palgrave MacMillan.
- Kinyanjui, Mary Njeri. 2019. *African Markets and the Utu-ubuntu Business Model: A Perspective on Economic Informality in Nairobi*. Cape Town: African Minds.
- Knight, Frank. [1921] 2006. *Risk, Uncertainty and Profit*. New York: Cosimo Books Inc.
- Lovejoy, Paul. 1978. "The Role of the Wangara in the Economic Transformation of the Central Sudan in the Fifteenth and Sixteenth Centuries." *Journal of African History* 19, no. 2: 173–193.

- Lydon, Ghislaine. 2009. *On Trans-Saharan Trails: Islamic Law, Trade Networks, and Cross-Cultural Exchange in Nineteenth-Century Western Africa*. New York: Cambridge University Press.
- Macamo, Elisio. 2016. "Blinded by Capitalism: Words that Think (For Us)." *Review of African Political Economy* (blog). URL: <https://roape.net/2016/12/07/blinded-capitalism-words-think-us/>.
- Maya, Wode. 2001. "How a Nigerian Established West Africa's Biggest Airline (Airpeace)." YouTube video, February 17, 2001, 32:57. URL: <https://www.youtube.com/watch?v=AGmh8bdiGfI&t=1386s>.
- Musso, Marta. 2018. "'Taking Control': Sonatrach and the Algerian Decolonization Process." In *Entrepreneurship in Africa: A Historical Approach*, edited by Moses Ochonu, 173–192. Bloomington, IN: Indiana University Press.
- Northrup, David. 1978. *Trade Without Borders: Pre-colonial Economic Development in South-Eastern Nigeria*. Oxford: Oxford University Press.
- Nwokeji, Ugo. G. 2010. *The Slave Trade and Culture in the Bight of Biafra*. Cambridge: Cambridge University Press.
- Ochonu, Moses E. 2018. "The Wangara Factor in West African Business History." In *Entrepreneurship in Africa: A Historical Approach*, edited by Moses Ochonu, 53–80. Bloomington, IN: Indiana University Press.
- Rodney, Walter. (1972) 2018. *How Europe Underdeveloped Africa*. New York: Verso Books.
- Schumpeter, Joseph. 1942. *Capitalism, Socialism and Democracy*. New York: Harper and Roe Publishers.
- Schumpeter, Joseph Alois 1947. "The Creative Response in Economic History." *Journal of Economic History* 7: 149–159.
- Shanghuia, Martin. 2018. "Ethnicity, Colonial Expediency, and the Development of Retail Business in Turkana, Northwestern Kenya, 1920–1950." In *Entrepreneurship in Africa: A Historical Approach*, edited by Moses Ochonu, 296–319. Bloomington: Indiana University Press.
- Sheriff, Abdul. 1987. *Slaves, Spices, and Ivory in Zanzibar*. London: James Curry.
- Suret-Canale, Jean. 1971. *French Colonialism in Tropical Africa 1900–1945*. Paris: Pica Press.
- Tripp, Charles. 2006. *Islam and Moral Economy*. Cambridge: Cambridge University Press.
- Usuanlele, Uyilawa. 2018. "Benin Imperialism and Entrepreneurship in Northeast Yorubaland from the Eighteenth to the Early Twentieth Century." In *Entrepreneurship in Africa: A Historical Approach*, edited by Moses Ochonu, 155–172. Bloomington, IN: Indiana University Press.
- van Onselen, Charles. 1997. *The Seed is Mine: The Life of Kas Maine, a South African Sharecropper, 1894–1985*. New York: Hill and Wang.
- Venter, William. 2008. "Ubuntu and Social Capital Factors in Family Businesses." *South African Journal of Entrepreneurship and Small Business Management* 1, no. 1: 66.
- Wilks, Ivor. 1982. "Wangara, Akan and Portuguese in the Fifteenth and Sixteenth Centuries I: The Matter of Bitu." *Journal of African History* 23, no. 3: 333–349.
- Wilks, Ivor. 1982. "Wangara, Akan and Portuguese in the Fifteenth and Sixteenth Centuries II." *Journal of African History* 23, no. 3: 467–472.
- Zezeza, Paul. 1993. *A Modern Economic History of Africa. Volume I: the Nineteenth Century*. Dakar: CODESRIA.



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PART 4

Expectation Formation in Times of Crisis



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AN UNEXPECTED CRISIS OF EXPECTATIONS

Mary O'Sullivan

The Great Depression of the 1930s, especially as it manifested itself in the United States, has been described as the holy grail of macroeconomics, and it has lured some of the most prominent economic thinkers of the twentieth century to its pursuit. In their efforts to explain this extraordinary crisis, scholars have made different claims about the crucial developments that plunged the US economy into a profound and enduring crisis between 1929 and 1933. Across explanations of the Great Depression, however, we observe a common emphasis on the potential for economic actors' changing expectations to shake the foundations of material life.

In the first part of this chapter, I focus on the most influential interpretations of the Great Depression in the United States, to show the crucial role assigned to shifting expectations by economists associated with both the Keynesian and monetarist traditions. With the notable exception of Keynes, as we shall see, few economists have tried to articulate a theoretical explanation of expectation formation, and its effects on economic behavior, as a basis for understanding this historical crisis.

Second, I review the historical evidence that economists have invoked to ground their claims about the role of changing expectations in the Great Depression, and I emphasize the limits of this evidence in both its extent and its variety. Moreover, I argue that even the evidence that has been used offers only an ambiguous basis for understanding the changing expectations of economic actors during the Great Depression.

Given the conceptual and historical limits of existing work, I turn to the possibilities for new research in the third and final part of this chapter. I argue for a broader methodological approach to generating historical evidence on the subjective and specific expectations in the Great Depression. And I call for more humility and creativity from economists to integrate this evidence into their conceptual debates about the formation and impact of expectations.

A Crisis of Expectations

Expectations are seen as emblematic of John Maynard Keynes's analysis of the "trade cycle," so I start with the central importance he assigned them in explaining cyclical movements in investment. Keynes himself, in his preface to the first edition of *The General Theory* (1936),

emphasized that the book's originality stemmed from its showing that "changing views about the future are capable of influencing the quantity of employment and not merely its direction" (Keynes 1936, vii). Expectations played a central role in economic activity, according to Keynes, because "[a]ll production is for the purpose of ultimately satisfying a consumer" but "[t]ime usually elapses... and sometimes much time—between the incurring of costs by the producer... and the purchase of the output by the ultimate consumer." Thus, "the entrepreneur [in which Keynes includes both the producer and the investor] has to form the best expectations he can as to what the consumers will be prepared to pay when he is ready to supply them" and "he has no choice but to be guided by these expectations, if he is to produce at all by processes which occupy time" (Keynes 1936, 46).

Central to Keynes's analysis was the distinction between entrepreneurs' "short-term" and "long-term" expectations. Short-term expectations about the costs and proceeds of the products to be sold were essentially expectations about price movements. Keynes considered that "it will often be safe to omit express reference to *short-term* expectation[s]" since they were revised in a "gradual and continuous" process, so that "expected and realized results run into and overlap one another in their influence" (Keynes 1936, 50). In contrast, reference to long-term expectations of profits or returns on further investments in capital equipment and working capital "can seldom be avoided" since "it is of the nature of long-term expectations that they cannot be checked at short intervals in light of realized results" and are "liable to sudden revision" (Keynes 1936, 51).

Keynes created a central role for long-term expectations in his theory of investment through the concept of the "marginal efficiency of capital," which he defined as the relation between the prospective or expected yield of a capital asset and its supply or replacement cost. When compared to the rate of interest, it determined the "inducement to invest" by entrepreneurs (Keynes 1936, 135–137).¹ Keynes argued that the dependence of the marginal efficiency of capital on long-term expectations was the chief factor that rendered it "subject to the somewhat violent fluctuations which are the explanation of the Trade Cycle" (Keynes 1936, 143–144).

Since Keynes assigned a crucial role to long-term expectations in *The General Theory*, he spent an entire chapter exploring the factors that determined "The State of Long-Term Expectations" (Keynes 1936, Chapter 12). These expectations, Keynes suggested, depended on the facts used to make forecasts and the confidence with which they were made; he emphasized that "[t]he outstanding fact is the extreme precariousness of the basis of knowledge on which our estimates of prospective yield are made." In the past, investment depended on a sufficient supply of entrepreneurs who were willing to embark on business without any "precise calculation of prospective profit." With the development of organized investment markets, however, the rate of investment was governed by "the average expectation of those who deal on the Stock Exchange as revealed in the price of shares, rather than by the genuine expectations of the professional entrepreneur" (Keynes 1936, 150–151).

That new factor, as he explained, "sometimes facilitates investment but sometimes adds greatly to the instability of the system." Valuations on the stock exchange are typically established, Keynes suggested, based on the assumption "that the existing state of affairs will continue indefinitely, except in so far as we have specific reasons to expect a change." And even though we know this to be unlikely, "the conventional method of calculation" allows for "a considerable measure of continuity and stability in our affairs." Nevertheless, the reliance on convention, "in an absolute view of things so arbitrary," creates the potential for economic instability given its "precariousness." Especially in abnormal times,

therefore, “the market will be subject to waves of optimistic and pessimistic sentiment, which are unreasoning and yet in a sense legitimate where no solid basis exists for a reasonable calculation” (Keynes 1936, 150–154).

In writing about investment and expectations, Keynes clearly had the Great Depression to the forefront of his mind, even if his clearest explanation of the crisis is found late in the book in his “Notes on the Trade Cycle.” There Keynes clarifies what he had already implied: “the phenomenon of the *crisis*—the fact that the substitution of a downward for an upward tendency often takes place suddenly and violently” is explained by “a sudden collapse in the marginal efficiency of capital” due to a sharp rise in pessimistic sentiment on the stock exchange (Keynes 1936, 315).

Expectations were at the heart of Keynes’s analytical framework, therefore, with long-run expectations influencing investment, and the stock market playing a crucial role in shaping them. Inspired by Keynes’s work, John Kenneth Galbraith represented an early and influential example of an economist who delved deeper into the stock market’s role in the Great Depression. Writing in 1954, Galbraith noted that the stock market crash tended to be relegated to a secondary role in economic discussions of the Great Depression, with emphasis placed instead on “much more serious forces.” His book, *The Great Crash, 1929*, was designed to correct that view as “seriously mistaken.”

Although focusing largely on 1929, Galbraith began with the Florida real estate boom of 1925 as the “first indication of the mood of the twenties” and a succinct expression of his explanation of “great speculative orgies.” Noting that Florida had a better winter climate than the population centers in the northeast of the United States to which it was increasingly accessible, Galbraith explained:

[o]n that indispensable element of fact men and women had proceeded to build a world of speculative make-believe. This is a world inhabited not by people who have to be persuaded to believe but by people who wanted an excuse to believe. In the case of Florida, they wanted to believe that the whole peninsula would soon be populated by the holiday-makers and the sun-worshippers of a new and remarkably indolent era.

(Galbraith [1954] 2009, 3–4)

Galbraith employed a similar narrative to build his account of the stock market boom, noting how some “indispensable element of fact” became the basis on which investors built “a world of speculative make-believe” in which they would get rich (Galbraith [1954] 2009, 3–4). And, as such optimistic expectations brought more people into the stock market, Galbraith claimed that

the tendency to look beyond the simple fact of increasing values to the reasons on which it depends greatly diminishes. And there is no reason why anyone should do so if the supply of people to buy with the expectation of selling at a profit continues to be augmented at a sufficiently rapid rate to keep prices rising.

(Galbraith [1954] 2009, 4)

As he had done for the Florida land boom, Galbraith emphasized the extent to which the stock market boom was fueled by credit. He observed that in all the “great speculative orgies” the financial means had emerged to allow investors to pursue their speculative ends.

But far more important, he insisted, than the supply of credit or the rate of interest was “the mood”: “Speculation on a large scale requires a pervasive sense of confidence and optimism and conviction that ordinary people were meant to be rich” (Galbraith [1954] 2009, 169). Thus, Galbraith’s explanation of the great speculative boom on the US stock market in the late 1920s attached overwhelming importance to people’s shifting expectations about the future.

As we might expect, therefore, Galbraith’s account of the ensuing bust did much the same. As he explained: “it is in the nature of a speculative boom that almost anything can collapse it.” Any serious shock, he argued, could shake the confidence of speculators in the future and lead them to sell their stocks to escape the final collapse. And

[t]heir pessimism will infect those simpler souls who had thought the market might go up forever but who will now change their minds and sell. Soon there will be margin calls, and still others will be forced to sell. So the bubble breaks.

(Galbraith [1954] 2009, 90)

Galbraith’s book was largely preoccupied with characterizing the shifting expectations that drove the US stock market to unprecedented heights and depths in the late 1920s. The narrative he constructed offered many echoes of Keynes’s description of organized investment markets in *The General Theory*, but it was grounded in detailed historical evidence that we do not find there. However, Galbraith showed no signs of any impulse to further Keynes’s conceptual discussion of expectation formation, with his central claim that humanity is prone to inherent bouts of optimism and pessimism being expressed as assertion rather than argument.

In terms of the economic impact of changing expectations, moreover, Galbraith cleaved closely to Keynes. Indeed, even if he believed strongly that any satisfactory explanation of the Depression “must accord a dignified role to the speculative boom and ensuing collapse,” Galbraith did not pretend to offer a complete explanation of the economic consequences of the stock market bust (Galbraith [1954] 2009, 90). What he did say in the final chapter of his book came close to Keynes in directing our attention towards an interruption in investment outlays, specifically investment in capital goods, as the crucial economic dynamic that precipitated a depression after the stock market imploded (see Galbraith [1954] 2009, 175–177).

Such claims came under serious fire from Milton Friedman and Anna Schwartz a few years later in their analysis of the “The Great Contraction” in *A Monetary History of the United States* (1963). They shifted attention from investment, or other components of national income or expenditure, in a deliberate attempt to break with Keynes’s influence and to focus instead on the rhythm of monetary events as the crucial economic dynamic behind the Great Depression. Along the way, they dismissed the economic importance of the stock market crash in October 1929 as a monetary non-event, arguing that the Great Depression only began when “[t]he monetary character of the contraction changed drastically in late 1930” (Friedman and Schwartz 1963, 308). Given their interest in dispensing with Keynes’s influence, Friedman and Schwartz might have been expected to leave no role for changing expectations in the Great Depression: in fact, expectations play a significant role in their explanation of how banking failures led to nationwide monetary contraction.

According to Friedman and Schwartz, four waves of bank failures from October 1930 to March 1933 determined the pace of “monetary events” that caused the Great Depression. They insisted that bank failures precipitated a “contagion of fear” among bank depositors

across the United States, prompting them to withdraw money from unhealthy and healthy banks alike, so that “the banking system as a whole was in a position to meet the demands of currency only by a multiple contraction of deposits, hence of assets” (Friedman and Schwartz 1963, 352–355). Presumably this implied a collapse in bank loans, although Friedman and Schwartz are unclear about how the monetary crisis was transmitted to the rest of the economy (Romer and Romer 2013; on the influence on business expectation formation, see also Chapter 29 of this volume). What is clear, however, is that Friedman and Schwartz assigned a crucial role in their explanation of the Great Depression to changing expectations of bank depositors about the future stability of their banks. But it is just as clear that the contagion of fear that plays such a crucial role in their account relies more on homespun wisdoms like “such contagion knows no geographical limits” than anything approaching a conceptual discussion (Friedman and Schwartz 1963, 308, cited in O’Sullivan 2022).

Nevertheless, as I explain in a recent essay, the new interpretation of the Great Depression that Milton Friedman and Anna Schwartz offered was to become the economic orthodoxy of the Great Depression in the United States for decades to come (O’Sullivan 2022). And that was true despite notable efforts by economists of a Keynesian persuasion to counter their claims and suggest alternatives to them. Particularly important in this regard was Peter Temin’s *Did Monetary Forces Cause the Great Depression?* (1976), which Elmus Wicker cast as having “its roots in Keynesian and post-Keynesian income and expenditure theory (of textbook fame)” (Wicker 1976). Nevertheless, in building his “spending hypothesis” as a rival to the “money hypothesis” of Friedman and Schwartz, Temin took issue with Keynes’s focus, arguing that it was not a decline in investment that made the Great Depression so severe but a decline in consumption (Temin 1976, 65, 68–69).

Noting that “[t]he stock-market crash has been offered as a possible cause for the sharpness with which consumption fell,” Temin allowed for an important causal role for expectations in explaining the decline in consumption alongside the alternative possibility that it reflected a decline in personal wealth. A series of regressions led him to conclude that wealth changes due to the stock market crash could not explain most of the fall in consumption in 1930, so he turned his attention to the possibility that the crash “altered consumer expectations in a way that caused them to decrease consumption expenditures” (Temin 1976, 69–74). However, Temin’s historical analysis led him to conclude there was no evidence that expectations turned decidedly negative in late 1929 or early 1930. And that left him with the rather unsatisfactory conclusion that “[t]he fall in consumption must be regarded as truly autonomous, which in this case means also unexplained” (Temin 1976, 83). Expectations of a serious downturn began to manifest themselves in the business press and economic forecasts only in late 1930, according to Temin, or even later if we rely on the less “impressionistic” evidence of bond ratings (Temin 1976, 79–82).

Nevertheless, other economists followed his lead in exploring the decline in consumption to generate new findings that suggested a significant role for changing expectations. Christina Romer argued that the collapse of stock prices in October 1929 generated temporary uncertainty for consumers about their future income. Their changed expectations about the future, she argued, led them to forgo purchases of durable goods in the present, prompting a collapse in consumer spending on automobiles and the like (Romer 1990). Martha Olney moved in a similar direction, but she insisted that to understand how consumers’ changed expectations affected their purchases it was necessary to take account of the rising consumer debt of the 1920s. Households’ increasingly pessimistic expectations

about future income, Olney claimed, made the prospect of default on their consumer debt more and more likely. Default was a costly process in 1930, she explained, since there was no guarantee that the equity built up by the household during the contract would be protected, so indebted families tried to avoid default by reducing consumption in nearly all spending categories (Olney 1999).

In emphasizing that “[w]hether high household indebtedness will lead to a collapse of consumption when expectations change depends upon the consequences of default,” Olney seems to echo the insistence of another Keynesian, Hyman Minsky, on the importance of indebtedness in generating economic instability. However, Hyman Minsky was convinced that Temin had taken Keynesians down the wrong path in focusing on consumption in the exploration of the Great Depression. He argued that by taking explicit account of “capital-assets, financing, time, and uncertainty,” post-Keynesians offered “a better framework for the analysis of the Great Depression” than either the money or spending hypothesis that Temin considered (Minsky 1976).

In making this claim, Minsky was not just advocating a return to Keynes’s focus on investment but suggesting the new approach he was developing. And although he looked to *The General Theory* for inspiration, Minsky emphasized that “the logical hole, the missing link” in Keynes’s book was that “the financial developments during a boom that make a crisis likely, if not inevitable, are hinted at but not thoroughly examined” (Minsky 1975). Minsky’s conviction about the importance of financial instability in capitalist economies stemmed from his own experience of the Great Depression and its consequences. And he was explicit that in developing his financial instability hypothesis, he was seeking to build “an economic theory which makes great depressions one of the possible states in which our type of capitalist economy can find itself” (Minsky 1975).

Minsky focused on financing relations, specifically the relations between “banking” and “industry” in a capitalist economy. He conceived of banks as institutions that supply financing for capitalist investment in return for promises to pay them out of the profits realized from these investments. Expectations of lenders and borrowers played a central role in Minsky’s analysis of the process through which capitalist investment was financed. Lenders extended money to borrowers based on their expectations of being repaid, which in turn depended on their expectations of borrowers’ profits, the contracts they concluded with them, and the “margins of safety” incorporated into them. Borrowers borrowed money to finance their investments based on their expectations of future profits and their relationship to financial payments to which they were contracted.

Moreover, Minsky’s model had a dynamic quality, since these expectations evolved over the course of the business cycle. At the trough of a business cycle, financing and investment patterns are relatively cautious as borrowers and lenders hedge their bets. If the economic upturn proceeds smoothly and realized profits exceed expectations, then expectations of borrowers and lenders become more speculative. Firms become more willing to borrow as they expect to realize more positive cash flows from their investments. As upturn turns to boom, both borrowers and lenders are willing to take more risks, even to the point of borrowing and lending when expected cash flows from investments will not cover all the financing costs. Minsky argued that as the balance of finance for investment in a capitalist economy shifts from hedge to speculative to Ponzi finance, the economy moves from financial stability to instability (Minsky 1976, 1979).

For Minsky, therefore, his “financial instability hypothesis” evoked an inherent tendency of the financial system in a capitalist economy to evolve from tranquility to instability and

even financial crisis (Minsky 1979). And at the core of this tendency was the evolution of the expectations of both lenders and borrowers. He believed that it was this tendency that was at work throughout the 1920s and that was responsible for causing the Great Depression. In the conceptual parts of his analysis, Minsky followed Keynes in emphasizing the distinction between expected and realized profits, but he focused to a greater extent than Keynes on lending and borrowing behavior. Still, when it comes to the evolving expectations of lenders and borrowers over the business cycle, which play such an important role in Minsky's account, it is not clear that he offers much more than Galbraith's inherent bouts of optimism and pessimism as explanation.

Evidence on Expectations as a Cause of Depression

Having emphasized the importance of changing expectations in leading economic explanations of the Great Depression, I turn in this second part of my chapter to the historical evidence that economists have mobilized to animate their reflections in this regard. Given the strong conviction with which different tribes of economists believe that Keynesian or monetarist specialists are right about the Great Depression, it is striking just how limited and disappointing that evidence is when we look for it.

Keynes might seem to present a significant challenge in this respect, since he wrote in the largely deductive style of earlier generations of English economists, rarely making specific mention of what we would recognize as empirical evidence today. What is crystal clear, however, is that the concrete reality that interested Keynes as the basis for his reflections on expectations was the Stock Exchange. His reference to a beauty contest is often cited as capturing the essence of what he meant about the conventional basis of valuation on organized investment markets, but the games he mentioned—Snap, Old Maid, Musical Chairs—are even more evocative (Keynes 1936, 156). He evoked them to capture the importance of social behavior that underlies the process through which prices of investment securities are established. As an active investor, Keynes knew the organized investment markets better than any other prominent economist of his day apart from Irving Fisher, and this gives his metaphors a particular credibility.

Keynes's firsthand knowledge was the source of other observations he made on the functioning of stock markets, with his reflections on Wall Street seeming especially pertinent to his analysis of the Great Depression. Noting that speculation could be seen as “the activity of forecasting the psychology of the market” and enterprise as “the activity of forecasting the prospective yield of assets over their whole life,” he explained that it was not always the case that speculation dominates enterprise. Nevertheless, he suggested that:

[a]s the organization of investment markets improves, the risk of the predominance of speculation does, however, increase. In one of the greatest investment markets in the world, namely, New York, the influence of speculation (in the above sense) is enormous.

(Keynes 1936, 158–159)

Then he went on to discuss why that might be the case compared to the London Stock Exchange, positing that it was less a matter of “national character” and more that the high brokerage charges and transfer taxes payable by investors on the London Stock Exchange served “to rule out a large proportion of the transactions characteristic of Wall Street” (Keynes 1936, 160).

In contrast to Keynes's manifest interest in the specific character of organized investment markets and their influence on expectations, he showed much less concern with the investment outlays they were supposed to shape. Despite the central role that the propensity to invest played in *The General Theory*, Keynes only occasionally steered close to even the broadest outlines of a description of investment behavior. He noted for example that investment in the United States in the five years preceding 1929 had been "on so enormous a scale in the aggregate that the prospective yield of further additions was, coolly considered, falling rapidly" (Keynes 1936, 323). But nowhere do we find any evidence that might bring the entrepreneurs making these investments into sight, which would be of interest not least in showing the important influence of sentiment on the stock exchange in their decisions to change (or not) their investment plans.

To move from *The General Theory* to *The Great Crash 1929* is to abandon the general for the specific in the discussion of expectations on the stock market. Galbraith did offer a preliminary note on his historical sources to explain how he had constructed his narrative of the stock market boom and bust. He explained that explicit citations were included of "public documents, books, magazine articles, or special sources of any kind" that he had used, but stated that "much of the story of 1929 is to be found in the general or financial press of the time." If no source was specified, therefore, "the reader can assume it was in the *New York Times*, the *Wall Street Journal*, and the other papers of general circulation of the day" (Galbraith [1954] 2009, xvii).

It was these sources that Galbraith used to build his narrative about the wave of speculative optimism that swept Wall Street in the late 1920s. But if we look closely at how his narrative builds, he seems to impute the optimistic expectations that drove speculation to the fact that stock prices rose at an extraordinary pace. That can be seen clearly, for example, in his discussion of the investment trust or company, which Galbraith describes as "[t]he most notable piece of speculative architecture of the late twenties" (Galbraith [1954] 2009, 46). However, as Keynes observed, it is important to identify where the balance lies between speculation and enterprise in stock market valuations. To assume, as Galbraith tends to do, that rising stock prices imply that expectations were changing, is—as Eugene White observed—to ignore the possibility that there were underlying improvements in the economy that justified greater optimism (Rappoport and White 1993).

Indeed, White argued that the improvement in economic prospects for the US economy over the 1920s was a much more important factor during the stock market boom than Galbraith allowed. White observed that where the data exist to look at the relationship between stock prices and underlying corporate earnings, we see that for some important sectors in the US economy such as the automobile industry, there was nothing particularly speculative about stock market valuations in the 1920s. The crucial point of this debate that it is far from straightforward to read expectations from evidence on stock valuations or press articles about the stock market, as Galbraith tried to do.

We might expect a different approach to marshalling evidence on expectations in the financial sphere from Friedman and Schwartz. Throughout most of the book, including in their chapter on the Great Depression, they make extensive use of a rich variety of historical sources. Surprisingly, when it comes to the "contagion of fear" among US bank depositors about the future of their banks, Friedman and Schwartz make only a few specific claims, based on limited evidence, even though the contagion plays a decisive role in their account of the crisis (O'Sullivan 2022).

So too we might expect Minsky to offer something quite different from Galbraith when it comes to documenting the speculative boom and bust of the 1920s. Any serious study of the Great Depression, he contended,

requires a thorough investigation of the evolution of debt structures—including the proliferation of new institutions with novel instruments and the consequent layering of debts—during the 1920s and how this changing debt structure affected the domain of stability of the financial system.

Only once did Minsky attempt such an investigation himself for the 1920s and 1930s and then to lament that there was little more to go on than “the anecdotal histories, such as J. K. Galbraith’s ‘The Great Crash’.” And truth be told, Minsky left the empirical investigation of the Great Depression little improved, and crucially added no historical evidence to understand the shifting expectations of borrowers and lenders that were at the core of his financial instability hypothesis (Minsky 1984).

For something more, we might well look to economic historian Charles Kindleberger, who picked up on Minsky’s financial instability hypothesis and used it to frame the book he published on *Manias, Panics, and Crashes* in 1978.² Kindleberger did insist on the importance of October 1929 as a watershed in the descent of the US economy into the Great Depression, noting that: “[w]hen the [stock market] crash came, the credit system suddenly froze. Lending on imports, for example, seems to have come to a complete stop” (Kindleberger 1978, 72). Unfortunately, he provided no explicit evidence for these provocative claims nor any sense of the changing expectations, or any other process, that drove them.

It is fair to say that if we are looking for pioneers in generating evidence on economic expectations in the Great Depression, it is to Peter Temin we should look, since he was more systematic and resourceful in going about his empirical task than any of his peers. As he noted: “[i]n 1929, most people expected good times to continue. By 1933, most people expected bad times to continue.” The crucial question, therefore, was “not whether expectations changed in the Depression, but when.” And specifically, given his interest in the onset of the Depression: “[h]ow did people regard the events of 1929 and 1930 as they happened?” (Temin 1976, 74–75).

Temin deserves credit, therefore, for his clear formulation of the empirical challenge of tracking changing expectations in the Great Depression and it made him conscious of how difficult it was to address it. There were, as he noted, “almost no data on the expectations of consumers.” Written sources “tend to be descriptive of the state of business, telling how much of something was sold, rather than people’s states of mind.” There were “more thoughtful accounts,” but they tended to be written with the benefit of hindsight when the author “could hardly help but see the events of 1929 and 1930 as the beginning of the long slide down” (Temin 1976, 74–75).

In the absence of better alternatives, Temin offered a systematic analysis of the arguments and evidence advanced by various commentators on the economic situation in the business press from late 1929 to 1930 and in the process brought nuance to Galbraith’s interpretation. Notwithstanding the expression of some pessimism in publications such as *Business Week* and the *New York Times*, Temin suggested that “the optimistic tone of the popular and semipopular press continued through the early part of 1930, into the spring, and was maintained during the summer.” He noted, however, that “during the last quarter

of 1930, the tone changed.” As he explained, “[t]he timing of this change is not known with precision, but it came approximately one year after the stock-market crash, and it preceded the banking crisis in November and December of 1930.” He continued that

[t]he precise events that produced this change are not known, and not everyone appears to have been conscious of it as it happened. Nevertheless, it would appear that businessmen’s and probably also consumers’ expectations built up during the 1920s about the normal state of business activity were not shattered immediately by the stock-market crash; they only dissolved about a year after the crash.

(Temin 1976, 79)

Although Temin drew quite clear conclusions about expectations from his reading of the business press, he believed that: “[t]his kind of evidence is extremely impressionistic” and preferred “to have some way to quantify the impressions received from it.” He observed that: “[w]e cannot do this for the timing, but we can quantify the amount of pessimism felt in 1930” based on an analysis of the credit ratings assigned to US bonds in 1930 compared to previous years. Temin took these bond ratings as “an index of informed, unbiased opinion about the future prospects of business” and concluded from his analysis that “the bond rating agencies did not expect a major depression in 1930.” Combined with the evidence from the contemporary business press, therefore, Temin concluded that there was no sign of a significant change in expectations, provoked by the stock market crash or any other development, prior to late 1930, leading him to suggest that the large fall in consumption in 1930 had “no satisfactory explanation” (Temin 1976, 82).

Although Christina Romer followed Temin along much the same analytical path in her efforts to explain the Great Depression, she offered new evidence on expectations to challenge his conclusions. One type of evidence she introduced was on the variability of real stock prices—measured as the annual average of the squared monthly change in real stock prices—which she used as a proxy for uncertainty about future income. She showed that there was a large increase in stock price volatility following the crash in October 1929, which supported her characterization of 1930 as a year of heightened uncertainty for consumers about their future income. Romer offered a second type of evidence for this characterization from her examination of the forecasts of five contemporary business analysts over the 1920s.³ These forecasts, as she explained, “not only provide evidence of their own expectations, but also their analyses of the determinants of consumer behavior.” She showed that four out of five analysts moved from strong certainty in their expectations in the late summer of 1929 to considerable uncertainty following the stock market crash, a pattern not observed for other downturns in the 1920s. Regarding consumer confidence, Romer’s interpretation of the business analysts’ forecasts was that consumers became unusually uncertain about the future due to the stock market crash and remained uncertain throughout much of the following year (Romer 1990).

Romer’s work represented a turning point in economists’ empirical research on the role of expectations in the Great Depression. In Keynesian research, Martha Olney moved the literature in a new direction by integrating consumer debt into the analysis of consumption but made Romer’s research on heightened uncertainty a crucial building block in doing so (Olney 1999). In addition, David Greasley and Jakob Madsen built on Romer’s approach to revive interest in Keynes’s own explanation of the Great Depression, using stock market volatility as a proxy for expectations of future profits and suggesting that it played a crucial

role in the sharp collapse in fixed capital formation that characterized the onset of the Great Depression (Greasley and Madsen 2006; see also 2013).

Given the significance of the turning point marked by Temin's work in the study of economic expectations in the Great Depression, there are several observations to be made about the empirical practices it fostered. From the beginning, as Temin himself acknowledged, the evidence mobilized reflected the views of economic actors other than those who were the focus of concern in studies of the Great Depression. Thus, Temin was interested in consumer expectations, but he collected evidence on the interpretations and forecasts of business journalists and bond rating agencies. He saw journalists and agencies as having "informed expectations" and suggested that they led the expectations of consumers who were "relatively uninformed." (Temin 1976, 80, 82). However, it seems a stretch to believe that journalists and analysts, located largely in US financial centers, would provide a clear window into the expectations of consumers across a heterogeneous country like the United States. If it is the behavior of those consumers that we care about, as Temin does, it is not clear why we would want to rely on such a distant proxy.

However, as we have seen, it is really Romer's methodological innovation that has come to dominate in recent studies that incorporate empirical evidence on expectations into their analysis of the Great Depression. It is not so much her review of business analysts that has attracted attention—it follows Temin's methodological lead and raises the same concern as expressed above—but her quantitative analysis of stock market volatility. It offered the kind of quantitative analysis that Temin cast as a preferred alternative to the "extremely impressionistic" evidence based on his interpretation of qualitative sources. Certainly, it offers a clear picture of the vagaries of stock prices over a long period of time with the stock market crash marking a clear increase in volatility that persists until late 1933 (see Greasley and Madsen 2006, 398 for a particularly clear graphical representation). It is only when we ask what is being measured that it becomes apparent that we have replaced "impressionistic" evidence of expectations with precise evidence of something quite different.

To measure the volatility of stock prices is not to measure expectations. At best, it offers some gauge of uncertainty in the stock market about the appropriate valuations of stocks. And all we can reasonably impute from that uncertainty is that no conventional approach to valuation—no new rules of the game for Old Maid—is agreed upon for any length of time by market participants. That may suggest that expectations are heterogeneous, or that they are shifting rapidly, or both at the same time. Certainly, it is difficult to know, without deepening the empirical analysis, what that might imply about economic behavior across the economy.

Romer's methodological approach has been invoked to argue that higher volatility in stock prices at the time of the Great Depression meant higher uncertainty about the future and made economic actors reluctant to make outlays on consumption or investment. But if volatility on the stock market means disagreement among investors about the future value of stocks, why would that disagreement be reflected in agreement about future investments? Instead, what economists seem to assume in these studies is that investment declines as uncertainty rises. But if that's the case, then we find ourselves returning to a portrayal of the Great Depression in the United States as reflecting a general wave of pessimism that hit the economy without any real explanation of where it came from and why it persisted for long enough to drive the economy into a deep and prolonged crisis.

It seems reasonable to conclude this part of the chapter by bringing out the double entendre in its title to suggest that existing evidence on expectations as a cause of the Depression is itself a cause of depression. The difficulty of collecting such evidence seems to have persuaded some

economists to avoid embarking on a path to look for it. More resourceful investigators have come up with methods that allow us to evaluate the expectations of business journalists and analysts and to extrapolate them to the consumers or entrepreneurs that are the focus of most explanations of the Great Depression. An alternative approach has been to generate quantitative measures based on stock market data, which seems more tractable until we acknowledge that it depends on specifying links between volatility on the stock market, uncertainty, and patterns of investment behavior that are currently posited rather than shown.

The Empirical and Theoretical Potential of New Evidence

In the third part of this chapter, I offer some suggestions for generating new types of evidence on the role that expectations played in the Great Depression. It is important to address this issue given the problems with existing evidence, but it is also important given the conceptual limits of the literature on expectations in the Great Depression. Better evidence may offer much-needed insights for theorizing about the formation of expectations and their impact on behavior. To take advantage of such evidence, I will argue, economists may need to show more humility and creativity to move beyond their longstanding preoccupation with stylized and general models of expectation formation.

Historical Expectations as Subjective and Specific

A substantial obstacle to overcome to generate meaningfully new evidence on expectations is economists' instinctive desire to steer clear of anything that connotes the subjective and specific. An instinctive orientation towards evidence that is objective and general has an important role to play in the development of economic analysis. However, if we are interested in understanding the role of expectations in economic life, specifically in the Great Depression, we must contend with the subjective and the specific.

To make this point, I turn to a recent account of the Great Depression in the United States by a documentary maker who makes no claim to be an economist but offers insights about expectations that many of us are inclined to overlook. The first episode of Ken Burns' 2012 television documentary series, *The Dust Bowl*, recounts the agricultural development of America's Southern Plains from the late nineteenth century through the Great Depression. Based on eyewitness accounts, Burns reconstructs how agricultural communities in states like Oklahoma and Texas perceived what was happening and imagined what the future held in store. What is striking about these eyewitness accounts when we get to 1929 and even 1930 is the extent to which people cast the Great Depression as a phenomenon underway elsewhere, far from them, in the east.

In contrast to a New York skyline, pictured under a tempestuous storm, Imogene Glover of Texas County described the agricultural situation around her:

We had the best crop that we had had in 1929. That's when the market was great. And the people that did plant wheat had a better year than they'd ever had. And they just thought they'd get wealthy. It was a great time and everything was looking up.

People on the Southern Plains learned from local newspapers and the newsreels they watched in local cinemas about the dire economic situation in other parts of the United States. Yet, they remained optimistic, even in the face of declining prices for the agricultural commodities they produced, like wheat and raw cotton.

As the documentary explains, the “big plough” was the term employed to evoke farmers’ final push to cultivate and plant more land in the Southern Plains in 1930 even after agricultural prices had started to fall. Since the weather proved clement, the harvest of 1931 was “great.” Caroline Henderson, a graduate of Mount Holyoke College, was a homesteader in Oklahoma and an occasional writer for *The Atlantic* magazine, and she cast her world in 1931 in glowing terms: “I have never seen a more beautiful harvest, one of the best wheat crops this country has ever produced in our 24 years of farming.” For the farmers, as the documentary tells us, the harvest of 1931 seemed like a veritable godsend. Their delight, however, was to prove fleeting. The rich harvest of 1931 did not find enough buyers, wheat accumulated in piles, and its price collapsed. “We are too old to cry,” Caroline Henderson said, “and we are suffering too much to laugh.”

It is tempting to do as an historian does in the documentary and describe these homesteaders’ optimistic planting as a preordained recipe for economic and ecological disaster. It seems more fruitful to acknowledge that the Great Depression, especially in its early stages, left a great deal of room for a variety of subjective and specific experiences. And that raises a set of fundamental questions about how people understand crises—what is an economic crisis? When does it begin? How do we know?—that would seem to have decisive implications for how they behave when crisis strikes. Indeed, we see clear signs of heterogeneity in the breadth and depth of the Great Depression across sectors and industries in historical evidence for the time. But the extract from Burns’ documentary hints at an even more profound challenge in showing the dangers of trying to understand people’s changing expectations as an objective consequence of shifting economic variables.

An analysis of the agricultural prices that US farmers received in the early years of the Great Depression shows that wheat and raw cotton were among the commodities that experienced the sharpest reversals. And yet, as Imogene Glover noted, wheat and cotton farmers remained optimistic. The prices of these internationally traded commodities were historically subject to wide fluctuations. They had fallen very low in the crisis of 1920–1921 only to recover again by the mid-1920s, and farmers in 1929 and 1930 may have hoped much the same thing would happen. But the point here is not to speculate on what was reasonable or unreasonable for farmers to expect, only to emphasize that we do not understand what they expected when we assume that it is obvious.

What is clear from Burns’ documentary is that farmers in Oklahoma were not enveloped by a wave of pessimism when the stock market crashed in New York City. Wall Street seemed like another country for many parts of the United States, as it had seemed for decades before. If nothing else, that shows the dangers of reading consumers’ sentiments from analysts’ opinions or using the stock price volatility as a proxy for farmers’ states of mind. There are alternative sources we can use, as Burns’ documentary shows, including private correspondence among people in America’s farming communities, as well as letters to, and articles in local and national newspapers from farming correspondents. Indeed, as recent historical work shows, there is a mine of information to be exploited from local and regional newspapers using methods from the digital humanities.

Theories of Expectations beyond Keynes and Muth

The appeal of generating further evidence on expectations in the Great Depression is not just to offer historians a more robust understanding of the crisis since economists need inspiration for theorizing about the formation and influence of expectations during economic

crises. And Burns' emphasis on the disparity between what was happening in New York and other parts of the United States bears directly on the foundational thinking that we owe to Keynes on expectations in the trade cycle and specifically the Great Depression.

As we saw, Keynes was quite categorical about the fact that in an economy with organized investment markets "the daily revaluations of the Stock Exchange, though they are primarily made to facilitate transfers of old investments between one individual and another, inevitably exert a decisive influence on the rate of current investment" (Keynes 1936, 151). However, the reasoning behind his claim was purely logical: why would anyone build a new enterprise, he asked, if it cost less to buy a similar enterprise on the Stock Exchange? But that is not the same as showing that rising or falling stock valuations played a decisive role in determining US entrepreneurs' expectations, and therefore their investment outlays, and knowing that was because they shared the same logic as Keynes.

In fact, there is reason to suspect that Wall Street's views may not have been as influential as Keynes believed on the expectations and decisions of Main Street. Ironically, we find suggestive evidence in this regard in the paper by Greasley and Madsen that seeks to empirically rehabilitate Keynes's hypothesis about the role of stock market sentiment in the collapse of investment early in the Depression. Along the way, they made the equally striking observation that, in contrast to what Keynes believed, the stock market boom does not seem to have driven investment to unprecedented heights prior to the stock market crash: "Inspection of the data, at least, does not suggest that excessive investment in the later 1920s led to the subsequent collapse. In these years producers may have ignored the sharp rise in share prices when making investment decisions" (Greasley and Madsen 2006, 400).

Such evidence begs the question of whether Keynes was right about the importance of Wall Street in shaping investment on Main Street. Addressing it invites us to learn more about how US entrepreneurs or capitalists thought about the future and acted on their heterogeneous and shifting expectations. Since Keynes started us along this course of reflection nearly a century ago, it seems odd that there has been so little interest in exploring this issue in empirical terms. Modern economists who work on the Great Depression, and even economic historians, might plead the absence of surveys as an excuse for knowing little about how automobile or steel magnates in the United States reflected on what was happening around them, and acted upon it, at the onset of the Great Depression. But as historians are well aware, business surveys have been conducted since the early twentieth century and there are many other sources in the archives of central banks, business associations, and businesses themselves, that could be used to explore these issues.

The importance of generating further historical evidence on the long-term expectations of the economic actors responsible for making investments stems from the importance that Keynes and others attached to them in their analysis of business cycles and economic crises. Conversely, Keynes considered that short-term expectations, specifically expectations about price changes, were less interesting since "in practice the process of revision of a short-term expectation is a gradual and continuous one" (Keynes 1936, 50). However, it is worth rethinking this dismissal given the high levels of volatility we observe in commodity prices during the 1920s and early 1930s. Sharp movements in commodity prices make it unlikely that the revision of short-term expectations about these prices occurred in a smooth and continuous process.

As the excerpt from Burns' documentary suggests, this theme is of central relevance for understanding the expectations and behavior of farming communities during the Great Depression. In a provocative article, Giovanni Federico offered an interpretation of the

movement of agricultural prices that confronted the long-standing claim that agricultural distress in the 1920s was an important cause of the Great Depression. Focusing on the United States, he challenged the widespread assumptions that real agricultural prices had fallen during the 1920s but that farmers continued to farm despite their growing economic distress. Federico suggested that “[s]uch a collective misjudgement is hardly credible,” since farmers had other options open to them like migrating to cities, but he points out that their behavior would have been “perfectly rational if prices had remained stable in the long run.” Sure enough, his paper sought to establish that US farmers behaved perfectly rationally by showing that agricultural prices were constant in the long-term: “[o]n the eve of the depression, they were back to their prewar level and, with one exception, the [long-run] rates of change from 1910 to 1929 are not significantly different from zero” (Federico 2005, 953).

Plausible on the face of it, Federico’s interpretation becomes debatable once one sees that he is implicitly claiming that farmers assessed the economics of their farms over a time-frame that stretched for two decades. That the claim is implicit suggests how far we can get from the realities of running a farm or an enterprise or finding and losing a job when we work out models of economic expectations and behavior. And that means that we sorely need more evidence that allows us to understand rather than invent how farmers perceived movements in commodity prices and incorporated them into their decisions not only about whether to farm or not but also about what seeds to buy and how much to plant.

To take advantage of this evidence—even to see its importance—requires some humility from economists. As we saw for Keynes, that may imply paying more attention to types of economic expectations—short-term expectations in this case—whose importance has been downplayed. But another kind of change in contemporary economists’ attitudes—which is suggested by Federico’s preoccupation with “rational” expectations—seems both more difficult and important to achieve.

The notion of rational expectations became so instinctively and broadly used in mainstream macroeconomics that it could be evoked without any explanation of its meaning or applicability in any given setting. However, John Muth’s defining article on the subject suggests that we need to be more discerning about the definition and use of the term. Muth’s “rational expectations hypothesis” stemmed from his interest in the role of firms in the adjustment of short-term prices.⁴ His main claim was “that expectations, since they are informed predictions of future events, are essentially the same as the predictions of the relevant economic theory.” The only explicit justification he offered for that claim was that “if expectations were not moderately rational there would be opportunities for economists to make profits in commodity speculation, running a firm, or selling the information to present owners” (Muth 1961).

Clearly, Muth’s justification does not hold if economists lack a correct model of the economic process. In a recent book, Stephen Marglin emphasized economists’ failure to seriously consider, never mind understand, the dynamic process of price adjustment that interested Muth. Were they concerned with that task, he argued,

[t]he very multiplicity of plausible adjustment mechanisms would make it necessary for economists to dirty their hands in the messy complexities of how agents actually behave in real life, an investigation of distinctly lower status that blurs the lines between economics, a discipline aspiring to the status of science, and anthropology, forever tainted in the eyes of most economists by its reliance on interpretation.

(Marglin 2021, 25)

If we broaden the challenge to include long-term as well as short-term expectations and consider them in the context of a crisis of the significance of the Great Depression, it becomes clearer still that humility and creativity from economists is essential to integrating new historical evidence into more satisfying explanations of the formation and impact of economic expectations in this historical crisis.

Conclusion

The potential of changing expectations to transform the material reality of economic life has animated economic research on the Great Depression since Keynes made it a centerpiece of *The General Theory*. In this chapter, I have emphasized just how central expectations are to some of the most influential interpretations of the Depression, not only by Keynes and Keynesians but also some of their greatest rivals. As we might expect, the specific economic role assigned to expectations varies a great deal across different explanations of the crisis. What is striking about many of these explanations, with the notable exception of Keynes's interpretation, is how little conceptualization they offer of how expectations are formed and influence behavior.

Notwithstanding the prominence of expectations in analyses of the Great Depression, the evidence that we have at our disposal to understand how expectations were formed and shaped economic behavior during that historical crisis is surprisingly limited. What evidence there is, moreover, seems quite unsatisfactory, mainly because it depends on indirect evidence on the expectations of economic actors and assumptions about their implications for economic behavior.

Given the shortcomings of existing theoretical and empirical research, I offer a few suggestions for generating and exploiting new evidence about the role of expectations in the Great Depression. Drawing on a recent documentary, I argue for greater attention to the subjective and specific reality of people's expectations about the economy. Then I turn to the potential for such evidence to alter our conceptual understanding of the formation and implications of economic expectations in the Great Depression and other historical crises. And I close by suggesting that the potential for economic and historical research to move forward along these lines depends on our acknowledging how much we do not understand and being open to learning what we do not know.

Notes

- 1 Keynes acknowledged that "the Marginal Productivity or Yield or Efficiency or Utility of Capital are familiar terms which we have all frequently used" but without any "clear statement of what economists have usually intended by these terms" and argued that "[t]he most important confusion concerning the meaning and significance of the marginal efficiency of capital has ensued on the failure to see that it depends on the prospective yield of capital, and not merely on its current yield" (Keynes 1936, 137–138).
- 2 Kindleberger was a respected historian of the international economy, with a particular interest in money and finance, and he had already published a book on the Great Depression in 1973. Since his later book covered nearly 30 financial crises from the eighteenth to the twentieth century, it is no surprise if the historical evidence on the Great Depression that Kindleberger included there was a distilled version of what can be found in his earlier book (Kindleberger 1973).
- 3 The forecasts she analyzed were those in *Business Week*, the Harvard Economic Society's *Weekly Letters*, *The Magazine of Wall Street*, Moody's Investors Service, and Standard Statistics Company's Standard Trade and Securities Service.

- 4 Muth's research was conducted as part of a project on the "Planning and Control of Industrial Operations" funded by the US Office of Naval Research.

References

- Federico, Giovanni. 2005. "Not Guilty? Agriculture in the 1920s and the Great Depression." *Journal of Economic History* 65, no. 4: 949–976.
- Friedman, Milton, and Anna J. Schwartz. 1963. *A Monetary History of the United States, 1867–1960*. Princeton, NJ: Princeton University Press.
- Galbraith, John Kenneth. (1954) 2009. *The Great Crash, 1929*. Boston, MA: Houghton Mifflin Harcourt.
- Greasley, David, and Jakob B. Madsen. 2006. "Investment and Uncertainty: Precipitating the Great Depression in the United States." *Economica* 73: 393–412.
- Greasley, David, and Jakob B. Madsen. 2013. "The Housing Slump and the Great Depression in the USA." *Cliometrica* 7: 15–35.
- Keynes, John Maynard. 1936. *The General Theory of Employment, Interest and Money*. London: Macmillan.
- Kindleberger, Charles P. 1973. *The World in Depression 1929–1939*. Los Angeles, CA: University of California Press.
- Kindleberger, Charles P. 1978. *Manias, Panics, and Crashes: A History of Financial Crises*. New York: Basic Books.
- Marglin, Stephen. 2021. *Raising Keynes: A Twenty-First-Century General Theory*. Cambridge, MA: Harvard University Press.
- Minsky, Hyman P. 1975. *John Maynard Keynes*. New York: Columbia University Press.
- Minsky, Hyman P. 1976. "Review of *Did Monetary Forces Cause the Great Depression?* by Peter Temin." *Challenge* 19, no. 4: 44–46.
- Minsky, Hyman P. 1979. "The Financial Instability Hypothesis: Capitalist Processes and the Behavior of the Economy." Hyman P. Minsky Archive, 471. URL: https://digitalcommons.bard.edu/hm_archive/471.
- Minsky, Hyman P. 1984. "Banking and Industry between the Two Wars: The United States." *The Journal of European Economic History* 4: 235–272.
- Muth, John. 1961. "Rational Expectations and the Theory of Price Movements." *Econometrica* 29: 315–335.
- Olney, Martha L. 1999. "Avoiding Default: The Role of Credit in the Consumption Collapse of 1930." *Quarterly Journal of Economics* 114: 319–35.
- O'Sullivan, Mary A. 2022. "History as Heresy: Unlearning the Lessons of Economic Orthodoxy." *Economic History Review* 75: 297–335.
- Rappoport, Peter, and Eugene N. White. 1993. "Was there a Bubble in the 1929 Stock Market?" *Journal of Economic History* 53, no. 3: 549–574.
- Romer, Christina D. 1990. "The Great Crash and the Onset of the Great Depression." *Quarterly Journal of Economics* 105, no. 3: 597–624.
- Romer, Christina D., and Paul D. Romer. 2013. "The Missing Transmission Mechanism in the Monetary Explanation of the Great Depression." *American Economic Review: Papers & Proceedings* 103: 66–72.
- Temin, Peter. 1976. *Did Monetary Forces cause the Great Depression?* New York: W. W. Norton & Co.
- Wicker, Elmus. 1976. "Review of *Did Monetary Forces Cause the Great Depression?* by Peter Temin." *American Historical Review* 81: 993–994.

28

EXPECTATION FORMATION IN (POTENTIAL) SOVEREIGN DEBT CRISES

Laura Rischbieter

Writing in 1984, Sylvia Ostry (1984) asked why the Organisation for Economic Co-operation and Development (OECD) forecasts had not foreseen the major economic crisis of the previous years. Canada's arguably best-known economist of the time, who had been Head of the Department of Economics and Statistics at the OECD since 1979, thereby triggered intense debate both amongst OECD staffers as well as in the operational units of national finance ministries and international financial organizations such as the International Monetary Fund (IMF). One year later, Lloyds Bank chairman Jeremy Morse engaged with this dilemma in the annual Per Jacobson Lecture held in Washington, DC. He asked himself and the luminaries of international finance in his audience what assumptions could be used to make any financial policy decisions at all about the future (Morse 1985). Both of these contributions were made against the backdrop of the seemingly endless sovereign debt crises of the 1980s. As such, the two commentators took the view that the lack of foresight had not only made the occurrence of a crisis more likely but had also made it impossible to take proper financial policy decisions to deal with the crisis.

However, from a reading of contemporary diagnoses from the 1960s to 1970s on the state of international financial markets, and the resulting potential for the proliferation of economic crises, it is not possible to conclude that contemporaries had not anticipated any sovereign debt crises. Statements such as those made by Sylvia Ostry and Jeremy Morse are thus by no means at odds with today's clearly recognizable benefits of past expectation formation procedures; the impending crisis was being widely discussed from 1977 onward at the latest (see for example Kindleberger 1978). It thus appears that the worldview was not inadequate in terms of its ability to predict a potential crisis. Yet these forecasts evidently did not establish sufficient political willingness to take action at the time, or at the very least contemporary political decision-making processes were unable to prevent future crises. Decisions reached by actors were characterized in particular by the desire to convert the economic uncertainty, which was often perceived as being particularly acute, into a calculable risk. This may have been due to a number of reasons. One specific reason will be discussed in greater detail in this chapter, specifically the relationship between expectation formation processes relevant for international financial policy cooperation and the repeated decisions not to regulate international financial market transactions. However, considered

from today's perspective, an astonishingly stable result was not only a *de facto* unregulated financial market, but also above all a constantly repeating behavioral routine that has persisted until today: debt rescheduling.

With the IMF, the chapter will concentrate on an organization the mission of which is to determine the global economy's susceptibility to crises and to offer advice in an emergency, or even propose relevant national regulations. It will also examine the Bank for International Settlements (BIS) and to lesser extent also OECD Working Party No. 3 (WP3)—two further organizations performing an important mediating role between governments (in the case of the WP3) and central banks (in the case of the BIS). Striving for the best possible results, all three organizations collect, evaluate, and classify information in order to generate knowledge about potential financial risks. The continuous (re) evaluation of international financial markets, and the search for systemic risk, is one rationale for their existence. If the economic climate is characterized by either acute or anticipated crises, staff at the three organizations as well as government officials seconded to the organizations by their respective political bodies must modify their expectations and actions. The more volatile the financial markets, the more frequently revisions of this nature are required.

After presenting a short overview of the literature and setting out some considerations on how expectation formation in the past within organizations such as the IMF and the BIS could be analyzed by historians, the second section of the chapter will discuss two related questions. It is necessary to consider the instruments that highly specialized experts at international financial organizations use to assess current trends, as well as the particular expectation formation procedures that have been relevant in achieving international policy coordination. Taking as case studies two crisis periods occurring during the last three years of the 1960s and the middle of the 1970s respectively, the third section of this study will examine the extent to which the resulting expectation formation influenced the political decision not to regulate international financial markets (see from another research perspective also Alvarez and Schenk, Chapter 30 in this volume). Finally, the conclusion will gauge the extent to which international crisis interventions in the 1980s were in turn related to expectation formation processes and decision-making mechanisms that emerged during the crises of the 1960s and 1970s, and will assess the longer-term effects arising as a result.

Expectation Formation and Financial Organizations

There is a dearth of studies examining the direct impact of expectation formation within and between financial organizations as well as in dealings with their member countries. Previous publications have largely focused on individual organizations or on recounting the history of crisis interventions (James 1996; Boughton 2001; Toniolo 2005; Gould 2006; Borio, Toniolo, and Clement 2008; Copelovitch 2010). Economic studies examine past macroeconomic trends with a strong dose of hindsight when identifying sovereign debt crises as well as the respective contributions made by international financial organizations, thereby developing solutions for current crises (Cline 1984; Eichengreen and Portes 1989; Krugmann 1989). Commentators in the field of international political economy assess the relevant institutional setting based on theory-driven approaches, with a view to making proposals for improving the existing order or reorienting international financial policy (Tetzlaff 1996; Gilpin 2001).

Depending upon whether authors have a more critical or more positive stance to the matter under investigation, they generally refer to the fact that either the actions of international financial organizations should be regulated by "better rules" (Ruggie 1982; Wood

1986; Helleiner 1996) or that transaction costs could be lowered by accessing information more efficiently (Keohane 1984; Eichengreen 2003). However, neither of these views addresses expectation formation before and during crises, and both assume rational decision-making. Regarding specifically this aspect, research into risk sentiment fundamentally calls into question the concept of rational decision-making. For some time already, studies have argued that risks cannot be objectively identified. Since knowledge of future events is always changing and is also vague and uncertain, according to John Maynard Keynes (1937) it is difficult to calculate statistically when any given event will actually occur. Keynes' view has been endorsed by recent research referring to the fact that subjective factors such as emotions, standards, and values determine what counts as a risk. In this view, there is no such thing as an objective risk (Olsen 2011; Nelson and Katzenstein 2014; and O'Sullivan, Chapter 27 in this volume). Other authors proceed on the assumption that, although risks can be calculated, they do not necessarily follow any objective logic (Daase and Kessler 2007). It is therefore highly disputed whether a clear-cut distinction can be drawn between concepts such as economic uncertainty and risk in the sense of Knight (1921).

Recent research also draws on more recent economic sociological approaches which proceed on the assumption that expectations regarding the future provide a particularly strong motivation to act for operators in capitalist economies (Beckert 2016). Actors have to engage with the open nature of historic situations, as their position is one of economic uncertainty. In order to deal with these challenges in the best possible manner, they collect, assess, and classify information so as to generate knowledge relating to possible risks. Information procurement and knowledge generation are core elements of expectation formation processes. The conclusions that actors infer from the expectations thereby generated constitute the basis for their decision-making. Simply put, the expectation formation process molds actors' experiences, on the basis of which they do and in fact *must* make decisions.

These newer approaches are particularly relevant for the question of practices and long-term trends relating to economic expectation formation within international financial organizations. A specific analysis of developments in global debt policy from an economic history perspective can cast light on the uncertainty of future events that confronted contemporaries. In the post-1945 world, the provision of loans for, by, and to governments was an economic policy goal and was in fact promoted. It was associated with a deluge of documents, debates, and decisions emanating from organizations such as the IMF, the BIS, and the OECD. Based on the empirical material, it is relatively easy to work out how a basic framework would emerge within which contemporaries regarded a specific situation as being risky or uncertain.

Practices of Expectation Formation: In the Office and at Meetings

Expectation formation took place in the offices of research and statistics departments at the BIS and the IMF in Basel and Washington DC or the IMF office in Paris. Here, staffers worked away at their desks with pen and paper, typewriters, and pocket calculators (and increasingly with their own computers from the 1980s onward), as they read, wrote, made phone calls, and systematized their thinking within statements, reports, and statistics. There is no question that the relevant research and country departments, and naturally above all statisticians, at the IMF, the OECD, and the BIS dedicated a great deal of energy and time day in, day out to calculating reliable figures for economic and sectoral processes, enabling

them to draw their own conclusions and develop their own statistics (Coats 1986; Babb 2009; Chwiero 2009). However, it must be noted that throughout the 1960s and right up until the 1990s, the focus of attention lay on describing and qualitatively analyzing specific processes, both in the in-house studies of the BIS and the IMF as well as in publications such as annual reports. The reports and memoranda are invariably replete with statistics and isolated figures concerning changes on the international financial markets. However, the authors intended these to serve more as an illustration of their interpretations of the current position, rather than as a starting point for their diagnoses. They were only ascribed anecdotal relevance.¹

In terms of time, IMF staff dedicated the greatest effort to a specific type of text which was akin to a statement, the so-called “memorandum.” Whenever required, the head of a department, or in many cases also the managing director himself, asked particular staff or a head of department to provide assessments in order to prepare for a meeting a week (or in some cases several weeks) in advance. Staff documented the results of their research in writing and initially circulated the “draft” text within their own departments. After this, they presented it to other colleagues for comments. People then enthusiastically added numerous, handwritten comments to these drafts. After various rounds of revision, the text was generally forwarded to all heads of department, and to the Executive Board.² However, in many cases the managing director did *not* pass on the papers to the Executive Board and member country staff. As a result, staff also made copies themselves and circulated the texts to national finance ministries. This is why they can be found even today, amongst other places, in the UK Treasury or in the Political Archive of the German Foreign Office. Here once again they were copied and circulated in-house, after which handwritten comments were added.³ Memoranda written by staff working in the Monetary and Economic Department at the BIS circulated in a similar manner to those written by IMF staff, although the documentary records provide less information here about the context within which they were written and the channels through which they were distributed. A large number of reports from this body ended up in the files of the IMF’s managing director.⁴

Taking for example an IMF memorandum from July 1973 on the risks of short-term credits for countries’ external debt levels, it features all of the key characteristics that memoranda used as a basis for expectation formation within international financial organizations until into the 1980s. The purpose of the memorandum was to provide an overview of the current situation, in this case the foreign debt of IMF member countries. The aim was to review whether the increase in lending volumes had also led to a change in the conditions under which countries could take on debt. Simply put, the IMF was concerned over a potentially overly lax examination of the creditworthiness of potential debtors by commercial lending banks. With this aim in mind, the memorandum started by presenting a qualitative summary of practices in the distant and recent past on the basis of discussions with commercial banks and national finance ministries. After this, it sketched out the situation prevailing at the time, focusing on individual case studies from different countries, and then finally presented an assessment of how risky the situation presented should be considered to be.⁵

Initiatives to refine the statistics in order to be able to identify possible risks from the data series failed from the 1960s to well into the 1980s. Commercial banks simply refused to centrally collect the relevant data on short-term transactions to other countries. However, due to the lack of available data concerning individual financial market developments, in particular on Eurodollar markets, the authors of the July 1973 memorandum (although

also the authors of other memoranda summarizing and reflecting on comments concerning developments on international financial markets) could do little more than present a narrative overview and qualitatively assess the situation. For this reason alone, the authors described above all market structures and conditions in the recent past along with predictions about their present and their immediate future, pondering the political and macroeconomic risks that could potentially be associated with these. A core focus of arguments was how markets worked and how specific business practices were of benefit, and for whom, and these aspects were also reflected in the structure of memoranda. The memoranda thus adopted an interpretative approach.

As was the case for the July 1973 report, all memoranda were generally based on five source groups. These included first of all reports and publications produced by other multilateral organizations (most frequently the IMF, the BIS, the OECD, and the International Bank for Reconstruction and Development). Second, memoranda and studies from individual central banks were used. In this respect the US Federal Reserve (“the Fed”) played a special role in relation to reports, not because it was a US entity but rather because, in contrast to other central banks, it had its own in-house research department with a long-standing tradition. Third, the reports drew on discussions with and material obtained from commercial banks. A fourth source were articles from specialist publications such as *Euromoney*, *Institutional Investor*, or *The Banker*, and the fifth and final source were academic publications. The reports naturally also considered newspaper articles where relevant. Staff thus collated highly disparate types of texts as well as information obtained from oral discussions and interpreted this material in the light of the prevailing circumstances and the topical issues of the day. IMF memoranda or BIS reports were thus based on adaptive expectation formation, i.e. the ongoing readjustment of knowledge through the incorporation of additional knowledge, or other information gained through reflection. It was not uncommon for the annual reports of the BIS and the IMF to contain phrases such as the following: “One begins here to run into the haze which obscures a clear vision of the future monetary system, since the longer-term practicality of this arrangement must be tested by time.”⁶

Alongside memoranda and brief statements, personal exchanges between delegates of the IMF, the OECD, and central banks at meetings organized by the BIS represented a second pillar of expectation formation. The activities of the BIS focused on monthly meetings of central bankers, which provided a forum for informal, face-to-face discussions concerning the current situation. Delegates from the OECD and the IMF were also invited. On the day before the meetings took place, participants would meet in the late Sunday afternoon to discuss informally and eat and drink together. These discussions were not minuted. The aim of these meetings was less to reach official agreements in order to regulate the financial markets through multilateral or bilateral agreements, than rather to enable unofficial exchanges of information (Toniolo 2005; Chwioroth 2009; Schenk 2020a). Participants in these meetings accordingly recount how they were intended primarily for a relaxed, confidential, unofficial exchange of views on both bilateral and multilateral levels.

Alongside the Basel meeting, from 1964 onwards the OECD’s WP3 provided a second locus for international coordination on financial policy issues (Lennep 1998; Carroll 2013; Yago 2013). This “working party” had been set up three years before as a research group into international payment systems, and met every six to eight weeks (Gyöthen and Volcker 1992). Its activities enhanced competition between the IMF and the OECD, even though the former had not yet been officially charged with the task of monitoring balances

of payments, which it only started to do in 1977 (Cohen 1998). The BIS provided the know-how as well as the necessary data. The WP3 was rather special in terms of its membership, as it included people working not only for the IMF and the BIS but also for central banks and finance ministries (Yago 2017).

Leaving aside the individual measures taken, informal and formal exchanges within the BIS and the WP3 soon took on a life of their own. From the perspective of contemporaries, it morphed from an instrument for solving specific problems in exceptional situations into a helpful routine. However, in this respect these discussions also structured the expectation formation of meeting participants. The monthly BIS meetings (as well as the intermediate meetings at the European office of the IMF or at the OECD in Paris, as well as in Washington DC) not only provided an informal framework within which formal arrangements could be agreed upon if necessary, but also served a further purpose for the participants. They provided a framework for bringing together different impressions of the contemporary situation, and then comparing and contrasting these assessments with one another (Dumouchel 2016). For instance, in 1973, Bank of Canada governor Louis Rasminsky found that the meetings even served “a therapeutic purpose.” For him it was sometimes like “going to a psychiatrist and confessing one’s self-doubts and hearing the confessions of others—a sort of group therapy” (BIS 1980, 200f.).

Arthur A. Coombs (at the time the Vice President of the Federal Reserve Bank of New York and since 1958 Head of the International Department and Special Manager of the Federal Open Market Committee, FOMC) wrote that agreement amongst the participants on how economic crises should be assessed had been reached within discussions in the corridors and backrooms of Basel and Paris. These meant that a cooperative approach could be pursued (Coombs 1976; Fielding 2000; Naef 2019), despite the highly disparate goals of the various G10 countries.⁷ The ongoing, routine, reciprocal exchange of views lowered uncertainty over how the situation should be assessed as well as the potential consequences of the decisions reached. As such, this in itself injected stability into expectation formation as a basis for decisions.

Expectations Formation and Decision-Making during Crises

It is beyond doubt that concepts drawn from economics and the mathematical modelling of expectations were relevant in forming perceptions about what economic policy action should be taken in relation to the transfer of (international) capital flows and/or balances of payments between open economies. However, any model at all first needs to be interpreted with reference to the specific circumstances. This means that potential interventions inferred from concepts and models, as well as norms based on these, were not feasible if the situation was not classified as “appropriate” (even if the position may appear different in retrospect from the perspective of today) (Boughton 2003; Babb 2009; Chwiero 2009). Second, if a situation was considered to be a relevant fit, the interpretation was based on contemporary understandings of the memoranda and statements written by staff in the research and statistics department, as well as the respective country department, of the IMF (Gould 2006; Copelovitch 2010; Chwiero 2012; Clegg 2012). Within day-to-day work, there were also ranges within which decisions could be taken—a selection of options within an accepted response framework typically decided by the senior officials of the BIS or IMF—, whilst the broad conceptual framework (such as for example the premise that the balance of payments should be zero in order to enable growth) remained unchallenged. The crisis year of 1968 provides a good example of this interplay between normative premises and adaptive expectation formation for financial policy decision-making during a crisis.

Currency crises started to become more frequent from the middle of the 1960s. Demand for gold shot up following the devaluation of sterling in November 1967. The London Gold Pool, which the Bank of England had used since 1961 to make coordinated purchases of gold, collapsed in March 1968. It was replaced by a twin-track system for buying and selling gold. The price of gold remained set at \$35 US dollars per ounce for official transactions between central banks, whereas the price for private transactions was set by the market. At this time, there were \$33.8 billion US dollars in circulation abroad, whilst US gold reserves, which guaranteed the dollar's value, had fallen to \$10.9 billion (Metzler 2009). A few months later, social unrest in France unleashed a further currency crisis. The French balance of payments collapsed under the weight of weeks of strikes, capital flight, and the generous pay increases granted in order to end the social conflict. However, President Charles de Gaulle refused to devalue the French franc unilaterally, and unsuccessfully called for a parallel increase in the value of the German mark. Both the franc and the mark came under speculative attacks from August until November 1968 (Schenk 2010; Zoeller 2019; Beroud 2021). Undoubtedly, stabilizing the international currency system took up a large part of actors' attention. From the perspective of BIS and IMF staff as well as members of the OECD WP3, the second half of the 1960s was characterized by both political and economic instability which called for international financial cooperation on an as yet unprecedented scale (Toniolo 2005).

Against this backdrop, the consensus position was that the situation could be calmed down by ending the convertibility of the US dollar into gold and regulating the Eurodollar markets from which the currency crises had originated (Rischbieter 2015; Altamura 2017). Nevertheless, participants in BIS and WP3 meetings decided time and again to stick to the Bretton Woods system and to adopt small-scale, ad hoc solutions that could attract a political majority at Sunday meetings and within the WP3, and that could also be inferred from the adaptive expectation formation in memoranda based on the narrow horizon of the specific situation confronting them.

Participants in these meetings gradually developed the idea of a new international currency facility. The original proposal was based on the findings of a secret working group set up by US President Lyndon Johnson in 1965.⁸ In order to reduce the significance of gold, the working group proposed creating a new international reserve asset at the IMF. The proposal was approved by the BIS and the IMF. So-called "Special Drawing Rights" (SDR) were introduced by the IMF in 1967 (Wilkie 2012). This was followed by further ad hoc initiatives to reduce the US deficit and to keep the system up and running in a makeshift fashion. Trade liberalizations were negotiated within the framework of the G10 by both the Kennedy and Johnson administrations, with the aim of cutting US tariffs and creating incentives for US companies to manufacture in Europe. They also introduced capital controls in order to limit capital outflows from the USA (Coppolaro 2013). In parallel, the US government even resorted to military pressure to secure concessions from its allies. For example, it forced Germany to agree to compensation arrangements to cover the costs of the US troops based in the country, and to relinquish its ability to convert US dollars into gold (Zimmermann 2002; Gavin 2004).

All of these decisions were aimed at achieving ad hoc solutions in response to the facts on the ground. As such, they were largely dependent on individual decision-makers as well as the particular time when they were taken. At the same time, they disregarded theoretical models concerning the interplay between financial market speculation and fixed exchange rates (Triffin 1960). The free convertibility of dollars into gold and fixed exchange rates

continued to provide the normative reference framework, even though interpretations of the situation and the measures that appeared necessary to contemporaries would be very difficult to reconcile with the objectives of the Bretton Woods theoretical mainstay (Cesarano 2006; Steil 2013). The Nixon shock of 1971 and a free-floating German mark did not undermine optimism regarding the potential for international financial cooperation as well as the largely positive basic attitude (which was however seldom voiced in public) toward Eurodollar markets over the following years. It was only around the middle of the 1970s, following the Herstatt crisis in 1974 (and the almost unpublicized crisis that broke out in New York at the same time), the dollar glut, foreign exchange speculation, and rising debt levels, that the previous approach of simply conducting detailed examinations and collecting information was recognized to be no longer adequate on its own.

From mid-1974 to mid-1975, OECD countries experienced the worst recession since the end of the Second World War. A crisis sentiment also became widespread amongst the general public (Cooper 2011). Although in the end the crisis did not unfold as severely as anticipated, expectation formation was changed by the summer of banking crises as well as the oil price shock and its consequences. However, this does not mean that IMF and BIS staff and WP3 participants began to assess the Eurodollar market and rapidly increasing debt levels as representing a risk (or an increased risk). New approaches to expectation formation gradually started to be accepted internally at the IMF in response to the crises during the first half of the decade, and also in view of the increasing need for economic models for open economies with floating exchange rates. An example of this may be found in the “Economic Outlook” of the IMF, which was circulated internally only throughout the 1970s. The outlook typically involved an assessment of global economic trends, forecasts, and potential risks; here, the body of experience used to drive economic expectation formation was gleaned both from the past as well as the present (Boughton 2001; Lenel 2023). In addition, older theoretical approaches to the fiscal or monetary policy of economies involved in international trade were now revised. At the same time, the second half of the 1970s saw lively discussions amongst BIS and IMF staff concerning the issue as to whether and how the concept of rational expectation formation should play any role within their everyday diagnoses. Ultimately, rational expectations became a constant feature of control models and crisis projections. However, this was meant not so much as a reference to Robert Lucas and neo-classical macroeconomics, but rather to a strand of neo-Keynesian positions promoted by the International Economics School under Rüdiger Dornbusch at Massachusetts Institute of Technology (MIT) (Dornbusch 1976; Mankiw 1992; Rogoff 2001).

In many respects, the oil price shocks, petrodollar recycling, and bank failures during 1974 also had effects on expectation formation processes within research and statistics departments. However, it is important to note that, until the end of the decade, the new processes, which centered on mathematical forecasting, did not have any recognizable impact on the decision not to pursue any political action against sharply rising public debt levels in OECD countries, and above all in African and Latin American countries, via the Eurodollar market. Decisions continued to be focused on the conclusions set out in memoranda.

Although IMF staff had been noting a sharp rise in borrowing levels since the start of the decade, and spent the following years puzzling over the precise causes for this, they did not unequivocally criticize this outcome, and forecasts continued to look optimistically to the future. In principle, there was an alignment between the interests of commercial banks, the way in which the Eurodollar market operated (which was considered to be efficient), and development policy goals. The IMF thus actively supported syndicated loans within the ambit

of co-financing arrangements, setting up an “oil credit line,” enabling oil-importing countries with negative balances of payments to request additional funds to cover the costs of rising oil prices. All of these considerations shared the characteristic feature that the Eurodollar market was regarded as a dynamically growing international financial market, and not as a systemically stabilizing (or also systemically destabilizing) factor for particular countries or the commercial banks operating in them. As such, both academic research and practical analyses within the IMF, the OECD, or the BIS barely focused on it (Rischbieter 2015).

Thus, until the last third of the 1970s few analyses focused on current developments, using them rather as a starting point for conducting specific risk analyses in relation to future crises.⁹ Even the February 1975 meeting of the OECD WP3 was dedicated mainly to OPEC profits and recycling them through public loans. Conceiving of these as “triangular flows,” participants seemed unable to anticipate what might happen in the future. They therefore considered whether the WP3 should engage more closely with the phenomenon, although nonetheless concluded that the problem would sort itself out in the future. They based their decision on a forecast of OPEC profits over the following five and ten years (until 1980 and 1985 respectively), which had been prepared by the OECD for this meeting. However, these forecasts were based on the specific assumption that the price of oil would remain unchanged, “because in conditions of uncertainty it is easiest to assume ‘no change’.”¹⁰

The more uncertain the present, the “more stable” the figures used as a basis for forecasts and decision making should be. Expectation formation during uncertain times was thus, paradoxically, explicitly grounded in anticipation of a future in which fundamental data were identical to those of the present. Moreover, since the price of oil had risen from \$22 to \$63 US dollars per barrel only a year and a half before, in pursuing this approach it would appear that the authors of the report did not incorporate experiences from their own recent past into expectation formation. It is likely that they considered the price of oil over the previous two years, as against oil prices since the Second World War, to be an anomaly.

However, it was only nine months later that the quarterly report of the BIS Monetary and Economic Department rejected the forecast that the Eurodollar market had passed its peak. According to this report, money was only just starting to seek out new pathways (BIS Archives 1976, 3).¹¹ The BIS report described rather dryly a trend that had been long in the making, but was only starting to crystallize at this point in time, and would persist into the future. Eurodollar transactions were now increasingly being processed through the offshore subsidiaries of commercial banks based in Paris, London, and New York. Singapore in particular stood out, being preferred due to its (from a banking perspective) favorable tax and investment regulations (Seung Woo 2018; Schenk 2020b).

Having lost the overview of how the Eurodollar market was actually working, whilst activity on the market was rapidly increasing, the WP3 was forced to revisit the bases for its forecasting. It now sought to cooperate with the IMF and the research department of the OECD, reviewing the substantive assertions made in its text concerning the potential significance of its forecasts in the light of the uncertainty. In 1977 the WP3 held a total of five meetings to discuss rising levels of public debt. It was no longer meeting exclusively in Paris, but also met twice in Washington DC, including on one occasion at the IMF. Confronted with rising uncertainty, the former competition between the organizations gradually transformed into an increasing readiness to cooperate. However, the key change lay in how OECD staff prepared information material for meeting participants. The documents now indicated a number of possible scenarios, which were referred to as “key assumptions.” These assumptions were

presented alongside one another in the text without any preference displayed in favor of any of them, and it was left to meeting participants to assess them through discussions at the meetings, and where appropriate to draw on individual assumptions (or combinations of assumptions) when making their own assessments of potential risks.¹² In addition, the material not only clearly marked the different key assumptions but also presented different forecasting periods. However, the forecast stretching furthest into the future only covered the following two years, and no longer the following five or ten years. This engagement with multiple scenarios coupled with the shortening of forecasting timeframes entailed a significant departure from previous practice. As a result, within just one year, forecasts lost their dominant role in the WP3 decision-making process. If optimistic future forecasts had provided the sole basis for decision-making until 1975, it was now up to meeting participants to come up with their own forecasts through discussions with one another and based on their own interpretation of the situation, taking account of the various scenarios.

The IMF also experienced a rapid course correction in 1976/1977. However, this did not affect the way in which situations were considered, as they continued to be assessed optimistically. By contrast, it was the criteria used to justify these assessments that changed: when confronted with a renewed increase in Eurodollar market activity, which was regarded as something of a mystery, a June 1976 report on the Eurodollar market used an absolutely unusual criterion for justifying why the situation should nonetheless be assessed in a positive light. The final section entitled “Outlook” stated: “In general, the situation in the international financial markets seems to be psychologically better now....”¹³

However, practically nobody engaged systematically with the issue of which potential crises might arise out of the situation prevailing at that time. As a result, nobody anticipated any specific crisis scenarios between 1974 and 1977 or any solutions based on such forecasts (see also Lenel and Reichmann, Chapter 16, and Alvarez and Schenk, Chapter 30 in this volume). However, from this point onward all observers had major concerns not only about debt levels but also about the related issue of the constant rolling over of debts, which became more prevalent as debt levels increased. This was noted in the first few paragraphs of an IMF memorandum drawn up in May concerning the situation. The three authors stated that their comments were based on “opinions.” The choice of word was intended to stress the fact that the core issue under examination was exclusively individual assessments of the current situation. Demand in OECD countries was considered to be 80 percent responsible for the boom, and the authors of the report were openly concerned about the consequences that this could have for other countries. They took the view that non-OECD countries were already perennially over-indebted, as their economic output was not sufficiently high to service existing debts.¹⁴ Nonetheless, no political action was taken, as in particular OECD country central banks considered the existence of Eurodollar markets to be beneficial. The G10 also endorsed this viewpoint on the back of the second oil price crisis and the new round of “petrodollar recycling” through Eurodollar markets (Braun, Kampf, and Murau 2021). Although from mid-1977 onward there was general talk of a coming crisis, the increasingly pessimistic assessments of the immediate future were not sufficient to trigger greater changes. And yet the crisis hit in the summer of 1982.

Conclusion

Looking back, writers speak largely with one voice as regards the causes of the 1980s debt crisis. There was not yet any academic discussion of sovereign debt crises triggered

by private borrowing that the IMF or the BIS could have used as a guide, and this debate would only start to emerge during the crisis. However, contemporaries needed to find a solution, including those working for the IMF, whose time finally appeared to have come with a new clarity about the IMF's role in monitoring and overcoming crises. It can therefore be concluded without any doubt that the situation from the autumn of 1982 offers a blueprint for analyzing whether contemporaries drew on any of the expectation formation processes mentioned above. Answering this is quite straightforward, although not clear-cut in terms of the actual answer (which is thus analytically unsatisfactory): between 1982 and 1989 analysts relied to different extents on known expectation formation processes and crisis intervention strategies based on them.

Decisions were initially taken quickly, on the assumption that not much time was available, and these were moreover closely tied to the situation prevailing at the respective time they were taken. Months passed without any improvement, and the assessments contained in memoranda and reports fluctuated strongly, as they had previously done during the mid-1970s crisis years. Also, within this context, the adaptive process of expectation formation as the preferred approach, which was strongly influenced by the acute circumstances of the time, resulted in actors constantly adapting the assessments contained in their analyses in line with new developments (Rischbieter 2015). On a substantive level, the method thus to some extent resulted in highly disparate information and interpretations of the situation within a very short period of time. No substantially new paths were embarked upon during subsequent years, with actors simply adhering to established processes that did not point towards any new solutions. Behavioral routines in place since the 1960s continued to be stoically applied. The only political answers were provided by bilateral and multilateral swaps and the permanent rolling over of loans (Schenk and McCauley 2020).

However, the action taken on this basis ended up making increasingly less sense, as the anticipated effects did not actually arise. These results led to the emergence of an environment that catalyzed academic research into sovereign debt crises, which in turn raised justified criticisms based on new insights into the approaches previously chosen (Rischbieter 2015). However, the political opinion process proved to be more important than new approaches to the analysis foreign debt in general and sovereign debt crises in particular: it was only after the major banks had slowly but surely written off their losses that, under the additional pressure caused by the stock market crash of 1987, a political majority emerged within OECD countries that emphatically favored interventions to change the structures of sovereign debt practices (conversion of loans into bonds) (James 1996; Boughton 2001).

Two structures with longer-term effects can be identified from the perspective of this approach to the relationship between expectation formation and decision-making processes. First of all, everyday operations were structured by adaptive expectation formation and the routine of international exchanges of views, which however at the same time prevented a complete overhaul of concepts, practices, and routines. The method of seeing the world in terms of numbers and series of data was incorporated into normative behavioral standards of multilateral cooperation as well as the temporal constraints of bureaucratic routines. In addition, tried and tested channels for communication also represented an essential prerequisite for decision-making. Over time, their stable and repeated usage created political behavioral routines of discussion and agreement. During the 1960s, the knowledge obtained through adaptive expectation formation within memoranda and at regular international meetings shifted views on what could be regarded as politically practicable and functional only at an extremely slow pace under the persistent pressure exerted

by one currency crisis after another. Nonetheless, Bretton Woods continued to provide the normative reference framework, even though interpretations of the situation and the measures that appeared necessary to contemporaries would be very difficult to reconcile with the objectives of the Bretton Woods theoretical mainstay. The decisions not to regulate the Eurodollar market were taken without any consideration either of new or old theoretical knowledge, or of models falling outside the clear boundaries of the Bretton Woods system.

Secondly, although throughout the 1970s econometric approaches increasingly attracted attention and the concept of “rational expectations” was embraced by research departments at the IMF and the BIS, at the same time event-specific qualitative analyses of the contemporary situation that assessed past developments continued to prevail. From mid-1974 to mid-1975, OECD countries experienced the worst recession since the end of the Second World War. The recovery in the major countries only started to be felt in the second half of 1975. At the same time, inflation shot up to record peacetime highs in many countries. The abstract reductionism of macroeconomic models was unable to portray the interaction between economic, social, cultural, and political factors. In order to be able to model on this large scale, a number of variables had to be factored out; however, precisely these variables had been developing in an extremely dynamic fashion in the 1970s. Expectation formation during uncertain times was thus, paradoxically, to a large extent explicitly grounded in anticipation of a future in which fundamental data were identical to those of the present. However, from 1976 onwards, memoranda and the assessments made at meetings started to diverge significantly even after a relatively short period of time, in spite of the fact that they originated from the same departments in the same organizations. This extremely high level of differential diagnosis continued for almost three years, even though from the middle of 1977 there were repeated discussions of a potential impending debt crisis.

Considered from this perspective, processes of expectation formation can be understood as social processes in which practices of adaptive expectation formation, and behavioral routines for coordination, both act as factors stabilizing expectations. These two factors operate according to slow dynamics and are stable over the medium term. Indeed, they must both be present at the same time in order to remain practicable for the everyday business of thinking, coordinating, and deciding in the sense of being workable and functional. However, considered from today's perspective, over the long term they resulted in a preference of intervening not much or hardly at all, so that smaller readjustments are chosen over large-scale measures. In political terms, an astonishingly stable result was not only a *de facto* unregulated financial market, but also above all a constantly repeating behavioral routine: debt rescheduling.

During the crises occurring between 1982 and 2014, decisions reached by actors were characterized in particular by the desire to convert economic uncertainty, which at this time was perceived as being particularly acute, into calculable risk. If sovereign debt crises are repeatedly conceptualized as exceptions (or as being caused solely by the mismanagement of individual governments, particular banks, or anonymous speculators), it makes sense that governments and staff working within finance ministries, central banks, and multilateral organizations tend to maintain the mechanism of permanent rescheduling for as long as possible. This keeps the practice of permanent indebtedness alive and drives forward financialization. Larger questions concerning systematic susceptibility to crisis are thus overlooked. Similarly, financial market regulation in the sense of limiting financial services during times of crisis will consistently appear to be undesirable if debt rescheduling is regarded as the preferred approach to dealing with a crisis.

Notes

- 1 Until the late 1970s, highly aggregated data sets on OECD countries alone were available, and sometimes some patchy data series on non-OECD countries; see the BIS and IMF annual reports from the 1960s to the 1980s. Thus also the IMF Economic Outlook.
- 2 This process can be traced in almost any file created by a senior staff. See, for example, the files of Jacques J. Polak, in: IMF Archives, Washington DC, USA, 132601 Jacques J. Polak Papers, 105629 Chronological Files, 16459; for a later point in time IMF Archives, Washington DC, USA, 24725 European Department Records, 91852 European Department Divisions Files 1947–1994, 91859 EUR Division Subject Files, 104168 The Adjustment Process.
- 3 As an example, see Bank of England Archives, London, UK, International Division Files, 3A143, Possible Consequences of a Default by a Major Borrowing Country, December 30, 1977–July 1982; or the files of the British Treasury: The National Archives, Kew, Richmond, UK, Public Record Office, HM Treasury, Overseas Finance Sector, International Monetary Division, T385/105.
- 4 As an example, we refer to the following series of files: IMF Archives, Washington, DC, USA, 2523 Office of the Managing Director Records, 547 Jacques de Larosière Papers 1968–1987, 36774 OMD Chronological Files.
- 5 IMF Archives, Washington DC, USA, 865759: Executive Board Documents, 169347: Staff Memoranda, 195157 1973 Staff Memoranda, 197788: SM/73/166, Short Term Credits and External Debt Management, prepared by the Exchange and Trade Relations Department in consultation with the Area Departments and the Treasurer Department, July 11, 1973.
- 6 BIS, *Annual Report* 1968, 199.
- 7 The Group of Ten (G10), established in 1962 as an informal forum of finance ministries and central banks of industrialized countries, served as a platform for discussing the international monetary system through the 1960s and 1970s.
- 8 National Archives and Records Administration, College Park, Maryland, US, November 6, 1965. Department of the Treasury, Office of the Under Secretary for Monetary Affairs, A1–952.
- 9 Almost clairvoyant: United States Senate, “Hearing before the Permanent Subcommittee on Investigations of the Committee on Government Operations, *Recycling of Petrodollars*, 16.10.1974, Washington DC 1974,” 3.
- 10 OECD Archives, Paris, France, February 17, 1975. DES/NI (75) 1, “The Medium-Term Balance of Payment Implications of the Oil Situation (Note by the Secretariat),” 2.
- 11 “Die Entwicklung des Eurogeldmarktes und des internationalen Bankgeschäftes auf breiter Basis—zweites Quartal 1976,” 3, Währungs- und Wirtschaftsabteilung, BIS Archives, Basel, Switzerland, November 16, 1976.
- 12 “The Future Pattern of Current Balances and Their Financing, Paris,” 1, CPE/WP3(77)1, Working Party No. 3 of the Economic Policy Committee, OECD Archives, Paris, France, February 15, 1977.
- 13 IMF Archives, Washington DC, USA, 169321 Executive Board Documents, 169347 Staff Memoranda, 179629 1976 Staff Memoranda, 182058 SM/76/138, “Paper prepared by the Staff Team to the Executive Directors, International Banking—Recent Developments and Present Outlook,” June 24, 1976, 12.
- 14 IMF Archives, Washington DC, USA, 169321 Executive Board Documents, 169347 Staff Memoranda, 221403 1977 Staff Memoranda, 225994 SM/77/111, “International Banking and Bond Markets. Recent Developments and Prospects for 1977, prepared by a Staff Team,” May 11, 1977.

Archival Sources

Bank of England Archives, London, UK. International Division Files.
BIS Archives, Basel, Switzerland. Währungs- und Wirtschaftsabteilung.
IMF Archives, Washington, DC, USA:
132601 Jacques J. Polak Papers
24725 European Department Records
2523 Office of the Managing Director Records, 547 Jacques de Larosière Papers 1968–1987
865759 Executive Board Documents
95157 1973 Staff Memoranda
197788 SM/73/166, Short Term Credits and External Debt Management

169321 Executive Board Documents

169347 Staff Memoranda

179629 1976 Staff Memoranda

182058 SM/76/138

221403 1977 Staff Memoranda

225994 SM/77/111 National Archives and Records Administration, College Park, MD, USA.

Department of the Treasury

National Archives, Kew, Richmond, UK. Public Record Office, HM Treasury, Overseas Finance Sector.

OECD Archives, Paris, France.

References

- Altamura, Carlo E. 2017. *European Banks and the Rise of International Finance. The Post-Bretton Woods Era*. London: Routledge, Taylor & Francis Group.
- Babb, Sarah. 2009. *Behind the Development Banks. Washington Politics, World Poverty, and the Wealth of Nations*. Chicago, IL: University of Chicago Press.
- Bank for International Settlements (BIS), ed. 1980. *Personal Recollections and Opinions*. Published on the Occasion of the Fiftieth Anniversary 1930–1980. Basel: BIS.
- Beckert, Jens. 2016. *Imagined Futures. Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Beroud, Samuel. 2021. “Beyond the Great Depression? The Transformation of Western Economic Policies, 1969–1985.” *Doctoral dissertation, Université de Genève*. DOI: 10.13097/archive-ouverte/unige:160720.
- Borio, Claudio E. V., Gianni Toniolo, and Piet Clement, eds. 2008. *Past and Future of Central Bank Cooperation*. Cambridge: Cambridge University Press.
- Boughton, James M. 2001. *Silent Revolution. The International Monetary Fund 1979–1989*. Washington, DC: International Monetary Fund.
- Boughton, James M. 2003. “On the Origins of the Fleming-Mundell Model.” IMF Staff Papers 50, no. 1: 1–9. URL: <https://www.imf.org/External/Pubs/FT/staffp/2003/01/bough.htm>.
- Braun, Benjamin, Arie Kampf, and Steffen Murau. 2021. “Financial Globalization as Positive Integration. Monetary Technocrats and the Eurodollar Market in the 1970s.” *Review of International Political Economy* 28, no. 4: 794–819.
- Carroll, Peter, and Aynsley Kellow. 2013. *The OECD. A Study of Organizational Adaptation*. Northampton: Edward Elgar Publishing.
- Cesarano, Filippo. 2006. *Monetary Theory and Bretton Woods. The Construction of an International Monetary Order*. Cambridge: Cambridge University Press.
- Chwieroth, Jeffrey M. 2009. *Capital Ideas. The IMF and the Rise of Financial Liberalization*. Princeton, NJ: Princeton University Press.
- Chwieroth, Jeffrey M. 2012. “The Silent Revolution. How the Staff Exercise Informal Governance over IMF Lending.” *The Review of International Organizations* 8, no. 2: 265–290.
- Clegg, Liam. 2012. “Global Governance behind Closed Doors. The IMF Boardroom, the Enhanced Structural Adjustment Facility, and the Intersection of Material Power and Norm Stabilisation in Global Politics.” *The Review of International Organizations* 7, no. 3: 285–308.
- Cline, William R. 1984. *International Debt. Systemic Risk and Policy Response*. Washington, DC: Peterson Institute for International Economics.
- Coats, Alfred W., ed. 1986. *Economists in International Agencies. An Exploratory Study*. New York: Praeger.
- Cohen, Benjamin J. 1998. “When Giants Clash. The OECD Financial Support Fund and the IMF.” In *Institutional Designs for a Complex World. Bargaining, Linkages and Nesting*, edited by Vinod K. Aggarwal, 161–192. Ithaca, NY: Cornell University Press.
- Coombs, Charles A. 1976. *The Arena of International Finance*. New York: Wiley.
- Cooper, Andrew Scott. 2011. *The Oil Kings. How the U.S., Iran, and Saudi Arabia Changed the Balance of Power in the Middle East*. New York: Simon & Schuster.

- Copelovitch, Mark S. 2010. *The International Monetary Fund in the Global Economy. Banks, Bonds, and Bailouts*. Cambridge and New York: Cambridge University Press.
- Coppolaro, Lucia. 2013. *The Making of a World Trading Power. The European Economic Community (EEC) in the GATT Kennedy Round Negotiations, 1963–67*. Farnham and Burlington, VT: Ashgate Publishing.
- Daase, Christopher, and Oliver Kessler. 2007. “Knowns and Unknowns in the ‘War on Terror.’ Uncertainty and the Political Construction of Danger.” *Security Dialogue* 38, no. 4: 411–434.
- Dornbusch, Rudiger. 1976. “Exchange Rate Expectations and Monetary Policy.” *Journal of International Economics* 6, no. 3: 231–244.
- Dumouchel, Joëlle. 2016. “Regulating International Finance: The Genesis and Transformation of Central Banking Practice.” Doctoral diss., University of Toronto. URL: <https://hdl.handle.net/1807/72959>.
- Eichengreen, Barry J. 2003. *Capital Flows and Crises*. Cambridge, MA: MIT Press.
- Eichengreen, Barry J., and Richard Portes. 1989. *Dealing with Debt. The 1930s and the 1980s*. Washington, DC: National Bureau of Economic Research.
- Fielding, Jeremy R. 2000. “The Currency of Power. Anglo-American Economic Diplomacy and the Making of British Foreign Policy, 1964–1968.” PhD diss., Yale University.
- Gavin, Francis J. 2004. *Gold, Dollars, and Power. The Politics of International Monetary Relations, 1958–1971*. Chapel Hill, NC: University of North Carolina Press.
- Gilpin, Robert. 2001. *Global Political Economy. Understanding the International Economic Order*. Princeton, NJ: Princeton University Press.
- Gould, Erica R. 2006. *Money Talks. The International Monetary Fund, Conditionality, and Supplementary Financiers*. Stanford, CA: Stanford University Press.
- Gyothén, Toyoo, and Paul A. Volcker. 1992. *Changing Fortunes. The World’s Money and the Threat to American Leadership*. New York: Times Books.
- Helleiner, Eric. 1996. *States and the Reemergence of Global Finance. From Bretton Woods to the 1990s*. Ithaca, NY: Cornell University Press.
- James, Harold. 1996. *International Monetary Cooperation since Bretton Woods*. Washington, DC: International Monetary Fund.
- Keohane, Robert Owen. 1984. *After Hegemony. Cooperation and Discord in the World Political Economy*. Princeton, NJ: Princeton University Press.
- Keynes, John M. 1937. “The General Theory of Employment.” *The Quarterly Journal of Economics* 51, no. 2: 209–223.
- Kindleberger, Charles. 1978. *Manias, Panics, and Crashes. A History of Financial Crisis*. New York: Basic Books.
- Knight, Frank. 1921. *Risk, Uncertainty and Profit*. Boston, MA and New York: Houghton Mifflin Company.
- Krugman, Paul R. 1989. “Market-Based Debt-Reduction Schemes.” In *Analytical Issues in Debt*, edited by Jacob A. Frenkel, Michael P. Dooley, and Peter Wickham, 258–279. Washington, DC: International Monetary Fund.
- Lenel, Laetitia. 2023. “Economists as Storytellers: Scenario Drafting at the International Monetary Fund.” *History of Political Economy* 55, no. 3: 577–603.
- Lennep, Emile van. 1998. *Working for the World Economy*. Amsterdam: NIBE.
- Mankiw, Gregory. 1992. “The Reincarnation of Keynesian Economics.” *European Economic Review* 36, no. 2–3: 559–565.
- Metzler, Allan H. 2009. *A History of the Federal Reserve. Volume 2, Book 2, 1970–1986*. Chicago, IL: University of Chicago Press.
- Morse, Jeremy. 1985. *Do We Know Where We’re Going?* Washington, DC: Per Jacobsson Foundation.
- Naef, Alain. 2019. “Sterling and the Stability of the International Monetary System, 1944–1971.” PhD diss., University of Cambridge. DOI: 10.17863/CAM.32540.
- Nelson, Stephen C., and Peter J. Katzenstein. 2014. “Uncertainty, Risk, and the Financial Crisis of 2008.” *International Organization* 68, no. 2: 361–392.
- Olsen, Robert A. 2011. “Financial Risk Perceptions. A Behavioral Perspective.” In *Advances in Entrepreneurial Finance*, edited by Rassoul Yazdipour, 45–67. New York: Springer Science + Business Media.

- Ostry, Sylvia. 1984. "OECD Economic Outlook. How We Got Here and Where We're Headed." *Journal of Business & Economic Statistics* 2, no. 2: 105–109.
- Rischbieter, Laura. 2015. "Risiken und Nebenwirkungen. Internationale Finanzstrategien in der Verschuldungskrise der 1980er Jahre." *Geschichte und Gesellschaft* 41, no. 3: 465–493.
- Rogoff, Kenneth. 2001. "Dornbusch's Overshooting Model after Twenty-Five Years." Second Annual IMF Research Conference Mundell-Fleming Lecture, November 29, 2001. URL: <https://www.imf.org/en/News/Articles/2015/09/28/04/53/sp112901>.
- Ruggie, John Gerard. 1982. "International Regimes, Transactions, and Change. Embedded Liberalism in the Postwar Economic Order." *International Organization* 36, no. 2: 379–415.
- Schenk, Catherine R. 2010. *The Decline of Sterling. Managing the Retreat of an International Currency, 1945–1992*. Cambridge: Cambridge University Press.
- Schenk, Catherine R. 2020a. "Regulatory Foundations of Financialisation. May Day, Big Bang and International Banking, 1975–1990." *Financial History Review* 27, no. 3: 397–417.
- Schenk, Catherine R. 2020b. "The Origins of the Asia Dollar Market 1968–1986. Regulatory Competition and Complementarity in Singapore and Hong Kong." *Financial History Review* 27, no. 1: 17–44.
- Schenk, Catherine R., and Robert N. McCauley. 2020. "Central Bank Swaps Then and Now. Swaps and Dollar Liquidity in the 1960s." BIS Working Paper No. 851. URL: <https://www.bis.org/publ/work851.htm>.
- Seung Woo, Kim. 2018. "The Euromarket and the Making of the Transnational Network of Finance 1959–1979." PhD diss., University of Cambridge. DOI: 10.17863/CAM.23876.
- Steil, Benn. 2013. *The Battle of Bretton Woods. John Maynard Keynes, Harry Dexter White, and the Making of a New World Order*. Princeton, NJ: Princeton University Press.
- Tetzlaff, Rainer. 1996. *Weltbank und Währungsfonds. Gestalter der Bretton-Woods-Ära. Kooperations- und Integrations-Regime in einer sich dynamisch entwickelnden Weltgesellschaft*. Wiesbaden: Leske + Budrich.
- Toniolo, Gianni. 2005. *Central Bank Cooperation at the Bank for International Settlements. 1930–1973*. Cambridge: Cambridge University Press.
- Triffin, Robert. 1960. *Gold and the Dollar Crisis. The Future of Convertibility*. New Haven, CT: Yale University Press.
- Wilkie, Christopher. 2012. *Special Drawing Rights (SDRs). The First International Money*. Oxford: Oxford University Press.
- Wood, Robert E. 1986. *From Marshall Plan to Debt Crisis. Foreign Aid and Development Choices in the World Economy*. Berkeley, CA: University of California Press.
- Yago, Kazuhiko. 2013. *The Financial History of the Bank for International Settlements*. London: Routledge.
- Yago, Kazuhiko. 2017. "A Crisis Manager for the International Monetary and Financial System? The Rise and Fall of the OECD Working Party 3, 1961–1980." In *The OECD and the International Political Economy Since 1948*, edited by Matthieu Leimgruber, and Matthias Schmelzer, 185–208. Cham: Palgrave Macmillan.
- Zimmermann, Hubert. 2002. *Money and Security. Troops, Monetary Policy and West Germany's Relations with the United States and Britain, 1950–1971*. Washington, DC and Cambridge: Cambridge University Press.
- Zoeller, Christoffer J. P. 2019. "Closing the Gold Window. The End of Bretton Woods as a Contingency Plan." *Politics & Society* 47, no. 1: 3–22.

MONETARY SHOCKS

Business Expectations at the Beginning and End of Two Gold-Based Currency Regimes

Jan-Otmar Hesse and Sebastian Teupe

Monetary Shocks and Expectations

Economic shocks or crises are moments of uncertainty. For economic actors, they accentuate the problem of gathering relevant information and choosing the correct model for decision-making (on information procurement and expectation formation, see also Nützenadel and Streb, Chapter 8, Fritsche and Döpke, Chapter 9, and Rischbieter, Chapter 28 in this volume). Economic and historical research has been interested in different ways in the interrelationship between crises and expectations. Are overly pessimistic expectations fuelling crises (see O’Sullivan, Chapter 27 in this volume)? Do optimistic expectations create conditions for “manias” that are followed by crashes (Kindleberger 1978)? Are economic crises capable of changing rules and structures of expectation formation in some fundamental way (Siegenthaler 1993; see also Rischbieter, Chapter 28 in this volume)?

Monetary shocks relate to a particular kind of economic crisis. They can be broadly defined as unexpected changes in prices that affect the firms’ view of the economy and their investment decisions. Today, in a world of powerful central banks and fiat currencies, monetary shocks are often caused by central bank policy (Christiano and Eichenbaum 1996; Ganley and Salmon 1997). Given the effects of monetary shocks on modern economies, economic theory has become increasingly interested in how decisions made by central banks are communicated and how economic actors react. The role of expectations is increasingly considered crucial. Not the price signal and the policy “shock” themselves change inflation rates and economic behaviour, modern theory claims; rather, inflation expectations of economic actors determine investment and consumption decisions as well as inflation (Binder and Kamdar 2022). Thus, credible commitment, communication, and “signalling” have become important tools for managing currencies (on central bank communication strategies, see Dräger, Chapter 12 in this volume). For most economic actors—it is assumed—central bank communication is just as important for expectation formation as statistics on the money supply and business forecasts. Modelling and tracking the role of information about monetary policy in the expectation formation of consumers and firms has made significant progress in recent years, questioning the established paradigm of rational expectations (see Born, Enders, and Müller, Chapter 10 in this volume).

In the past, however, central banks have played a much more limited role in influencing inflation expectations (Singleton 2011). In the nineteenth century, monetary shocks were the result of gold and silver discoveries (Barsky and de Long 1991) or politically motivated changes in currency laws (Friedman 1990). During the existence of the Bretton Woods system, monetary shocks were triggered by political decisions about exchange rate adjustments (Schenk 2011). The “exogenous” factors relevant for inflation expectations went well beyond the control of central banks, and were political as well as economic. Thus, many of our theoretical insights with regards to inflation expectations and monetary shocks depend on the existence of a monetary system that has historically not been the norm. How did monetary shocks in the past change expectations of economic actors in the absence of a powerful, independent, and credible central bank? Did firms perceive monetary policy as a distinct sphere that was exogenous and that could signal future developments? Or was there a mutual interrelation?

This chapter focuses on two historical episodes that mark the beginning and the end of a global gold-based currency regime. The first part focuses on the monetary shock of the “Great Deflation” between 1873 and 1896 which resulted from the decision of the German Empire (the *Kaiserreich*), the United States, and other countries to adopt gold as a currency standard, initiating the “classical” gold standard. The second part discusses the unravelling of the Bretton Woods system in the early 1970s when the Federal Republic of Germany (West Germany), among other countries, decided to give up gold parity and permanently let the Deutschmark float against the US dollar in 1973. Both periods are usually considered as periods of great economic stability. However, the classical gold standard as well as the Bretton Woods system confronted economic actors with monetary uncertainties that greatly depended on political decision-making. Our focus is particularly on corporations in the United States and West Germany to understand how, and to what extent, the monetary shocks were related to business expectations and preferences.

How businesspeople adjusted their expectations to monetary shocks in the past has been studied surprisingly little. Much of the evidence depends on information from financial markets or newspaper accounts, and is often solely related to the Great Depression (e.g., Romer and Romer 2013; O’Sullivan, Chapter 27 in this volume). Household surveys are of little use for a business history perspective, and systematic surveys of business inflation expectations do not date back very far (Binder and Kamdar 2022). We discuss two examples for which the relation between monetary shocks and the expectations of entrepreneurs can be studied in greater detail. For the United States in the nineteenth century, we focus on American railway managers and their attitude towards the US gold standard. For West Germany in the 1970s, we focus on German export entrepreneurs and their attitude towards the change to a floating exchange rate regime.

American Railroads and the “Great Deflation” of the Late Nineteenth Century

The Gold Standard, Economic Crises, and Calls for Monetary Reform

The economic history of the Western world in the final decades of the nineteenth century is rife with ambiguities. On the one hand, industrial production skyrocketed, and real wages increased considerably. The rapid construction of railway lines and steamships brought globalization into full swing, adding considerably to economic growth (Findlay

and O'Rourke 2007). Throughout the period, firms in the US, Great Britain, and Germany enjoyed a high degree of political stability. On the other hand, financial and economic crises became pervasive global problems. A major financial panic hit the world in 1873. In 1893, another economic crisis broke out. In between the two crises, prices never fully recovered. The period was marked by business complaints, cartelization, the building of trusts, and industrial unrest. Against this background, historical interpretations of the era between 1873 and 1896 vary considerably. While some see the period as a "Great Depression" (Rosenberg 1967), others have attached to it the label of a "Good Deflation" (Bordo and Redish 2004; Bordo et al. 2004).

From the perspective of monetary history, the 1870s marked a watershed. Great Britain had already been "on gold" since 1717, legally since 1821. This meant that the value of money was determined by gold alone. Paper money could be exchanged for the yellow metal at a fixed rate. When in 1873 the newly founded German Empire abandoned the traditional silver standard of its states in favor of gold, it initiated the period of the "classical gold standard" (de Cecco 1984; Eichengreen 1996; Eichengreen and Flandreau 1997; Flandreau 2004). Now other countries quickly followed, establishing a global monetary web of fixed exchange rates (Meissner 2005). For most countries, the new monetary regime meant a radical departure from traditional silver or bimetallic standards. The reasons for adapting the gold standard and the specific timing has been a matter of intense debate. While for Germany the exemplary economic success of Great Britain may have played a decisive role, many countries had started to favor a gold standard in principle already in the 1860s (Morys 2023). For the period following 1873 the most important reasons for adopting gold were the international economic networks already established through trade and finance (Meissner 2005).

The United States, following the monetary disruptions of the Civil War, had already been on a path to full gold convertibility in the late 1860s and 1870s. Convertibility was finally achieved in 1879 thanks to a deflationary policy of monetary contraction. The gold standard eliminated the risk of exchange-rate fluctuations and high inflation rates. It was not, however, a period of monetary stability (Fisher 1912; see Figure 29.1). Moreover, since the economic reasons for establishing the gold standard were mainly not of domestic origin, it quickly became an object of dispute between different economic actors (Frieden 1997). The political contestation was particularly intense in moments of economic crisis. As profits declined and firms collapsed, the currency regime became enmeshed in debates about the underlying causes.

The Western world had already experienced one such major economic crisis in 1873. In September of that year, the New York-based Jay Cooke & Company bank collapsed. Having speculated in stocks of the Northern Pacific Railroad, Cooke's company became the victim of a stock market panic. The collapse of the House of Cooke triggered a crisis that affected the whole economy. For the railroads, the blow hit particularly hard. Many firms collapsed and "railroad stock prices fell by 60 percent between 1873 and 1878" (White 2012, 84). As European capital was tied up in US-American railway investments, the crash in the US became a global economic problem. In October 1873, the bankruptcy of the Vereinsbank Quistorp & Co. marked the beginning of a stock market crash in Berlin that wiped out 700 of 900 newly founded companies across all sectors (Plumpe 2017, 65). After a frantic rise in prices and economic activity in the early 1870s, the crash caused a reversal. Prices continued to plummet until the late 1870s, and production declined. It was the "classical" business cycle that inspired much of the economic debate on business cycles in the 1880s.

In Cooke's opinion, his bank's failure had been mostly due to faulty monetary policy. In the absence of a central bank, which would not come into existence in the US until 1914

Monetary Shocks

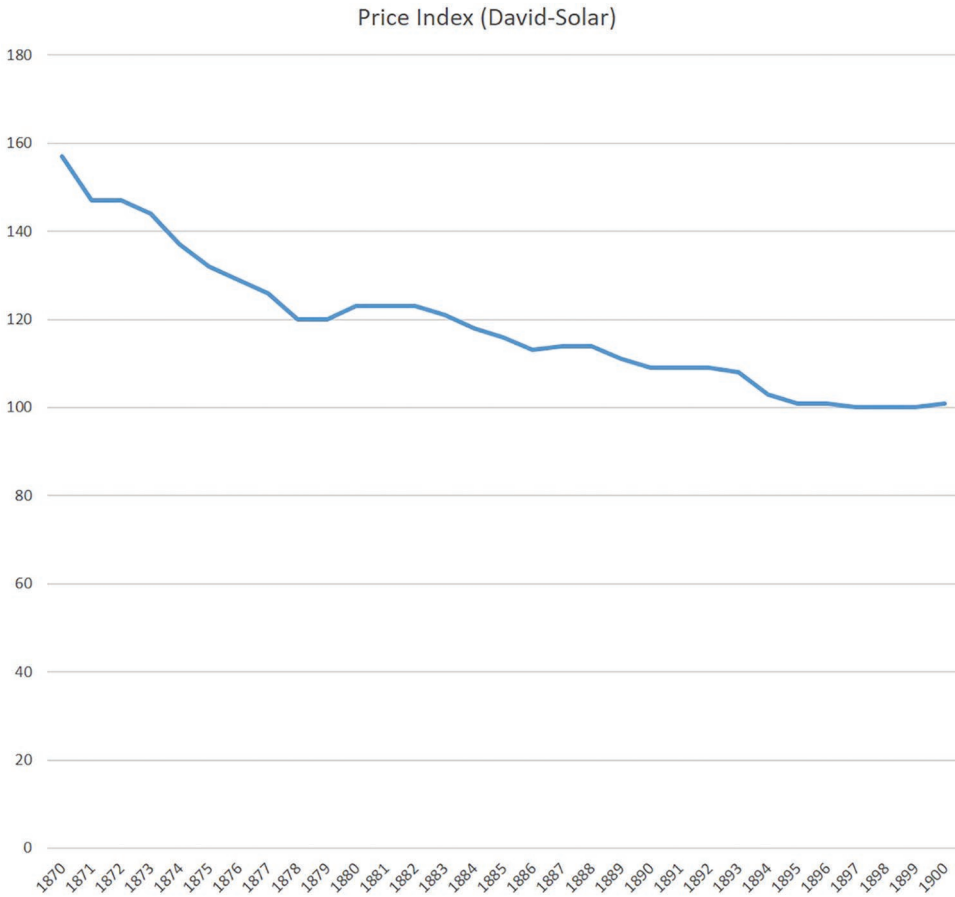


Figure 29.1 Consumer Price Index for the United States (1913=100).

Source: Hanes 2006, 15.

(Wood 2009), the US government was in charge of monetary policy. The government was determined to achieve full gold convertibility of the “greenbacks” (“resumption”), a paper money fiat currency that had been issued during the Civil War (Nugent 1968, 141ff; Smith and Smith 1997). This policy of “tight money” prevented Cooke from raising the funds he needed to survive the crisis. Until his death, Cooke “denounced hard money and the gold standard as a source of suffering and ruin” (White 2012, 80–83). Later historians have questioned this view. To them, Cooke and others had been infected by a railroad fever that was “fueled by speculative dreams of rapid economic development along the new western lines” (Beckert 2001, 208). These expectations proved fictitious (Beckert 2016).

The 1880s were a comparatively smooth decade compared to the 1870s and 1890s. Prices stabilized and production levels recovered. Not all industries did equally well. Railroads and heavy industry suffered from excess capacities and low prices while industries of the “second industrial revolution” (chemicals and electronics) fared better (Plumpe 2017, 66). Between 1883 and 1886 growth stagnated, followed by a renewed phase of industrial optimism and recovery of prices. In the US, falling railroad rates—which were due to a mixture of intense

competition and general deflationary tendencies—helped to keep business activity at high levels. It was this period that most likely deserves the label of a “good deflation.”

Firms kept complaining, however. This was partly due to their focus on prices and stock market indices which were nominally falling for much of the period. In the late nineteenth century, the definition of a business depression was nearly synonymous with a price decline. As the British economist Herbert S. Foxwell noted:

The very language of the markets bears unconscious testimony to the effect [of falling prices] on trade (...) When prices are maintained, the markets are ‘buoyant,’ ‘better,’ ‘firm,’ ‘fair,’ ‘strong,’ and ‘improve’; when prices decline, they are ‘languid,’ ‘depressed,’ ‘slack,’ ‘drooping,’ ‘lifeless,’ and ‘dull’.

(Foxwell 1886, 49)

This explains how even small changes in general price developments, as in 1879 and 1887, had major effects on economic expectations. Following contemporary assumptions of cyclical ups and downs, managers and workers expected “good times” and “bad times” rather than any long-term price trend (Teupe 2021). Yet the general revival of business activity during the period of the “Great Deflation” proved more short-lived than expected, at least when considered from the perspective of price trends.

According to Foxwell, businessmen in the world of the gold standard had trouble making sense of these developments:

A Sheffield employer not long ago complained to me that business men felt puzzled at the state of trade. They were accustomed to expect a recovery of prices after three or four years of low price; but the low prices seemed now to be persistent.

(Foxwell 1886, 33)

To Foxwell, the underlying reason for the “prolonged depression of prices” was not the availability of credit, “but [...] a continuous change in the value of money” (Foxwell 1886, 33). Since in the context of the gold standard the money supply was largely dependent on the global gold supply, many economists soon identified its availability as a crucial indicator for general price trends.¹ The debate was complicated because not all price changes could be explained by fluctuations in the currency. Already in the early 1860s, the British economist Stanley Jevons had highlighted the distinction between changes in “prices” and changes in the “currency.” Unlike price changes that every businessmen could easily detect, changes in the currency were “imperceptible, because the slow rise of prices due to gold depreciation is disturbed by much more sudden and considerable, but temporary fluctuations which are due to commercial causes” (Jevons 1863, 49). Between the 1870s and 1890s, commercial causes overlapped with a stagnating money supply that was largely dependent on an exogenous and unpredictable gold supply. This overlap made it difficult to choose a “model” for forecasting (Barsky and de Long 1991).

According to the Austrian economist Julius Landesberger, the inadequate supply of money from the 1870s onward had direct effects on economic expectations:

Repeated experience of the short duration of the favourable state, makes the market and the producers distrustful, takes all spirit from their plans, intensifies competition,

and so produces again psychological and material factors which, in their turn, act unfavourably upon the state of affairs.

(Landesberger 1895, 105)

Yet business complaints were also due to a very real financial problem. The deflation put pressure on debtors, a group to which all expanding industries belonged. In light of the unexpected price declines firms had contracted loans which they found increasingly difficult to repay. "The effects upon industry and trade of a diminishing money supply, in enhancing the burden of debts and fixed charges, and in disparaging the profits of business and hence reducing the motives to production", economist Francis A. Walker stated in 1889, "have been discussed so much at length that we need only inquire here as to the fact" (Walker 1889, 192).

In this context, monetary reform became a contested topic, in the United States as well as across the Atlantic. The two most seriously discussed alternatives were a continuation of the gold standard, and bimetallic reform. The US had been on the bimetallic standard for most of the nineteenth century. The bimetallic standard made it possible to exchange gold as well as silver bullion for US dollars at a fixed rate. However, in 1873 a Coinage Act passed Congress that effectively demonetized silver by preventing holders of silver from minting it into dollars. Treasury secretary George S. Boutwell later explained the demonetization in the *Boston Herald* with the expectation of deteriorating silver prices:

At that time the power drill had been invented and its value established. The use of dynamite was well understood, and the number and richness of the silver mines in the Rocky Mountains justified the conclusion that silver would deteriorate in value with each succeeding year. On this theory of the then future my policy was based.

(Nugent 1968, 148–149)

It was a policy intended to stabilize the dollar. What Boutwell did not expect was the rapid price decline following the economic crisis of 1873 and the inadequate supply of gold for a world in which more and more countries adopted the gold standard. By the mid-1880s, few economists were left who defended the unstable gold standard. Walker was one of the most fervent advocates for an international bimetallism, but this necessitated an agreement between nations as to the exact ratio. The problem with monetary reform was the fact that it was backward as much as forward-looking since it would affect monetary contracts negotiated long before the reform. "Not only in the United States, but everywhere in the world," the economist Charles Spahr wrote, "creditors have instinctively contended for the contraction of the currency and debtors have instinctively contended for its inflation; and each class has simply recognized its own obvious interests" (Spahr 1893, 424–425). In the US, it was mostly the farmers of the mid-west and the silver miners who argued for money inflation, whereas the strong "monied interests" of the Northeast worked against the abolition of the gold standard (Ritter 1997). For its American advocates, the gold standard was intended to limit "the power of legislative intervention so susceptible to democratic popular influences" (Beckert 2001, 304). As Horace White, a financial journalist who had done a brief stint in the railway industry, argued in 1894 during a hearing of the Committee on Banking and Currency: "Business men are in a chronic state of alarm lest the Government should not be able to redeem them in gold, or lest a political party should come into power in a platform of not redeeming them at all. You can not have any real business stability while

such apprehensions exist” (United States House of Representatives 1894, 89). The political aspect of the money question made “rational” discussions about the proper solution difficult, particularly at an international level where national interests were added. Numerous international monetary conferences led nowhere (Geyer 2001; Thiemeyer 2009).

The debate also had a moral dimension. Those who were in favor of (inflationary) reform tended to argue that deflation’s bad effects on debtors were simply unjust. “We must come out of this unreasonable condition”, the New York industrialist Peter Cooper argued in 1875,

or we shall be subject, for all time, to these periodic disturbances of our money and currency, which bring such widespread ruin and distress on our commercial industries, and work, on the part of the Government, positive and cruel injustice.

(Cooper 1883, 37)

Economists such as John B. Clark disagreed, however. In 1895, he admitted that individuals might have different knowledge about the future; but the market context made sure that ignorance was not punished: “In the general market it is impossible that knowledge of the future should be very unevenly distributed. Lenders, as a body, know as much as borrowers, and not more” (Clark 1895, 392). Clark held that what had happened to the debtors over the last years had nothing to do with “fraud” but with uncertainty, as variations in the standard had been “unforeseen” (Clark 1895, 393). This was a valid argument, but only if one considered the monetary regime as a given—which authors such as Cooper clearly did not.

Developments in the early 1890s intensified the debate. Already in 1891, following another phase of declining prices, the business outlook worsened. Two years later, the US banking panic of 1893 led to another period of industrial turmoil and rapidly falling prices that lasted until 1896/1897. The US banking crisis had its background in “rising concerns about the currency and the economy” (Carlson 2013, 40). In 1890, Congress had passed the Sherman Silver Purchase Act of 1890 that required the US government to purchase a certain amount of silver bullion in exchange for paper money. It was a concession to the “inflationary” interests of farmers and silver miners, even though it fell short of their demands for “free coinage.” While the Act had no discernible effect on the price level, it produced anxiety concerning the future willingness and ability of the US government to remain on the gold standard (Friedman and Schwartz 1963, 106ff). Following the Act, gold reserves at the Treasury declined as holders of treasury notes exchanged them for gold. Withdrawals by foreign investors increased, particularly investors from Europe, who were already anxious due to a crisis in Argentina that same year.

On the railroads, the Act had an “immediate impact” as it would “quickly affect their attempts to raise capital” (White 2012, 385). In February 1893, the Philadelphia and Reading Railroad declared bankruptcy, raising concerns of a general economic downturn in the US. Overall 70 railroad companies eventually failed, “one quarter of American railroads in the hands of receivers” (Carlson 2013, 40). Problems in the railroad industry soon affected the real and perceived solvency of banks who had acted as lenders. There were bank runs in numerous cities across the United States, mostly in western and northwestern parts of the country. Given the continuous strain on their resources, “banks in New York severely restricted the shipment of currency to the rest of the country” (Carlson 2013, 46). The lack of cash and credit throughout the country severely affected everyday business and trade, leading to numerous layoffs.

By autumn of the same year, the banking panic was over. Industrial production and prices, however, continued to decline. Later estimations of GDP assumed a decline of about

13 percent (Carlson 2013, 48). Unemployment, which in 1892 had been as low as 3 percent, fluctuated between 11 and 18 percent from 1893 and did not fall below 10 percent before 1899 (Department of Commerce 1975). Industrial tensions increased, including events like the Pullman Strike of 1894 in which 13 workers were killed. The crisis of 1893 had caused one of the steepest downturns in the country's history (Steeple and Whitten 1998, 1–2; Carlson 2013, 40). Against this background of industrial turmoil, the Democratic convention nominated William J. Bryan as the party's presidential candidate, who famously promised not to “sacrifice mankind on a cross of gold” (Bryan 1896).

Case Study: American Railroads during the “Great Deflation”

If there was an industry in the US that stood at the center of these developments, it was the railroad industry. The railroad growth of the late nineteenth century was a global phenomenon, but in the United States, it was particularly spectacular. In 1860, the length of railway tracks in use had been close to 50,000 kilometers (km). By the end of the century, the length exceeded 310,000 km. This came close to what all other countries of the world combined had built by this time (Torp 2013, 13). Railway growth was also a global phenomenon in terms of finance. Construction was costly, involving land exploitation, huge amounts of resources, and hard labor. Maintenance of the roads was costly as well, and in its early stages hardly any railway company was expected to turn a profit. Throughout the period of the Great Deflation, the railways depended on credit for construction as well as maintenance. They mostly looked to the Northeast and across the Atlantic for investors. Some of the money came from the issuing of stocks, but a large part came from the issuing of bonds with fixed interest rate payments. As Fisher later noted, the rate of interest that they had to pay was “not a narrow phenomenon applying only to a few business contracts, but permeates all economic relations.” It was “the link which binds man to the future and by which he makes all his far-reaching decisions” (Fisher 1907, 336). If railroad managers had foreseen the financial burden of credit payments in the future when contracting a loan, they would have realized that the Great Deflation was a difficult time for them. This is obvious for periods of economic crises, but it was also true for the 1880s because of the trend of falling prices that directly affected the (authorized) fees for the (freight) transportation services (the “railroad rates”), which were the chief source of the railroads' income.

For investors, it seemed to be a good time. Even the nominal rates for bonds were lucrative. The Northern Pacific, for example, sold \$160 million worth of bonds in 1889, offering 5 percent interest and a repayment schedule “designed to run for one hundred years” (White 2012, 383). Between 1867 and 1890, the bonded debt of American railroads rose from \$416 million to \$5,055 million. Railroads became “highly leveraged operations” and “any diminishment in their ability to borrow meant disaster” (White 2012, 69, 78). General price declines had the effect, as Fisher observed, that interest rates became even higher in real terms. The investors' gain was the railroads' predicament, forcing them to cut costs and increase profits, simply to meet outstanding interest payments. Against this monetary background, railroad expansion seemed unlikely. In hindsight, it was not sustainable, neither for investors nor for the railroads. Each investment boom was closely followed by bankruptcy and default on bonds, turning the promise to pay into wishful thinking. Why were investors willing to invest, and managers willing to expand?

The answer lies in a kind of forward-looking optimism that is difficult to pin down, let alone rationalize. After the end of the Civil War, the “rapid economic development” had “expanded

horizons and boosted ambitions among all upper-class New Yorkers” (Beckert 2001, 152), where much of American money came from. The confidence was not restricted to New Yorkers. It was driven by technological progress as much as by imaginations of the vast new underdeveloped and resource-rich areas that could be turned into profitable objects of investments. Compared to Britain, American investments yielded higher marginal profits. “American business entities were prepared to issue bonds with higher coupons because they expected their projects to yield even higher profit rates, permitting the servicing of that debt” (Field 1983, 425).

Within this larger narrative of expansion, economic crises were a nuisance, but not a sign that the end of opportunities had been reached. In April 1888, to offer one example, the small Wall Street banking house of John H. Davis & Co. issued an investment circular that it sent to the chairman of the CB&C, John M. Forbes.² The circular was issued by the bank’s bond department and contained a long list of “many disturbing elements in the financial and railroad situation.”³ The circular criticized Congress for its management of the public debt, noting that its “inaction will be reflected in the business world, which dreads and fears uncertainty as to the monetary situation.”⁴ The railroads were plagued by bad weather, strikes and the “demoralization of rates” mostly a result of “the over building of the past two years.” The outlook for the northwestern roads was “not hopeful, for the underlying conditions are not favorable.”⁵ Although this sounded like a prudent analysis, its careful and pessimistic outlook was thwarted by the same circular’s analysis of prospects for the southern railroads. These railroads had been expanding considerably (Klein and Yamamura 1967) and with regards to their future development, the circular was very optimistic. It spoke of an “opportunity for almost unbounded expansion” and considered a possible end “in disastrous depression” as “pronounced unfounded.”⁶

It took less than five years before this optimism itself proved unfounded. For the southern railroad industry, the 1890s were a period “early punctuated by numerous defaults and receiverships” (Stover 1955, 218), eliminating whatever money investors had poured in. It was also a decade that “produced relatively less new mileage (in terms of percentage increase) than any other ten year period since” (Stover 1955, 218). Nevertheless, the “imagined expectations” (see Nützenadel and Streb, Chapter 8 in this volume) of investors had clearly created a vibrant industry in the years before.

Railroad managers shared the diehard optimism reflected in the investors’ circular. Fisher once ascribed to these “captains of industry” a “superior foresight” that would explain why the management of capital was delegated to them. “When prices are rising, borrowers are more apt to see it than lenders” (Fisher 1896, 286). Railroad construction, however, was more the result of hopefulness and competition than of careful analyses or superior foresight. In the late 1880s, when the western railroads had expanded greatly, Charles Francis Adams of the Union Pacific admitted “that the Union Pacific had not taken enough time to get information about the regions in which they constructed railroads” (White 2012, 214). The same carelessness in construction applied to the management of existing roads. Most railroads, for much of the Gilded Age, had little information about their actual labor costs and the wages they paid on different roads. While managers were well informed about railroad rates and competition, they were struggling with estimating costs for repairs, rolling stock replacements, and other items, let alone forecasting them across the numerous divisions.

Henry Villard of the Northern Pacific Railway, who was extremely successful in collecting money from German investors, is a particularly vivid illustration of the forward-looking recklessness that characterized much of the railway industry in the Gilded Age. Villard ran “a

loose, almost haphazard operation, totally unconcerned about cost accounting” (Buss 1978, 98). As historian Richard White has shown, Villard was frank about the railroads’ problems in a private letter, when he was finally facing disaster in the economic downturn of 1883:

In the kind of sentence that pretty much summed up his managerial style and that of many of his contemporaries, [Villard] wrote, “[T]he trouble was not only that the cost was much greater than expected but that it was almost impossible to know at any one time what it would be.”⁷

Villard fled to Germany and returned in the late 1880s for a second stint. He had gained a lot of experience since the 1870s, but he had not become a different man. Another businessman once commented on Villard that he “never prepares for nor anticipates disasters or disappointment, but presumes always on a greater increase of business than the growth of the country will warrant” (White 2012, 383). Villard was an extreme example, but also very much a child of his time.

All American railroads shared the fate of their indebtedness, to some extent a structural necessity of capital-intensive industries in their early stages. This meant that developments in credit markets and currency fluctuations were collectively fateful. To what extent did railroad managers understand this, and how did they position themselves in the debate of “Goldbugs” and Inflationists? One might assume that in light of the economic importance of the monetary question, railroad managers would be heavily involved in the debate. Yet even though the “monied interest” of the Northeast and the farmers of the Midwest had vocal and divided interests (Beckert 2001, 226), the historical evidence of businessmen’s views on monetary reform is limited. Guilford Lindsey Molesworth, an English civil engineer, was puzzled by the ignorance and apathy he found when it came to questions of monetary reform. In 1891, he noted “it is still very common to receive from the majority of business men [*sic*], either a confession that the subject is too abstruse to be mastered by them, or a dogmatic unquestioning condemnation of Bimetallism” (Molesworth 1891, 89). Herbert Somerton Foxwell also believed—based on anecdotal evidence rather than empirical research—that not all businessmen understood the importance of alterations in the standard (Foxwell 1886, 33). Industrialists like Peter Cooper were clearly an exception, not only due to Cooper’s rejection of the gold standard, but also due to his informed opinion. It was not that railroad managers generally distanced themselves from political discourse, but their agitation focused on the more tangible questions of rates, labor, or land reform (White 2012). They were remarkably silent when it came to questions of currency reform.

In 1894, Charles Perkins, the president of the Chicago, Burlington and Quincy Railroad, in a rare document reflected on the question of monetary reform explicitly and at length. Perkins was critical of the “continued purchase of silver bullion” which the Sherman Act had initiated, and which had led to an outflow of gold from the US.⁸

Perkins was, however, no “goldbug” either. While he rejected a go-it-alone policy of bimetallism, he favored a “universal” or “international” bimetallism as a necessary monetary reform, concluding that such a departure from the gold standard would

place the whole business world upon a safer and better basis than it has been on since 1873 (...) Besides helping our silver industry, international free coinage will accomplish many other desirable things, by giving us a more stable measure of value and medium of exchange.⁹

Jay Cooke of the eponymous bank would certainly have agreed with Perkins' critique of the gold standard, but otherwise it is difficult to generalize Perkin's opinion. It is noteworthy, however, that even though his views on monetary reform were not intended to directly influence politics, they were essentially political. Not only would international bimetallism have greatly affected relations between creditors and debtors. More importantly, Perkins obviously did not consider the monetary regime as a given. It could be subject to change. At the same time, Perkin's views on bimetallism were almost completely detached from his everyday problems of managing a railroad. His awareness of the country's unstable measure of value did not change the fact that railroad firms depended on credits, and on conditions that they could not influence.

In 1896, Fisher had noted that the fault of depressions did not lie with businessmen as these had been responsive to "real" rather than nominal interest rate levels. Instead, Fisher had charged the bankers with being responsible for the inadequate adjustment of interest rates. To Fisher, this lack of acceptance of monetary reality was an empirical fact: "If lenders, as a class, were possessed of greater foresight than borrowers, we should find trade languishing during rising prices and stimulated during falling prices" (Fisher 1896, 78). For the railroads, however, the situation was different because the industry expanded greatly at a time when prices were falling. The challenge for economists and historians then is to explain how rational people—managers and investors—were able to build something on such shaky monetary grounds and in a period that has often been characterized as "depressed." As this chapter has argued, imagined expectations—rather than foresight—are key to understanding this great paradox of the late nineteenth century.

At the time of writing in 1896, Fisher was still confident that no monetary reform was needed, and that contracting parties could forestall gains and losses if they understood the monetary system and had proper foresight. By 1912, Fisher had lost confidence in this "microeconomic" solution of financial literacy and became one of the most outspoken advocates for monetary reform (Fisher 1912, 1919). As experience had shown, businessmen did not always end up where they expected to be, but where the fate of the monetary tide washed them up. Perkins would certainly have agreed with Fisher's newly-won insight: monetary shocks were so unpredictable that the transfer of wealth that they caused was without any foundation and economically harmful. For all its mistaken optimism, the investment circular of 1888 had correctly noted that the business world "dreads and fears uncertainty as to the monetary situation." The best solution for businessmen was to stabilize the currency. The paradox of late nineteenth-century American politics was that without a central bank, any attempt to do so only tended to cause further destabilization.

The Crisis of Bretton Woods and West German Exporters, 1970s

The Crisis of Bretton Woods from the German Perspective

The postwar world differed from the world at the turn of the twentieth century. By the early twentieth century, the gold standard had become a "religion" among monetary theorists and politicians, so influential that it obstructed prudent political measures during the Great Depression of the 1930s and pushed the world into a global crisis (Eichengreen 1992; see also Alvarez and Schenk, Chapter 30 in this volume). After the war, these quasi-religious attitudes had not been "healed" and the monetary order of Bretton Woods was established as a gold standard without gold, with the US dollar operating as a placebo (Bordo and

Eichengreen 1993; Eichengreen 1996; Schenk 2011). Only the US had been able to stay on a gold standard after Roosevelt's return to gold in 1935, while the other countries did not possess enough gold reserves to reintroduce a gold-based currency. However, in 1944 the international community—guided by monetary experts from the UK and the US during a League of Nations conference in Bretton Woods, New Hampshire—restored a gold-like monetary order on the basis of fixed exchange rates, free convertibility of currencies, and strict regulation, with “the rules of the game” now enforced by an international institution, the International Monetary Fund (IMF) that was dominated by the US (Steil 2013; Dauntton 2023).

The whole setting rested on the strong belief that stable exchange rates had to be granted to secure economic recovery and the recovery of world trade in particular. The originators of the regime shared the strong opinion that the global economy had to be protected against all sorts of volatility and fluctuation, especially that resulting from financial markets that were consensually blamed for having worsened, if not triggered, the Great Depression (Chwioroth 2009; O'Sullivan, Chapter 27 in this volume). It was therefore imagined that some of the fundamental rules from the gold-standard system had to be temporarily waived for only a limited period after the war: the introduction of currency convertibility was planned for later and capital flows had been completely banned in some countries until the mid 1960s.¹⁰ On the basis of the number of banking crises, Carmen Reinhart and Ken Rogoff considered the Bretton Woods regime to be one of the most stable period in 800 years of financial crises (Reinhart and Rogoff 2009); scholars such as Eric Helleiner translated this into a kind of hagiography of this institutional setting that, in the latter's opinion, was to be sadly destroyed by neoliberalism in the 1970s (Helleiner 1994; Helleiner 2010).

There can be no doubt that West Germany strongly profited from the Bretton Woods environment after the Second World War. The country's membership in the IMF and the General Agreement on Tariffs and Trade (GATT) in 1952 did not only secure its return to global economic policymaking relatively soon after the end of the war. It equipped German industry in particular with several advantages—although not always intentionally. Especially the more or less unrestricted access to the markets of Western Europe and the US turned out to fuel Germany's “export miracle” that is today identified as the driving force behind the country's “economic miracle” (Vonyó 2018). Within a decade, Germany was reintegrated into the “Atlantic economy” (Findlay and O'Rourke 2007) as a supplier of manufactured goods using raw materials from the rest of Europe and the Americas. Liberalization of imports for manufactures, and tariff reductions that were negotiated within the GATT framework, served the German economy much better than they did agricultural exporters such as France. As a consequence, Germany started to accumulate growing export surpluses after 1952 (Neebe 2004). When the IMF noticed that these current account surpluses were permanent and were hindering the economic growth of Germany's trading partners, where they were mirrored as current account deficits, the IMF requested reactions on the part of German politicians as early as 1957.

Among different explanations, the exchange rate was identified as a cause of this imbalance by monetary scholars as well as international institutions (Kindleberger 1965). German economic policy allegedly suppressed wages and domestic consumption, thus enabling the country's export industry to win large profits. Trading partners asked the German government to increase domestic investment and allow wage increases in order to increase imports for the necessary balance of payments adjustment. If that did not help—so the contemporary debate among economic theorists—the appreciation of the Deutschmark

against the dollar (and thereby against all other Bretton Woods currencies) would become necessary. Such an action could not be imposed by the IMF on its member countries, unlike its competences in terms of current account deficits, for which the regulation of the 1944 treaty included a regular escalation scenario. In contrast, countries with a constant current account surplus, like West Germany, could only be pushed by moral suasion and political pressure. The undervaluation of the German currency that was identified as an important driver for the German “economic miracle” by contemporary economists as well as modern economic historians, could only be changed from within, i.e. by German economic policies.

Over the course of the 1960s and 1970s, a consensus among monetary specialists started to grow that a fixed exchange-rate regime was preventing the necessary monetary adjustment among national economies with different productivity levels. The specialists suggested changing the institutional structure of the Bretton Woods system. The drive to this consensus had already begun with the expertise of the young Milton Friedman on the monetary problems of the Marshall Plan countries, which were resolved by the foundation of the European Payments Union in 1952. It became more widely shared when the Austrian-American economist Fritz Machlup formed the “Bellagio Group.” This group had been encouraged and financed by the Rockefeller Foundation to discuss solutions to the increasingly serious issues of the Bretton Woods system.¹¹ However, the final shift towards floating exchange rates did not result from academic debate, but from the shocks the institutions generated in the late 1960s.

One of the motivations for the establishment of the IMF was to “provide[] the machinery for the consultation and collaboration on international monetary problems,” as Article 1 of the IMF’s Articles of Agreement puts it.¹² The monetary regime was all about stabilizing the expectations of politicians but also of the business world. Expectations did not only relate to fixed exchange rates, as these had to be “defended” by member countries in form of buying or selling their respective currency on international money markets. Furthermore, the Bretton Woods system established a complex procedure for exchange-rate adjustments in case trade imbalances became too frequent or a stabilization policy too costly.

Speculative investments started to escape from the tightly regulated US market in the 1950s to form what became known as a “Eurodollar” market in London and later also in Switzerland and Luxembourg (Schenk 1998; Rischbieter 2015). This meant that investors could build a speculation pattern on their expectations in relation to the management of currency crises as revealed in the IMF statutes. Relocating funds even encouraged currency revaluations because it put pressure on the exchange rate. Paradoxically, it was therefore stable expectations (in terms of political reactions) that triggered speculative capital flows in the 1960s and marked the beginning of the end for the fixed exchange-rate regime.

Because of its constant current account surplus and the clear undervaluation of its currency, West Germany became an important target for speculative global capital flows, which were referred to as “wandering capital” (“vagabundierendes Kapital”) in the German debates. Under significant public attention, the country’s politicians agreed to two regular appreciations of the Deutschmark in 1961 and 1969. Germany experienced one further appreciation after turning to floating exchange rates for seven months in 1971, before the permanent floatation against the dollar was declared in March 1973. Bundesbank director Otmar Emminger famously quipped that “the German mark was the centre of the international currency quake” (Emminger 1986), thereby contributing to the legend that the Bundesbank’s straight monetary politics had brought the irresponsible inflationary circle to a halt. In fact, Germany performed best in the fight against inflation in the 1970s

in comparison with other European countries and the US. This was considered to be the result of the first application of “monetary targeting,” to which the Bundesbank turned in 1974 (von Hagen 1998).

But the monetarism of the Bundesbank (which never completely dominated its policy) did not restore stable economic expectations on a broad scale. Rather, the regime of fixed exchange rates collapsed step by step beginning with the sterling devaluation of 1967 and the US’s suspension of the gold standard—the “Nixon shock” of August 1971 (Gray 2007; Schenk 2010). Even after many countries gave up exchange-rate stabilisation in the summer of 1973, it was not until the Jamaica conference in 1976 that the “floating” practice, which gave national central banks more power, was legalised within the IMF. At the same time, in Europe and other parts of the world groups of countries established regional fixed exchange-rate systems that tried to restore exchange-rate stability and thereby stable expectations (Mourlon-Druol 2012).

The gold standard did not collapse in a monetary “big bang” in 1971 or 1973 as older literature has suggested, exposing the world to economic instability. Rather, the monetary regime slowly transformed into a new global monetary order step by step, affecting economic expectations in politics and business. On the level of monetary politics, we can observe a long transformation from the New Deal order to a neoliberal order, as it was recently described by Gary Gerstle, who dated the transformation period as starting in the 1970s and ending at around the turn of the century (Gerstle 2022). Also in the new neoliberal monetary order, politics and business together aimed at stabilizing expectations; this, however, was not revealed to international speculators but secretly negotiated, as in the case of the Plaza Agreement of 1985 (Reinhart and Rogoff 2004; Bergsten and Green 2016).

While in the Bretton Woods system, business had to target national politics when aiming at influencing the monetary order, in the world of floating exchange rates between Europe and the dollar zone, national economic and monetary politics and business became increasingly intermingled. In the 1980s and 1990s, it was not the business world that had to adjust its expectations to external monetary shocks created by independent monetary politics. Instead, the relationship comprised mutual adjustments of expectations by central bankers, politicians, and the business world, in which global operating banks played a role. How this mutual adjustment was prepared for can be observed in the links between monetary policy and the German export industry.

The Expectations of the German Export Industry

In a monetary order in which exchange rates are fixed between countries, it is possible for businesspeople to profit from different wage-price ratios on domestic as opposed to foreign markets. When wages and prices are stable at home and increase abroad, the different speed of inflation between the two countries cannot translate into a currency adjustment whereby domestic producers can profit from increasing prices abroad without adjusting their (domestic) wages. Though some scholars still deny the validity of this connection for Germany’s economic miracle,¹³ it has been robustly evidenced for West Germany in the 1960s (Boltho 1996). Herbert Giersch, an economist who played the most active role on the German Council of Economic Experts in the 1960s, had no doubt that the undervaluation of the currency helped the German export industry.¹⁴ Ultimately, the export industry itself was very much aware that the currency regime shielded its profits on a large scale; they did not miss a single opportunity to delay a currency appreciation which Germany had been

under international pressure to adopt since the late 1950s. This attitude is well documented historically, for example through the “Gürzenich affair” of 1956, the appreciation debate in 1961, and the campaigns surrounding the general election of 1969 (Nützenadel 2005).

The situation of the German export business was completely different to that of the railway entrepreneurs discussed in the previous section. Like politicians and monetary theorists, German exporting industrialists were well informed about the consequences of even small appreciations of the German currency. A 5 percent increase in the foreign value of the Deutschmark would produce an annual loss of 75 million DM for his company, argued Siemens board member Gert Tacke in November 1968.¹⁵ After the Nixon shock, the elite of the German export industry engaged in a competition about which branch was likely to suffer the biggest loss. The CEO of the Darmstadt pharmaceutical company E. Merck, Hans Harms, believed that a 1 percent revaluation would cost the chemical industry 200 million DM. Volkswagen boss Carl Hahn estimated that floating, as it had been practised by the Bundesbank since May 1971, was costing his business 30 million DM per month, while Daimler-Benz boss Johannes Zahn spoke of a 15 percent cost increase for Daimler-Benz’s US exports.¹⁶ Some of the managers had already experienced floating regimes in the interwar period or had had the opportunity to study their consequences. Gert Tacke, for example, was already involved in Siemens’ international strategies across different exchange-rate regimes in the interwar period (Feldenkirchen 1997, 412). German export business had also systematically explored the effects of the 1961 revaluation through surveys conducted by industry associations and the Chambers of Commerce and therefore must have been very aware of the effects of monetary shocks by the end of the 1960s.

Though the German export industry had a very clear understanding of the nature of exchange rate adjustment and a relatively realistic belief that the German currency would be revaluated over the next years, they still tried to slow down every advance in this direction. They did not shrink from attempting to engage the public in this endeavour, issuing public announcements about large financial losses (as mentioned above) and the likely consequences for domestic employment, and threatening to end their collaboration with the government on international problems, for example by resigning their membership of the Foreign Trade Advisory Council of the Minister of Economics (*Außenhandelsbeirat beim Bundesminister für Wirtschaft*, hereinafter Foreign Trade Advisory Council) (Hesse 2023, 208f).

Many of these fights—especially those carried out in the public sphere—must be considered as strategically revealed expectations. The export industry aimed at putting pressure on the government to keep the fixed exchange-rate regime going and to delay the next revaluation. After several revaluations and a drop of the nominal exchange rate against the dollar of 50 percent until the mid-1970s, it turned out that in fact, the export industry did not suffer. The export surplus grew until 1975, partly because of the increased demand from oil-exporting countries, partly because of the softening effect of inflation rates. The real exchange rate (i.e. the inflation-adjusted exchange rate) with most trading partners had revaluated the German currency by only 15 percent between 1968 and 1973 and the export industry was fully aware of this effect, as Hoechst manager Alexander Menne reported in a meeting of the Foreign Trade Advisory Council in 1972; since industry could not influence the revaluation politics of the Brandt government, it was now hoping for higher inflation rates in the countries of the trading partner, which would balance the effect of the revaluation of the Deutschmark.¹⁷

Of course, the industry did not actually rely on hope, but had actively influenced its position in the meantime. Almost as a tradition, representatives of the export industry

complained about the poor state of export credit and export credit insurance in Germany and asked the government for improvements in order to catch up with their global competitors. Some of these requests were granted. An “exchange-rate insurance” was added to the already extended system of financial instruments in the early 1970s. Firms also prepared for revaluations that they apparently expected in the early 1960s by indebting themselves in foreign currency, which of course was easier for the larger firms and less attractive for the small. But the most influential strategy became global sourcing, which had been systematically explored by businesses but also within the Ministry of Economics since the late 1950s. In a memorandum on the long-term competitiveness of the German export industry, the Foreign Trade Advisory Council, which included members of the top elite of Germany’s export industry of the time, considered offshoring production as the main strategy to protect German export business from revaluation and in general from exchange-rate volatility.¹⁸ The whole behavior of the German export industry in the course of the 1960s and 1970s therefore shows a very informed and knowledgeable economic expectation formation and led to the strategy of liberating the industry from national monetary policy through global sourcing.

When the postwar monetary order finally broke down in 1973, German business was prepared and not shocked. The industry continued to support a return to a fixed exchange-rate regime. However, this support was applied in parallel with outsourcing strategies that targeted independence from national monetary policy. In Chancellor Helmut Schmidt, who managed to set up a separate European monetary regime in 1972, the industry found a fitting partner (von Karczewski 2008; Krauss 2021), though the “snake”—as the first European monetary regime was referred to—operated properly only for a few years. In contrast to the ideological view of a completely independent monetary policy, it can be easily shown how exchange rate policies were used even after the “breakdown” of the Bretton Woods system and how politicians suited their strategies to anticipated possible concerns of the German export industry. In a note for Chancellor Helmut Schmidt, the Secretary of State for European Economic Affairs Hans Tietmeyer (later president of the Bundesbank) reassured the chancellor, who was facing federal elections in October the same year, that he would not have to worry about the public indignation of the export industry if he only followed Tietmeyer’s suggestion and revaluated the Deutschmark within the European monetary system by 10 percent. The higher inflation rates of the trading partners would balance the currency revaluation.¹⁹ Thus, it was mainly stable expectations for German exports that guided German foreign trade policy during those years at the beginning of a second wave of globalization in world affairs. German industry worked together with German politics to create an environment in international affairs in which the country was able to act as a “trading power” (Gray 2023).

Conclusion: Did Monetary Shocks Change the Formation of Business Expectations?

The two periods discussed in this chapter share general attributes of stability and growth. That the economies of both Germany and the United States were growing during the late nineteenth century and after the Second World War is beyond doubt. From the perspective of monetary history, however, the attribute of stability is questionable. The gold standard was more stable in the rose-tinted spectacles of hindsight than in fact. The Bretton Woods system suffered from trade imbalances and speculative attacks. Despite the great differences

between the two case studies in terms of time, place, industry, and context, we find that in both cases monetary stability was of paramount interest to businesspeople. In both cases, economic problems—defaults in the late nineteenth century and trade imbalances in the 1970s—were related to questions of monetary policy. In both cases, politicians and theorists not only debated questions of detail, but challenged the established monetary system more generally. In the 1970s, this led to the transformation of Bretton Woods. In the late nineteenth century, it caused considerable uncertainty.

There certainly was commitment on the part of politicians, but in light of the monetary system's fragility and politicians' exchangeability it was hardly credible. There was no central actor who could effectively signal a future path of monetary development. Within the context of the gold standard the limited role of central banks was intentional. However, as prices were far from stable in the first decades of its existence, the gold standard failed to achieve a status quo beyond question, and political interventions like the Sherman Silver Purchase Act of 1890 signaled that the gold standard was not a natural phenomenon. Rather, it remained the result of a political decision that could be changed. Within the context of Bretton Woods, political control of the exchange rate was more transparent and more predictable. The problem was that economic developments seemed to overstrain the possibilities of international coordination, and that the system was as disliked by as many economists as the gold standard had been. The possibility of fundamental change made expectations so uncertain that forward-looking German exporters focused on minimizing their risks rather than fine-tuning their forecasts.

Businesspeople were well aware that anticipating general price changes or changes in exchange rates was beyond their capacity (which is, of course, why these changes frequently turned into "shocks"). In the US during the Great Deflation, the combination of monetary shocks and preferences for monetary stability led to widespread calls to abandon the gold standard and create an (international) bimetallic system, which was challenged by economic interest groups in the Northeast. In Germany during the 1970s, export interests meant preserving—or even rebuilding—the Bretton Woods system with its stable exchange rates, which however at the same time was undermined by many businesses. Rather than looking for central bank signals, firms would have had to turn to politics in order to form expectations, and possibly to exert some influence. In the realm of monetary policy, neither the interests of the American railways nor those of the German export industry prevailed, but the more important point is that monetary policy was not perceived as a strictly exogenous issue.

The material effects of the monetary shocks were quite different. While the heavily indebted US railways frequently went into receivership as soon as currency deflation and financial crises combined, the German export industry found ways to shield itself from the shocks of the 1970s. Further research is needed, but the comparative perspective suggests that this difference was due more to structural reasons than to general differences in knowledge, foresight, or expectations. Moreover, there are greater opportunities of shielding oneself from risky international currency fluctuations than from general (global) price developments that neither borrowers nor lenders expect. Nevertheless, given the rather reckless cost accounting of American railways in comparison to the comprehensive strategies of German exporters in shielding themselves from exchange rate shocks, we may also assume a trend towards more professionalized expectation management in the roughly 100 years that elapsed between the two periods.

Comparing the two case studies further suggests that once the framework of a stable institutional setting breaks down, there is no clear alternative for a model of business

expectations. While the US railroad industry was built on imagined expectations, German exporters tried to control the risk of exchange rate fluctuations politically as well as managerially. In both cases, however, the monetary shocks did not change business expectations in the narrow sense. Neither the risk of long-term deflation—as in the US—nor that of currency appreciation—as in Germany—seem to have fundamentally altered business decision-making. The monetary shocks did, however, change the ways in which businesspeople thought about the instability of monetary policy in general, and what they hoped for in the future. In the case of the US, this led to a growing rejection of the gold standard; in the case of West Germany, it meant resistance to the monetary system's breakdown even if the pessimistic expectations of such a breakdown scenario were largely communicated for strategic reasons. The original Bretton Woods system eventually collapsed, while the gold standard was continued even after the turbulent 1890s, mostly thanks to the fortunate gold discoveries in Australia and South Africa at this time. Yet in both cases the likelihood of a radical policy change was just as real, and businesses were well aware of this.

Modern models of inflation expectations depend on (independent) central banks and a clear communication of monetary policy. From a business history perspective, it seems less useful to generalize these insights to periods in which the models' institutional underpinnings not only were absent, but were continuously in doubt. The sources for business (inflation) expectations during these times were therefore very different, and they largely depended on models for decision-making that were not necessarily "rational" in the strictest sense. In both our periods, then, participants perceived themselves "as operating in an economy with a structure that may not be stable over time." As Barsky and de Long observed some time ago (1991, 835), in such a situation "predictions of the relevant economic model" may not coincide with the actors' forecasts "because of the fear that the underlying structure might be changing over time, so that correlations characterizing the past might not characterize the future" (1991, 835). Business expectations were therefore not simply based on exogenous monetary factors such as gold discoveries or interest rates, and they were formed in political contexts much more fluent and complex than the current models allow for (see also Rischbieter, Chapter 28 in this volume).

Notes

- 1 Others remained skeptical, pointing to more important factors in the "real economy" instead (Schmoller 1913).
- 2 John H. Davis to John M. Forbes, Esq., April 3, 1888 Newberry Library (hereafter: NL), Chicago/IL, Burlington & Quincy Railroad (hereafter: CB&Q). Record Group 33, Box 97, Folder 754. Decade Subject Files—Strike. Correspondence Forbes, April–July 1888.
- 3 Because of the absence of a central bank before 1914 and the US banks' reliance on Treasury securities for issuing paper money monetary questions and the public debt were even closer related than at other times. See Singleton 2011, 51.
- 4 *Monthly Investment Circular* No. 14, April 1888. Banking House of John H. Davis, NL CB&Q, RG 33, Box 97, Folder 754.
- 5 *Monthly Investment Circular* No. 14, April 1888. Banking House of John H. Davis, NL CB&Q, RG 33, Box 97, Folder 754.
- 6 *Monthly Investment Circular* No. 14, April 1888. Banking House of John H. Davis, NL CB&Q, RG 33, Box 97, Folder 754.
- 7 Villard to Dolph, October 8, 1883, cited in White 2012, 222.
- 8 Charles E. Perkins to Leo Beck, January 8, 1894, NL, CB & Q, Record Group 3, Box 617, Folder 8199. Correspondence Perkins, 1893.

- 9 Charles E. Perkins to Leo Beck, January 8, 1894, NL, CB & Q, Record Group 3, Box 617, Folder 8199. Correspondence Perkins, 1893.
- 10 For the general history of the IMF see the classic contributions by: Eichengreen 1992; Eichengreen 1996; also Bordo and Eichengreen 1993; Schenk 2011; Chwiero 2009; Martin 2022.
- 11 On the Bellagio Group see Connell 2013. On the German monetary discussion see also Hesse 2016. Arguing for a “neoliberal conspiracy”: Schmelzer 2010.
- 12 Horsefield 1969, 187.
- 13 Most prominently and often cited but without any further reference and also limited to the period before 1958: Buchheim 1990. See also and proven for the period before 1954: von Delhaes-Guenther 2003.
- 14 Giersch et al. 1994; 142. Sitzung des Wissenschaftlichen Beirats beim Bundesministerium für Wirtschaft. May 15, 1971, Bundesarchiv B102/136829.
- 15 *Der Spiegel*. “Währungskrise: Deutsche Frage.” November 25, 1968.
- 16 “Protokoll der Sitzung des Außenhandelsbeirats beim Bundesministerium für Wirtschaft und Finanzen, August 23, 1971, Bundesarchiv B102/85142.
- 17 “Protokoll der Sitzung des Außenhandelsbeirates beim Bundesministerium für Wirtschaft und Finanzen, 5.1.1972.” January 5, 1972, Bundesarchiv B102/90767.
- 18 Außenhandelsbeirat beim Bundesminister für Wirtschaft, Memorandum des Außenhandelsbeirats zur langfristigen Wettbewerbssituation der deutschen Ausfuhrwirtschaft, October 1966, Bundesarchiv B102/226530.
- 19 Leiter Abt. 1 (Tietmeyer) an Minister (Friedrich), Spannungen im gemeinschaftlichen Wechselkursverbund. August 23, 1976, Bundesarchiv B102/171704.

Archival Sources

Newberry Library, Chicago, IL. Burlington & Quincy Railroad Company Records. URL: <https://archives.newberry.org/repositories/2/resources/806>.
 Bundesarchiv Koblenz, Germany. BArch B 102 (not digitized).

References

- Barsky, Robert B. and J. Bradford de Long. 1991. “Forecasting Pre-World War I Inflation: the Fisher Effect and the Gold Standard.” *The Quarterly Journal of Economics* 106, no. 3: 815–836. DOI: 10.2307/2937928.
- Beckert, Jens. 2016. *Imagined Futures. Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press. DOI: 10.4159/9780674545878.
- Beckert, Sven. 2001. *The Monied Metropolis: New York City and the Consolidation of the American Bourgeoisie, 1850–1896*. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9781107050822.
- Bergsten, Carl F., and Russell A. Green. 2016. *International Monetary Cooperation: Lessons from the Plaza Accord after Thirty Years*. Washington, DC: Peterson Institute for International Economics.
- Binder, Carola, and Rupal Kamdar. 2022. “Expected and Realized Inflation in Historical Perspective.” *Journal of Economic Perspectives* 36, no. 3: 131–156. DOI: 10.1257/jep.36.3.131.
- Boltho, Andrea. 1996. “Convergence, Competitiveness, and the Exchange Rate.” In *Economic Growth in Europe Since 1945*, edited by Nicholas F. R. Crafts, and Gianni Toniolo, 107–130. Cambridge and New York: Cambridge University Press. DOI: 10.1017/CBO9780511758683.
- Bordo, Michael D., John Landon Lane, and Angela Redish. 2004. “Good Versus Bad Deflation: Lessons from the Gold Standard Era.” *National Bureau of Economic Research Working Paper* no. 10329. DOI: 10.1017/CBO9780511605475.010.
- Bordo, Michael D., and Angela Redish. 2004. “Is Deflation Depressing? Evidence from the Classical Gold Standard.” In *Deflation. Current and Historical Perspectives*, edited by Richard C. K. Burdekin, and Pierre L. Siklos, 191–217. New York: Routledge. DOI: 10.3386/w9520.
- Bordo, Michael D., and Barry J. Eichengreen, eds. 1993. *A Retrospective on the Bretton Woods System: Lessons for International Monetary Reform*. Chicago, IL: University of Chicago Press. DOI: 10.7208/9780226066905.

- Bryan, William J. (1896) 2002. "Crucifying Mankind." In *The Money Changers: Currency Reform from Aristotle to E-cash*, edited by David Boyle, 33–35. London: Routledge. DOI: 10.4324/9781315071992.
- Buchheim, Christoph. 1990. *Die Wiedereingliederung Westdeutschlands in die Weltwirtschaft 1945–1958*. Vol. 31 of *Quellen und Darstellungen zur Zeitgeschichte*, edited by the Institut für Zeitgeschichte. Munich: R. Oldenbourg.
- Buss, Dietrich G. 1978. *Henry Villard: A Study of Transatlantic Investments and Interests, 1870–1895*. New York: Arno Press.
- Carlson, Mark. 2013. "The Panic of 1893." In *Routledge Handbook of Major Events in Economic History*, edited by Randall E. Parker, and Robert Whaples, 40–49. London and New York: Routledge. DOI: 10.4324/9780203067871.
- Cecco, Marcello de. 1984. *The International Gold Standard: Money and Empire*. New York: St. Martin's Press.
- Christiano, Lawrence J., and Martin S. Eichenbaum. 1996. "The Effects of Monetary Policy Shocks: Evidence from the Flow of Funds." *The Review of Economics and Statistics* 78, no. 1: 16–34. DOI: 10.2307/2109845.
- Chwieroth, Jeffrey M. 2009. *Capital Ideas. The IMF and the Rise of Financial Liberalization*. Princeton, NJ: Princeton University Press. DOI: 10.1515/9781400833825.
- Clark, John B. 1895. "The Gold Standard of Currency in the Light of Recent Theory." *Political Science Quarterly* 10, no. 3: 389–403. DOI: 10.2307/2139952.
- Cooper, Peter. 1883. *Ideas for a Science of Good Government, in Addresses, Letters and Articles on a Strictly National Currency, Tariff and Civil Service*. New York: Trow's Printing and Bookbinding Co.
- Connell, Carol M. 2013 *Reforming the World Monetary System: Fritz Machlup and the Bellagio Group*. London: Pickering & Chatto. DOI: 10.1080/00076791.2013.828430.
- Daunton, Martin J. 2023. *The Economic Government of the World: 1933–2023*. London: Allen Lane.
- Delhaes-Guenther, Linda von. 2003. *Erfolgsfaktoren des westdeutschen Exports in den 1950er und 1960er Jahren*. Vol. 22 of *Untersuchungen zur Wirtschafts-, Sozial- und Technikgeschichte*, edited by the Gesellschaft für Westfälische Wirtschaftsgeschichte (GWVG). Dortmund: Ardey Verlag für Westfalen.
- Department of Commerce, Bureau of the Census. 1975. *Historical Statistics of the United States. Colonial Times to 1970*. Washington, DC: US Government Printing Office.
- Eichengreen, Barry J. 1992. *Golden Fetters: The Gold Standard and the Great Depression, 1919–1939*. New York: Oxford University Press. DOI: 10.1093/0195101138.001.0001.
- Eichengreen, Barry J. 1996. *Globalizing Capital: A History of the International Monetary System*. Princeton, NJ: Princeton University Press. DOI: 10.2307/j.ctt7pfmc.
- Eichengreen, Barry J., and Marc Flandreau, eds. 1997. *The Gold Standard in Theory and History*. New York: Routledge. DOI: 10.4324/9780203978870.
- Emminger, Otmar. 1986. *D-Mark, Dollar, Währungskrisen: Erinnerungen eines ehemaligen Bundesbankpräsidenten*. Stuttgart: Deutsche Verlags-Anstalt.
- Feldenkirchen, Wilfried. 1997. *Siemens: von der Werkstatt zum Weltunternehmen*. Munich: Piper.
- Field, Alexander James. 1983. "Land Abundance, Interest/Profit Rates, and Nineteenth-Century American and British Technology." *The Journal of Economic History* 43, no. 2: 405–431. DOI: 10.1017/S0022050700029703.
- Findlay, Ronald, and Kevin H. O'Rourke. 2007. *Power and Plenty. Trade, War and the World Economy in the Second Millennium*. Princeton, NJ: Princeton University Press. DOI: 10.1016/j.jinteco.2008.03.002.
- Fisher, Irving. 1896. "Appreciation and Interest." *Publications of the American Economic Association* 11, no. 4: 1–98.
- Fisher, Irving. 1907. *The Rate of Interest: Its Nature, Determination and Relation to Economic Phenomena*. New York: Macmillan.
- Fisher, Irving. 1912. "A More Stable Gold Standard." *The Economic Journal* 22, no. 88: 570–576. DOI: 10.2307/2222267.
- Fisher, Irving. 1919. "Stabilizing the Dollar." *The American Economic Review*: Supplement 9, no. 1: 156–160. URL: [jstor:stable/1813996](https://www.jstor.org/stable/1813996).
- Flandreau, Marc. 2004. *The Glitter of Gold: France, Bimetallism, and the Emergence of the International Gold Standard, 1848–1873*. Oxford: Oxford University Press. DOI: 10.1093/0199257868.001.0001.

- Foxwell, Herbert Somerton. 1886. *Irregularity of Employment and Fluctuations of Prices*. Edinburgh: Co-operative Print. URL: <https://catalog.hathitrust.org/Record/100534361>.
- Frieden, J.A. 1997. "Monetary Populism in Nineteenth-Century America: An Open Economy Interpretation." *Journal of Economic History* 57, no. 2: 367–395. DOI: 10.1017/S0022050700018489.
- Friedman, Milton, and Anna J. Schwartz. 1963. *A Monetary History of the United States: 1867–1960*. Princeton, NJ: Princeton University Press. DOI: 10.1515/9781400829330.
- Friedman, Milton. 1990. "The Crime of 1873." *Journal of Political Economy* 98, no. 6: 1159–1194. DOI: 10.1086/261730.
- Ganley, Joe, and Chris Salmon. 1997. "The Industrial Impact of Monetary Policy Shocks: Some Stylised Facts." Bank of England Working Paper 68. DOI: 10.2139/ssrn.74661.
- Gerstle, Gary. 2022. *The Rise and Fall of the Neoliberal Order: America and the World in the Free Market Era*. New York: Oxford University Press. DOI: 10.1093/oso/9780197519646.001.0001.
- Geyer, Martin H. 2001. "One Language for the World. The Metric System, International Coinage, Gold Standard, and the Rise of Internationalism, 1850–1900." In *The Mechanics of Internationalism: Culture, Society, and Politics from the 1840s to the First World War*, edited by Martin H. Geyer, and Johannes Paulmann, 55–92. Oxford: Oxford University Press.
- Giersch, Herbert, Karl-Heinz Paqué, and Holger Schmieding. 1994. *The Fading Miracle: Four Decades of Market Economy in Germany*. Cambridge and New York: Cambridge University Press. DOI: 10.1017/CBO9780511628542.
- Gray, William Glenn. 2023. *Trading Power. West Germany's Rise to Global Influence, 1963–1975*. Cambridge: Cambridge University Press. DOI: 10.1017/9781108341196.
- Gray, William Glenn. 2007. "Floating the System: Germany, the United States, and the Breakdown of Bretton Woods, 1969–1973", *Diplomatic History* 31, no. 2: 295–323. DOI: 10.1111/j.1467-7709.2007.00603.x.
- Hagen, Jürgen von. 1998. "Geldpolitik auf neuen Wegen (1971–1978)." In *Fünfzig Jahre Deutsche Mark: Notenbank und Währung in Deutschland seit 1948*, edited by Ernst Baltensperger, and Deutsche Bundesbank, 375–405. Munich: Beck. DOI:10.4232/1.8186.
- Hanes, Christopher. 2006. "Prices." In *Historical Statistics of the United States*, Vol. 3, edited by Susan B. Carter, 147–157. Cambridge: Cambridge University Press.
- Helleiner, Eric. 2010. "A Bretton Woods Moment? The 2007–2008 Crisis and the Future of Global Finance." *International Affairs* 86, no. 3: 619–636. DOI: 10.1111/j.1468-2346.2010.00901.x.
- Helleiner, Eric. 1994. *States and the Reemergence of Global Finance: from Bretton Woods to the 1990s*. Ithaca, NY: Cornell University Press. DOI: 10.7591/9781501701986.
- Hesse, Jan-Otmar. 2023. *Exportweltmeister. Geschichte einer deutschen Obsession*. Berlin: Suhrkamp.
- Hesse, Jan-Otmar. 2016. "Wissenschaftliche Beratung der Wirtschaftspolitik. Das Bundeswirtschaftsministerium und die Volkswirtschaftslehre." In *Das Bundeswirtschaftsministerium in der Ära der Sozialen Marktwirtschaft : der deutsche Weg der Wirtschaftspolitik*, edited by Werner Abelshausen, 391–481. Berlin: De Gruyter. DOI: 10.1515/9783110465266-061.
- Horsefield, J. Keith. 1969. "Articles of Agreement of the International Monetary Fund (July 22, 1944)." In *The International Monetary Fund 1945–1965. Twenty Years of International Monetary Cooperation*. Vol. III, *Documents*, edited by the International Monetary Fund, 185–214. Washington, DC: International Monetary Fund. DOI: 10.5089/9781451972511.071.
- Jevons, William Stanley. 1863. *A Serious Fall in the Value of Gold Ascertained. And its Social Effects Set Forth*. London: Edward Stanford.
- Karczewski, Johannes von. 2008. "Weltwirtschaft ist unser Schicksal": *Helmut Schmidt und die Schaffung der Weltwirtschaftsgipfel*. Bonn: Dietz.
- Kindleberger, Charles P. 1965. "Germany's Persistent Balance-of-Payments Disequilibrium." In *Trade, Growth and the Balance of Payments. Essays in Honor of Gottfried Haberler*, edited by Robert E. Baldwin, 230–248. Chicago, IL and Amsterdam: Rand McNally.
- Kindleberger, Charles Poor. 1978. *Manias, Panics, and Crashes: A History of Financial Crises*. New York: Basic Books. DOI: 10.2307/203353.
- Klein, Maury, and Kozo Yamamura. 1967. "The Growth Strategies of Southern Railroads, 1865–1893." *Business History Review* 41, no. 4: 358–377. DOI: 10.2307/3112646.
- Krauss, Clemens. 2021. *Geldpolitik im Umbruch: die Zentralbanken Frankreichs und der Bundesrepublik Deutschland in den 1970er Jahren*. Berlin: De Gruyter Oldenbourg. DOI: 10.1515/9783110728286.

- Landesberger, Julius. 1895. "The German Silver Commission." *The Economic Journal* 5, no.17: 95–109. DOI: 10.2307/2956237.
- Martin, Jamie. 2022. *The Meddlers: Sovereignty, Empire, and the Birth of Global Economic Governance*. Cambridge, MA: Harvard University Press. DOI: 10.1111/deve.12331.
- Meissner, Christopher M. 2005. "A New World Order: Explaining the International Diffusion of the Gold Standard, 1870–1913." *Journal of International Economics* 66, no. 2: 385–406. DOI: 10.1016/j.jinteco.2004.08.007.
- Molesworth, Guilford Lindsey. 1891. *Silver and Gold: the Money of the World*. Manchester: The Bimetallic League.
- Mourlon-Druol, Emmanuel. 2012. *A Europe Made of Money: the Emergence of the European Monetary System*. Ithaca, NY: Cornell University Press.
- Morys, Matthias. 2023. "The Gold Standard and the Reichsbank: The Transformation of the Monetary Regime." In *An Economic History of the First German Unification*, edited by Ulrich Pfister, and Nikolaus Wolf, 144–159. New York: Routledge. DOI:10.4324/9781003283430.
- Neebe, Reinhard. 2004. *Weichenstellung für die Globalisierung: deutsche Weltmarktpolitik, Europa und Amerika in der Ära Ludwig Erhard*. Cologne: Böhlau.
- Nugent, Walter Terry King. 1968. *Money and American Society, 1865–1880*. New York: Free Press. DOI: 10.2307/3112001.
- Nützenadel, Alexander. 2005. *Stunde der Ökonomen: Wissenschaft, Politik und Expertenkultur in der Bundesrepublik 1949–1974*. Göttingen: Vandenhoeck & Ruprecht.
- Plumpe, Werner. 2017. *Wirtschaftskrisen: Geschichte und Gegenwart*. Munich: C.H. Beck.
- Reinhart, Carmen M., and Kenneth S. Rogoff. 2004. "The Modern History of Exchange Rate Arrangements: A Reinterpretation." *The Quarterly Journal of Economics* 119, no. 1: 1–48. DOI: 10.1162/003355304772839515.
- Reinhart, Carmen M., and Kenneth S. Rogoff. 2009. *This Time Is Different: Eight Centuries of Financial Folly*. 7th ed. Princeton, NJ: Princeton University Press. DOI: 10.2307/j.ctvc4m4gqx.
- Rischbieter, Laura. 2015. "Risiken und Nebenwirkungen. Internationale Finanzstrategien in der Verschuldungskrise der 1980er Jahre." *Geschichte und Gesellschaft* 41, no. 3: 465–493.
- Ritter, Gretchen. 1997. *Goldbugs and Greenbacks: The Antimonopoly Tradition and the Politics of Finance in America*. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9780511807725.
- Romer, Christina D., and David H. Romer. 2013. "The Missing Transmission Mechanism in the Monetary Explanation of the Great Depression." *American Economic Review* 103, no. 3: 66–72. DOI: 10.1257/aer.103.3.66.
- Rosenberg, Hans. 1967. *Grosse Depression und Bismarckzeit: Wirtschaftsablauf, Gesellschaft und Politik in Mitteleuropa*. Berlin: de Gruyter. DOI: 10.1515/9783110814651.
- Schenk, Catherine R. 2010. *The Decline of Sterling: Managing the Retreat of an International Currency 1945–1992*. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9780511676499.
- Schenk, Catherine R. 2011. *International Economic Relations since 1945. The Making of the Contemporary World*. Abingdon and New York: Routledge. DOI: 10.4324/9780203817261.
- Schenk, Catherine R. 1998. "The Origins of the Eurodollar Market in London: 1955–1963." *Explorations in Economic History* 35, no. 2: 221–238.
- Schmelzer, Matthias. 2010. *Freiheit für Wechselkurse und Kapital: die Ursprünge neoliberaler Währungspolitik und die Mont Pèlerin Society*. Marburg: Metropolis-Verlag.
- Schmoller, Gustav. 1913. "Neuere Arbeiten über Geldwertveränderung und neuere Preissteigerung." *Schmollers Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft* 37: 373–382.
- Siegenthaler, Hansjörg. 1993. *Regelvertrauen, Prosperität und Krisen: Die Ungleichmäßigkeit wirtschaftlicher und sozialer Entwicklung als Ergebnis individuellen Handelns und sozialen Lernens*. Tübingen: Mohr.
- Singleton, John. 2011. *Central Banking in the Twentieth Century*. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9780511782053.
- Smith, Gregor W., and R. Todd Smith. 1997. "Greenback-Gold Returns and Expectations of Resumption, 1862–1879." *The Journal of Economic History* 57, no.3: 697–717. DOI: 10.1017/S0022050700019100.
- Spahr, Charles B. 1893. "Giffen's Case against Bimetallism." *Political Science Quarterly* 8, no. 3: 401–425. DOI:10.2307/2139826.

- Steeple, Douglas, and David O. Whitten. 1998. *Democracy in Desperation. The Depression of 1893*. Westport, CT and London: Greenwood Press.
- Steil, Benn. 2013. *The Battle of Bretton Woods : John Maynard Keynes, Harry Dexter White, and the Making of a New World Order*. Princeton, NJ: Princeton University Press. DOI: 10.4000/oeconomia.1043.
- Stover, John F. 1955. "Northern Financial Interests in Southern Railroads, 1865–1900." *The Georgia Historical Quarterly* 39, no. 3: 205–220. URL: [jstor:stable/40577595](https://www.jstor.org/stable/40577595)
- Teupe, Sebastian. 2021. "Inflation and the Negotiation of Wages. Comparative Responses to Monetary Changes in Germany and the United States during the Gold Standard Era, 1876–1926." *Labor History* 62, no. 1: 1–22. DOI: 10.1080/0023656X.2020.1844875.
- Thiemeyer, Guido. 2009. *Internationalismus und Diplomatie: Währungspolitische Kooperation im europäischen Staatensystem 1865–1900*. Studien zur internationalen Geschichte 19. Munich: Oldenbourg. DOI: 10.1524/9783486713800.
- Torp, Cornelius. 2013. "Mitten im Weltmarkt. Globalisierung und deutsche Volkswirtschaft im späten 19. Jahrhundert." In *Otto von Bismarck und die Wirtschaft*, edited by Michael Epkenhans, 1–27. Paderborn: Schöningh.
- United States Congress. Committee on Banking and Currency, William M. Springer, Fred L. Fisher, and United States Congress. 1894. *Report of the Committee on Banking and Currency Together with Hearings Thereof*. Washington, DC: US Government Printing Office. URL: <https://hdl.loc.gov/loc.gdc/gdcsd.0033770279A>.
- Vonyó, Tamás. 2018. *The Economic Consequences of the War: West Germany's Growth Miracle after 1945*. Cambridge and New York: Cambridge University Press. DOI: 10.1017/9781316414927.
- Walker, Francis A. 1889. *Money in its Relations to Trade and Industry*. New York: H. Holt.
- White, Richard. 2012. *Railroaded. The Transcontinentals and the Making of Modern America*. New York: W.W. Norton & Company.
- Wood, John H. 2009. *A History of Central Banking in Great Britain and the United States*. Cambridge: Cambridge University Press. DOI: 10.1016/j.jinteco.2006.04.001.

SOVEREIGN EXPECTATIONS

Theory and History in the Financial Shocks and Crises of the 1970s and 1980s

Sebastian Alvarez and Catherine Schenk

The importance of perspectives and beliefs about the future for understanding economic performance and financial outcomes has been long recognized. Although with different interests and in varying degrees, concerns and views on future economic conditions or specific variables, such as prices, interest rates, employment, or growth, among others, frame and determine the actions of private and public actors throughout their activities and decision-making processes (see also Nützenadel and Streb, Chapter 8 in this volume). Because of its importance, the study of expectations—the way agents shape and form their visions about the future (and vice versa)—has gained a prominent presence in economics since at least the Great Depression of the 1930s and helped inspire more recent theories of behavioral economics, which challenge some of the fundamental assumptions of mainstream expectations theories (see O’Sullivan, Chapter 27, and Schweighofer-Kodritsch, Chapter 4 in this volume). This chapter examines research and developments in the field of economic expectations during the 1970s and 1980s, a time of economic turbulence and major historical changes in the world financial order as well as of the rational expectation revolution in economic theory and its rise to prominence in economic policymaking (on the impact of the 1970s on political and business expectation formation, see Rischbieter, Chapter 28 and Hesse and Teupe, Chapter 29 in this volume).

The purpose of this exploration is to raise questions about the way policymakers and financial sectors engaged with expectations in two major inter-related financial episodes: the sharp increase in interest rates orchestrated by Paul Volcker in 1979 and the international debt crisis of 1982. In the first instance, monetary authorities identified market expectations as a key factor for decision-making and in the second, we explore how expectations were constructed by policymakers and lenders. While the effectiveness of the so-called “Volcker shock” in 1979 was partly attributed to its unforeseen nature, a sovereign debt crisis was widely expected by the early 1980s; yet, this did not translate into adequate preparations for widespread defaults. This chapter will dissect the intricacies of sovereign finance, including the prevalent presence of embedded moral hazard—which emerged as a prominent aspect of the 1980s debt crisis—and how its unique characteristics hamper the reliability of *ex ante* expectations. Moreover, the ability of sovereign borrowers to repeatedly return to international capital markets despite their history of defaults raises doubts

about the utility of historical patterns in predicting sovereign credit risk (see, among others, Eichengreen and Lindert 1991; Tomz 2007; Panizza, Sturzenegger, and Zettelmeyer 2009). Yet, this phenomenon opens avenues of analysis for economic historians who are attuned to changes in institutional contexts.

After the Golden Age of the post-Second World War period, the problems of stagflation and financial instability that followed the end of Bretton Woods in 1973 shook the foundations of the leading macroeconomic paradigms of the time. As the limits of Keynesianism in understanding the new realities became increasingly apparent, economists looked for new theoretical frameworks and analytical tools to think about economic phenomena, economic policy, and the importance of expectations in financial and real outcomes. Indeed, the breakdown of the assumed relationship between inflation and unemployment as embodied in the Phillips curve, gave impetus to the development of the theory of rational expectations that increasingly challenged the predominant adaptive expectations approach (see Sargent 1999; Blinder 2022, Chapter 6). With the development of new macro models and empirical research, the neoclassical framework for the formation and role of expectations gained prominence in the understanding of economic activity, particularly in the domain of macroeconomics.¹ Notably, however, despite a voluminous corpus of research, curious vacuums exist between these theoretical developments and their application to major contemporary financial events.

This chapter focuses on the increasing dominance of expectation approaches and how they were mobilized in the Federal Reserve's monetary policy and in interpretations of the international debt crisis of the 1980s and its immediate causes (see Rischbieter, Chapter 28 in this volume). The sharp rise of international interest rates and deceleration of the world economy that followed the restrictive monetary policy deployed by Paul Volcker to control inflation from 1979 prompted a worldwide wave of sovereign debt crises among developing countries. This ended the international lending boom that had dominated capital markets since the oil shock of 1973 (see, for instance, Lipson 1979; Wionczek 1979; Moffitt 1984; Wellons 1987; Kapstein 1994). A multitude of efforts have taken place among economists as well as political scientists and historians to enhance our understanding of the boom in foreign lending and the global reach of the sovereign debt fallouts in what became the first major international financial crisis since the Great Depression of the 1930s. However, despite their significance, expectations have received limited attention in these analyses, and when they are given more serious consideration, explanations tend to favor the adaptive perspective over the rational approach, despite the latter's overwhelming traction in mainstream economics in academia and policymaking circles at the time.²

Indeed, developments in the economic literature on expectations and the international debt crisis of the 1980s overlap very little. Given its systemic importance and the threats it posed to the US and European financial and banking sectors (Volcker 1983; Cline 1984; Volcker and Gyohten 1992), the outbreak of the crisis attracted a great deal of attention among mainstream macroeconomists. Prominent scholars (albeit not theorists), such as Jeffrey Sachs, William Cline, Barry Eichengreen, and Rüdiger Dornbusch, dedicated considerable effort to the study of the behavior of the market players and the economic dynamics during the lead-up to the crisis and its aftermath.³ Likewise, the most influential macro specialists of leading international organizations and think tanks such as the International Monetary Fund (IMF), the Brookings Institution, the Institute for International Economics, and the United Nations Economic Commission for Latin America and the Caribbean, extensively addressed the topic.⁴ Two seminal contemporary contributions by Eaton and

Gersovitz (1981) and Bulow and Rogoff (1989) questioned the very rationality of lending to sovereigns given the strength of information asymmetries. While discussions within this burgeoning scholarship often referred to expectations about payments, devaluation, inflation, growth, capital flows, interest rates, and more, these analyses had tenuous, if any, connections to concurrent theoretical developments. Conversely, although analytical and empirical models of expectations underwent rigorous testing for various cases and specific episodes of market instability, they largely overlooked the main financial fallouts of the 1980s. Notably, leading macroeconomists and proponents of the adaptive expectation hypothesis, such as Milton Friedman and Edmund Phelps, alongside advocates of the rational expectations approach, like Robert Lucas and Thomas Sargent, remained conspicuously silent about these significant contemporary financial events, despite their direct relevance to their research interests.

We contend that the lack of imbrication between these two bodies of literature underscores the methodological challenges and empirical limitations of expectations theories when it comes to (not) conforming with historical examples and events. To support this argument, we provide concise summaries drawn from contemporary secondary sources as well as recent works and primary sources on the Volcker shock of 1979 and the international debt crisis of 1982 within the context of economic expectations literature. Through this approach, the points of convergence between these research areas become evident. By examining the historiography of these events, we gain insight into how certain contemporary actors grappled with expectations concerns, while also revealing important lacunae in our understanding of expectations formation. Our analysis does not encompass all the financial shocks and crises of these turbulent decades, nor does it cover all empirical studies grounded in expectation theories. However, these two episodes arguably represent the most consequential crises, given their significant economic and financial ramifications and global repercussions. Furthermore, the actors and markets involved were central to global finance and were directly influenced by, and engaged with, the new theoretical developments in the field of economic expectations. This was particularly evident in the case of the Volcker shock, as we shall show, but also in relation to the international debt crisis of 1982.

Expectations and the Volcker Shock of 1979

When Paul Volcker assumed the role of chair of the Federal Reserve Board in August 1979, the Fed had been struggling to contain inflationary pressure for over a decade. Fiscal dominance in the 1960s under Fed chair William McChesney Martin and the reversal of interest rate tightening in the 1970s under his successor, Arthur Burns, had eroded the reputation and credibility of monetary policy. Volcker embarked on a bold and innovative approach to fight inflation, which had risen sharply from less than 6 percent in 1976 to about 11 percent in 1979, peaking at over 13 percent in 1980. Rather than directly targeting interest rates, he opted to control the Federal Reserve funds rate, allowing interest rates to soar from approximately 10 to 14 percent between August and December 1979, and eventually reaching 20 percent in 1981. As a result, the US economy entered an economic downturn from July 1981 until November 1982—the worst in the postwar period—but inflation fell to around 6 percent in 1982 and to 3 percent in 1983. Volcker's decisive actions are widely credited with restoring both price stability and the Fed's monetary policy credibility, ushering in an era of monetarism alongside the adoption of a neo-classical economic policy framework. Because of the role of the US dollar, and despite the existence of flexible or

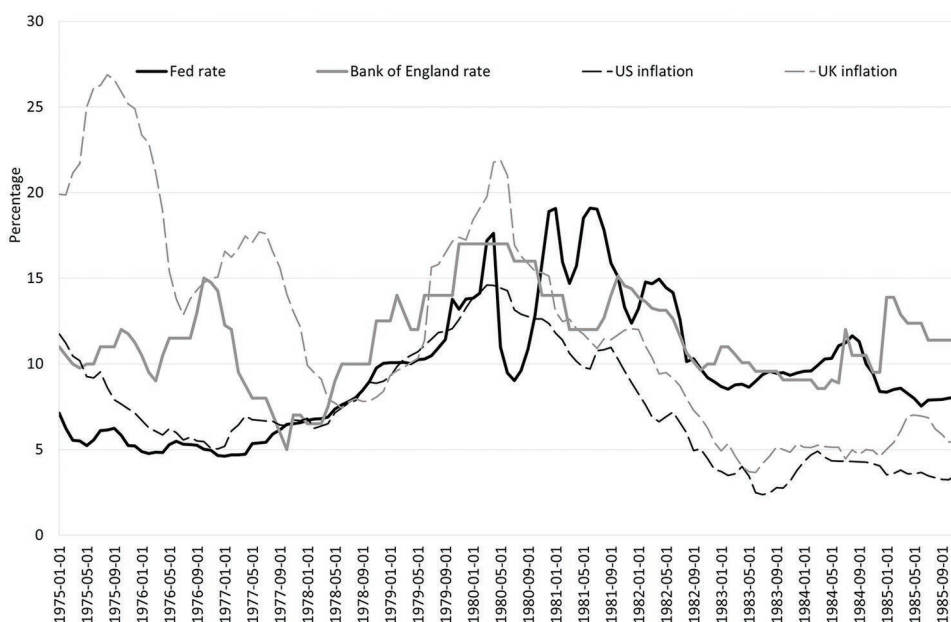


Figure 30.1 Policy rates and inflation in the US and the UK, 1975–1985.

Source: Fred statistics.

floating exchange rates, the impact of US monetary policy reverberated globally, contributing to a rise in nominal international interest rates that placed considerable pressure on world capital markets. Figure 30.1 shows the evolution of policy rates in the United States and the United Kingdom along with monthly inflation rates for the period between 1975 and 1985.

Since the early meetings with Volcker at the helm, the Federal Open Market Committee (FOMC) had placed significant emphasis on managing expectations when shaping monetary policy. In particular, the question of how the Committee could “dampen inflationary expectations” took center stage, and monetary policy was seen as “the principal weapon to break inflationary expectations and to get some deceleration in the actual rate of inflation.”⁵ Eventually, as it came to be recognized, “there [was] absolutely no way in the world other than by affecting expectations to anticipate a reduction in inflation during the calendar year 1980.”⁶ This statement not only underscores the importance of expectations within the framework of monetary policy, it is also evidence of a change in approach. In fact, FOMC members explicitly acknowledged this shift with one member remarking that, while “ten years ago [it] would have sounded like an absolutely absurd assumption,” “by failing to factor expectations in, we’ve completely misspecified [*sic*] the shape of the economy.”⁷ It particularly worried FOMC members that “[their] credibility and hence impact on long term interest rates and inflationary expectations in general will be messed up if [they] don’t meet those goals that [they] have announced.”⁸ Clearly, expectations were part of the development of the Fed’s monetary policy innovation under the new chairmanship of Paul Volcker.

In the context of the stagflation of the 1970s, both inflation and interest rates were variables where it became widely believed that expectations played an important role. On the

one hand, the adaptive expectation perspective—according to which individuals base their expectations on past experiences and adjust them according to the deviation of current values from expected ones—had been applied by Friedman (1968) and Phelps (1967) to explain the breakdown of the stable negative relationship between inflation and unemployment of the Phillips curve. On the other hand, the evolution of the rational expectations approach—which questioned the usefulness of the assumption that individuals can be systematically wrong and do not take into account changes in policy when forming their expectations, as embodied in the Lucas critique—was also concerned with monetary policy and inflation as the key policy challenges of the day (see especially Lucas 1972, 1976; Lucas and Sargent 1979). Under the rational expectations hypothesis, rather than using the past to predict future outcomes, economic agents were treated as if they had an accurate understanding of the economy and could rationally foresee the effects of economic policies using all available relevant information (so-called Full Information Rational Expectations (FIRE), see Born et al. 2023 and Born, Enders, and Müller, Chapter 10 in this volume). In fact, information was key to both approaches; it was crucial in the adaptive expectations approach to correct for wrong predictions and improve (*adapt*) individuals' expectation formation model, while fully available contemporaneous information was a central pillar of rational expectations.

While these theoretical developments and empirical evidence found their way into the heart of Federal Reserve discussions, achieving a consensus and understanding their implications remained far from straightforward. Incorporating expectations into decision-making processes and molding monetary policy was not only a formidable and inherently complex task, but it also faced profound skepticism on the part of some FOMC members. In an illustrative, though informal, exchange during the November 20, 1979, meeting, Mark Willes (President of the Federal Reserve Bank of Minneapolis) sarcastically expressed his appreciation to the staff for “finally understanding rational expectations,” because “we noticed that in our copy of the supplement to Current Economic and Financial Conditions the page that is supposed to have capacity utilization on it [is] blank.” This led him to believe that “they finally understand!” Fed Governor J. Charles Partee reacted by inquiring whether he “mean[t] rational expectations [were] an empty box?,” prompting Fed Governor Nancy Teeters to add that the missing page was likely unique to Mark Willes' copy, Willes being a rational expectations skeptic.⁹ In any case, whatever the perspectives of FOMC members, the potential impacts and arguments presented by both the rational and adaptive expectations approaches were a central part of their deliberations and the FOMC's agenda, particularly concerning interest rates and anti-inflationary policies.

As part of the stagflation puzzle, it was apparent that contrary to the implications of the Phillips curve, efforts to combat inflation might not inevitably lead to significant output losses (see on inflation expectations also Fritzsche and Döpke, Chapter 9 in this volume). Additionally, the pivotal role of the public's perception of the government's strategy in shaping both public and market responses to policies and ultimately determining their effectiveness was increasingly evident. Within this analytical framework, a key implication was the recognition of the paramount importance of institutional and policy credibility, emphasizing the necessity of formulating and executing policies that aligned with the rational expectations of the private sector.¹⁰ In their examination of the FOMC transcripts, Goodfriend and King (2005) demonstrate the extent to which Volcker and the Fed Board thought that establishing the credibility of the Fed's commitment to lowering inflation was critical to the success of their program. Whether through the effects of a more decisive control of monetary aggregates or sustained high short-term interest rates, the key to bringing down

inflation for the new administration lay in managing expectations. The need to improve the Fed's inflation-fighting credibility in the eyes of economic agents in order to contain rising inflation expectations was at the heart of the Volcker shock.¹¹

Acknowledging the role expectations played in curbing inflation, and incorporating this into policymaking, required ways to identify those expectations, and interest rates provided the tools. "One of the major revelations of the FOMC transcripts under Volcker," Goodfriend and King (2005, 997) highlight, is the "recogni[tion] that inflationary expectations were imbedded in long-term interest rates." While the influence of inflation expectations on market interest rates had been long recognized and studied among adaptive expectations scholars (Fisher 1930; Mundell 1963; Gibson 1970), the rational expectations hypothesis pushed the enquiry forward and focused on the term structure of interest rates (see for instance Sargent 1972, 1979; Modigliani and Shiller 1973; Shiller 1981). High short-term Fed rates with falling inflation but accompanied by raising long-term bond rates (e.g., ten-year Treasury Bills) came to be interpreted as an indicator that financial markets expected inflation to return in the future. Indeed, Volcker and FOMC members monitored long-term interest rates not only as an indicator of inflationary expectations but also of the credibility of their disinflationary policy.

The Volcker approach to inflation and expectations implied a decisive change in the conduct of monetary policy and the transmission mechanism. Under both Keynesianism and monetarism—as well as the neoclassical synthesis—the channel by which monetary policy traditionally influenced the short-term economic cycle (i.e. inflation, production, and employment) was by directly affecting the amount of money in circulation in the economy (the money supply) through monetary aggregates, that is banknotes and coins, deposits, repurchase agreements, money market fund units, and debt securities. Whatever the instrument used by the central bank, a monetary policy that led to a contraction of the money supply and a rise of interest rates would affect investment levels and reduce output, leading to an adjustment of prices within the economic system through deflation (see also O'Sullivan, Chapter 27 in this volume). The expectations literature called for a role for the future when accounting for the effects of economic policy. Current consumption spending, for instance, will partly depend on how high or low consumers expect their future income to be. Hence, the impact of monetary policy will also act through the influence on individuals' expectations and their effects on present behavior and economic outcomes.

Rather than controlling price levels by means of the macroeconomic mechanics of monetary aggregates, the strategy moved towards attempting to influence the expectations of economic actors whose activities propelled the transmission channels. In other words, as Walter (2020) has pointed out, monetary policy adopted an inherently forward-looking perspective and it increasingly sought to manage inflation by shaping, or governing through, the future. In particular, the signals sent through the management of the short-term interest rate were to affect long-term interest rates (and asset prices), providing the Fed with more effective tools to control the trajectory of inflation over time (Braun 2005). Such signals would then be transmitted to the price system of the economy through the expectations of economic actors. These changes marked the initial steps into the new era in monetary policy making from the mid-1980s known under the name of "inflation targeting," which was progressively adopted by central banks throughout the 1990s and 2000s, disrupted only by the great financial crisis of 2008, the global pandemic of 2020, and the Russian invasion of Ukraine in February 2022 (Bernanke and Mishkin 1997; Bernanke and Woodford 2004; Cobham et al. 2010).¹²

While the debates on economic expectations had an important impact on central banks and monetary policy, how they help to interpret the Volcker shock and explain its implications is much less clear.¹³ Whether the conquest of inflation was due to the old-fashioned mechanism of tight money and high unemployment—which grew in the USA from 6 to 10.8 percent between 1979 and 1982—or a change in a policy regime that succeeded in positively influencing expectations, or a combination of both, is largely unknown. In a rational expectations framework, policymakers and economic actors share the same macroeconomic model and the effectiveness of monetary policy lies in the combination of anticipated and unanticipated movements along with credibility factors. When it came to fighting inflation, as Sargent (1986, 41) put it, “how costly such a move would be in terms of foregone output and how long it would be in taking effect would depend partly on how resolute and evident the government’s commitment was.” What remains elusive, however, is the extent to which the forces at work in the effectiveness of the anti-inflationary program were the old ones of Keynesian macroeconomics embodied in the Phillips curve, or if the expectations factor undermined or alleviated this tradeoff between inflation and unemployment, and if so, how.

In fact, when it comes to understanding Volcker’s disinflation, the efforts of rational expectations scholarship do not appear entirely proportional to the influence of the rational expectations model on central bank policymaking. Moreover, the few studies on the topic have ambiguous results and inconclusive interpretations. Blanchard (1984), for example, finds no evidence of any effect of the policy regime change on inflation in regard to any given level of unemployment, which could have been due either to unchanged ways of forming expectations or to expectations playing only a small role in the determination of inflation. More recently, Sargent (2022) reflected on the role of rational expectations in explaining how Volcker brought inflation down. In his view, “the FOMC [was] just a decision rule that map[ped] information into its actions, a rule that everyone inside and outside macroeconomic models kn[ew],” but it turned out there is no “coherent description of an FOMC decision rule or evidence that the Fed thought systematically about designing one” (Sargent 2022, 280–284). He finds it difficult, therefore, to reconcile the theoretical framework with the historical and empirical evidence on the Volcker shock, contending that “the gap between actions at the FOMC and how [rational expectation] economists thought choices should be framed did not reflect well on the FOMC” (Sargent 2022, 285).

Apart from central banks and monetary policy, inflation was also related to fiscal matters. In addition to the implications of government deficits on price behavior highlighted by monetarists, the rational expectations framework introduced a forward-looking perspective. A contractionary monetary policy in the absence of an independent central bank and fiscal discipline would not necessarily translate into a reduction of inflation, as individuals anticipate the effects of potential money creation in financing government spending in the future (Wallace and Sargent 1981). To rational observers, US President Ronald Reagan’s economic program and abrupt turn in fiscal policy toward lower taxes and bigger budget deficits would be likely to undermine the credibility and effectiveness of Volcker’s anti-inflationary program. Indeed, as Sargent (1986, 35) stressed,

the high long-term nominal interest rates that prevailed in 1981 and 1982 can be interpreted as reflecting the market’s guess that large deficits would persist and eventually be monetized in large part, leading to high inflation rates in the future.

But the success of the program in permanently reducing inflation suggests that either the fiscal concerns were not a significant issue, long-term interest rates did not accurately reflect inflationary expectations, expectations did not play a role in the transmission mechanism, or a combination of these factors, along with some other potential reasons. Considering the outcomes, the lack of discussion in the rational expectations scholarship regarding the channels and empirical significance of the Lucas Critique and the role of expectations in achieving price stabilization under Volcker is noteworthy.¹⁴

The challenges of the literature on expectations extended to other countries that implemented analogous policies to those of the United States. In the United Kingdom, for example, following a historic peak of 26 percent in 1975, inflation decreased to approximately 7 percent in 1976 before soaring to a new peak of 22 percent in 1980. Similar to Volcker in the US (and the Bundesbank in Germany), Prime Minister Margaret Thatcher's economic advisers, including Alan Walters—a pioneer of rational expectations analysis in monetary models (Kantor 1979; McCallum 2004)—advocated an innovative approach and a fresh monetary attack on inflation (the Bank of England was not independent at this time) (Pepper and Oliver 2001; Needham 2014). Between 1978 and 1980, the Bank rate surged from about 7 to 17 percent and then declined from 15 to 9 percent between 1982 and 1983 (see Figure 30.1). Old-fashioned mechanisms seem also to have been at play in this case, as the UK economy contracted by 5.3 percent in 1981, while the unemployment rate rose from 5.4 percent in 1979 to 11.5 percent in 1983. The impact of rational expectations mechanisms in reducing inflation in this instance is not readily discernible either, particularly regarding the effectiveness of the policy and the credibility of an autonomous central bank. The silence from rational expectations and neo-classical economics regarding these occurrences is particularly remarkable given that their prominence in academic economics has been largely associated with the eradication of inflation.

Expectations and the International Debt Crisis of 1982

The immediate motivations and assessments of the Volcker shock concerned mainly its domestic aspects, but the implications went beyond national borders. After the oil shock of 1973, many developing countries sought to close the gap in their current accounts through sovereign borrowing from banks. While the so-called recycling of petrodollars from oil exporters to borrowers through the international banking system was initially welcomed as a demonstration of how efficient capital markets could resolve global imbalances, the IMF soon began to warn of the risks in the rapid accumulation of dollar-denominated debt.¹⁵ The sharp escalation of short and long-term interest rates at the end of the 1970s in the US came along with an increase in the costs of global liquidity, generating significant pressures in international financial markets. The rise in the price of foreign capital and the appreciation of the US dollar (USD) together with the slowdown of world trade that followed the tight monetary policies of industrial countries, inflicted a major blow to developing countries that had been borrowing heavily through syndicated loans from banks (Sachs 1989; Volcker and Gyohten 1992). Eventually, when Mexico declared a moratorium on its external debt in August 1982, a number of other large international debtor countries that faced similar difficulties, such as Argentina, Brazil, and Venezuela, pursued the same path, unleashing the crisis at an international level. The cascade of defaults severely compromised the balance sheets of creditor banks (mainly, but not only, North American ones) and this intensified the urgency to reschedule to avoid a wider international banking crisis (Devlin 1989; Cline 1995).

The magnitude and scope of defaults, and the threat they represented for creditor banks and the stability of the international banking system, raised questions about market expectations (see referring to these discussions in 1982 Rischbieter, Chapter 28 in this volume). One crucial implication of the rational expectations theory concerned the efficient market hypothesis, positing that the behavior of prices in financial markets reflects all available information for lenders and is tied to the conditional expectations of future prices or circumstances (see, for instance, Sheffrin 2012, Chapter 4). With this framework in mind, scholars have thoroughly examined international credit markets, analyzing the pricing of bank loans and the trends in bond yields to evaluate their association with the sovereign debt payment issues. Economic fundamentals, alongside the fiscal and monetary developments of debtor countries, were used to ascertain the repayment profile and the expected probability of default as captured in the spread or premium charged to the borrowers. Despite various metrics and empirical strategies employed in these investigations, determining the extent to which financial markets, in this case specifically lending banks, anticipated the international debt crisis has proven challenging (Feder and Just 1977; Edwards 1984, 1986; Özler 1993; Rockerbie 1995). In the case of sovereign loans, the lack of a transparent price discovery mechanism on banks' balance sheets, since their assets were not tradeable in a market similar to bonds, added to the complexity.¹⁶ Cruces and Trebesch (2013) found, for instance, that sovereign debt restructurings that posed higher losses for lenders were reflected in higher borrowing costs when the sovereigns returned to the market, but their data pertain mainly to bond markets. Ultimately, the recurrent systemic financial crises and widespread and repeated debt repayment problems are difficult to align with the provisions of the rational expectations and efficient market hypotheses.

One approach to reconcile the theory with the history is to consider the unique characteristics of sovereign debt. Sovereigns depend on uncertain tax revenues to repay their debts, often experience currency mismatches between government income and external debt obligations, and the timing of defaults can be affected by idiosyncratic political factors. Private sector creditors face substantial challenges in seizing assets forcibly in place of payment, but as Walter Wriston of Citibank (a leading creditor) famously put it back then, "countries don't go bankrupt." Moreover, by the 1970s the probability of a sovereign collapse without third-party financial aid and IMF rescue programs (which frequently entail creditor bailouts) was minimal.¹⁷ Whereas lenders priced the repayment likelihood based on their expectations of the borrowing countries' future economic and fiscal performance, the presence of moral hazard (the possibility for example of a situation where a party acts recklessly, assuming others will cover the adverse effects) affected the perception of risk and undermined the significance of accurate expectations.¹⁸ When questioned in 1977 by IMF officials about Deutsche Bank's sovereign lending, Wilfred Guth (a member of the bank's management board) remarked that

although his bank was concerned at the increase that had taken place in the country risks that it was running, they relied on the assumption that in the end countries would be 'bailed out' and therefore could not become externally bankrupt.¹⁹

Indeed, state involvement on both the lending and borrowing sides obscured market rationality, as highlighted in Anna Schwartz's (1989) critique of the role of the IMF. Schwartz argued that borrowers and lenders were incentivized to collude, sustaining a mythical level of debt repayable to access support for the release of additional funds from states and international

financial institutions. Furthermore, the common practice of syndicating credits among multiple (sometimes hundreds) of banks could have distorted banks' risk assessments and led them to underestimate losses from unmet revenue projections (see Friedman 1983).

The dynamics of expectations surrounding the international debt crisis and the Volcker shock were closely intertwined with interest rates, as foreign bank credits to developing countries were primarily arranged at US and UK variable rates. Higher interest rates were likely to induce debt payment problems, triggering an increase in spreads based on expectations of a greater default probability, which would aggravate the borrower's situation and justify or self-confirm the expectations (see, for instance, Ayres et al. 2018). While Volcker's tight monetary policy may have been an unexpected shock, nominal interest rates had been rising under his predecessor, Arthur Burns, although real interest rates were still very negative. By the time the Volcker shock commenced, borrowing countries were already on a path to unsustainable debt. Figure 30.2 illustrates the nominal rate of new sovereign borrowing, specifically the three-month LIBOR and US prime loan rate, between 1973 and 1982. Had interest rates not risen so sharply and suddenly or monetary policy not been effective to stabilize prices, the increase of the debt itself without a rise in servicing could have been sustainable if inflation continued to eat away at it. What these counterfactuals and conjectures highlight is the wide range of potential scenarios and diverse economic dynamics simultaneously at play, bringing into focus the challenge of how lenders could effectively integrate and assess all these factors within their expectation formation process.

Regardless of the borrowers' conditions or the expectations held by lenders, historical evidence suggests that the eruption of a sovereign debt crisis with global ramifications was highly probable in the minds of many policymakers involved in these processes. As noted above, in September 1974, the IMF alerted Executive Board members to the diminishing capital adequacy of bank lenders, advocated enhanced transparency regarding the outstanding debt to developing economies, and recommended a reduction in reliance on the international banking system for financing current account deficits.²⁰ Despite these warnings, central bankers opted to leave lending decisions to the banks, yet their concerns remained. In 1977, the Bank of England initiated a study titled "Possible Consequences of a Default by a Major Borrower Country"—later titled "Apocalypse Now"—which was presented to Volcker and to governors of European central banks and debated at the Bank for International Settlements (BIS) in 1981 and 1982 (see Rischbieter, Chapter 28 in this volume).²¹ While the study's aim was not to predict the likelihood of specific countries defaulting, but rather to examine potential issues within the global banking system in the event of a significant shock to capital markets and how preparations might help ameliorate the impact of a crisis when it came, the exercise and its escalation to central bankers at the BIS confirms that the occurrence of a debt crisis involving a major borrower was not anticipated. Focusing on Brazil and Poland as illustrative examples (both of which eventually defaulted), the study aimed to raise awareness of the underlying issues and encourage ex ante preparations and central bank cooperation.²² The initial iteration of the "Apocalypse Now" study, produced in February 1980, highlighted the various ramifications that such defaults could trigger, as well as the measures authorities could undertake to ensure the stability of the financial system.

The types and range of problems envisioned in the study materialized as realistic anticipations of the challenges faced in the aftermath of the Mexican government's announcement in August 1982 that it would no longer service its bank debt. The study foresaw significant shockwaves across the global financial system, a deceleration in the extension

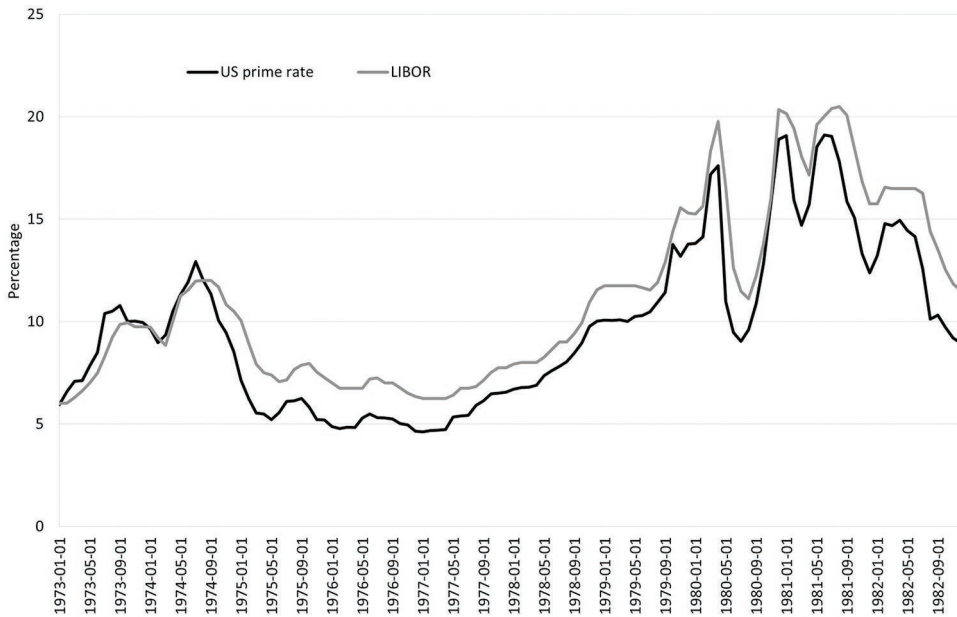


Figure 30.2 US prime rate and UK LIBOR, 1973–1982.

Source: Fred statistics.

of new credit to other borrowers, a contraction of global liquidity, funding pressures, and solvency concerns within certain banks or bank groups. It also highlighted the necessity for banks to bolster loan loss provisions and the potential requirement for an emergency fund or a new IMF/World Bank emergency facility for troubled countries, among other outcomes.²³

Assessing the likelihood of infrequent yet substantial shocks or financial crises might seem daunting within theoretical frameworks,²⁴ but the “Apocalypse Now” study demonstrates that central banks were well-positioned and possessed the analytical capacity to formulate accurate expectations (on central bank communication, see from a general perspective also Dräger, Chapter 12 in this volume). The simulations conducted by the Bank of England were largely informed by its understanding of past episodes, particularly the Credit-Anstalt Bank crisis of 1931 and the more recent Herstatt Bank crisis of 1974. Similarly, the IMF undertook an exercise to draw lessons from the smaller rescheduling episodes of the 1970s to develop a more coherent approach to sovereign defaults (see Sgard 2011). It is evident that historical experience, even from several decades prior, played a role in future planning, central bank coordination, and the management of sovereign debt problems and broader financial crises.

There is obviously a contrast between expectations as used in macroeconomic literature and prudential anticipations for planning, which was at the core of the Apocalypse Now study. Yet, there are at least two aspects where these frameworks overlap and interact with each other. On the one hand, there is commonality in the backward-looking perspective and the relevance and use of the past for extrapolation and the formation of expectations, embedded in adaptive expectations (see Cassis and Schenk 2021a, 2021b). Indeed, one implication of this approach is that expectations can be understood and informed

from past experiences and, thus, can be seen as functions of historical understanding. On the other hand, it also aligns with the rational expectations hypothesis, which posits that agents respond to policy changes or economic fluctuations by considering the long-term consequences. While lenders also recognized and anticipated the emergence of sovereign debt market problems, moral hazard and the desire to protect the book value of existing credits constrained them from curtailing lending. “History doesn’t repeat itself, but it often rhymes,” Mark Twain is alleged to have said. The question is how actors and expectations reckon with this notion and whether, in the end, it obscures or elucidates market rationality.

From an analytical perspective, the Kindleberger-Minsky model of financial crisis and expectations provides a framework where these theoretical and historical approaches meet; revisiting historical episodes of market turbulence, Aliber, Kindleberger, and McCauley (2023) offer a general model of financial crisis based on Minsky in which expectations are at the center of the analysis. Investors and lenders’ behaviors are strongly influenced and determined by their expectations about the future and estimates of the profitability and risks of their investments. Since these expectations are pro-cyclical, they increase the likelihood of financial crisis. Contrary to the backward-looking view from the future to the present embedded in the rational expectation theories, the Kindleberger-Minsky model draws on adaptive expectations in which the future is foreseen as an extension of the trends in the recent past. The analysis is also closely intertwined with, and builds upon, the Keynesian approach to behavior under uncertainty and formation of expectations, as we shall discuss below. While this model significantly departs from the neoclassical macroeconomic approach, it remains the dominant analytical framework to assess, evaluate, and make sense of the role of expectations in the development and dynamics of market behavior during the Latin American debt crisis of the 1980s (and other major financial crises in history more broadly) (see Aliber, Kindleberger, and McCauley 2023, and also Minsky 1972).

What Role for Expectations?

The preceding discussion underscores the difficulties faced by theoretical frameworks in assessing and analyzing how economic actors anticipate the future and shape their expectations. Undoubtedly, when making decisions that have both short- and long-term consequences, individuals generally consider potential scenarios and their repercussions, albeit with varying levels of detail and analysis. What remains less evident is the extent to which such assessments within decision-making account for final outcomes, and what role contingency plays.

At the core of this statement revolves the old distinction between risk and uncertainty, which underlies the Keynesian perspective on expectations and its discrepancies with the neoclassical viewpoint. In his 1921 book *Risk, Uncertainty, and Profit*, Chicago economist Frank Knight delineated a fundamental contrast between scenarios where the outcomes are unknown, yet it is possible to assign precise numerical probabilities to each potential outcome (*risk*), and those where it is impossible to calculate probabilities and all potential outcomes cannot be fully known (*uncertainty*). In this context, Keynes observed that

[while] the expectation of life is only slightly uncertain (...) the sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention, or the position of private wealth-owners in the social system in 1970.

About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know.

(Keynes 1937, 214)

In a fundamentally uncertain world, the assumption of well-defined probability distributions, as implied by the rational expectations approach, not only poses theoretical challenges but also encounters difficulties due to the non-uniformity of how people evaluate probabilities. Indeed, from a Keynesian point of view, agents form their expectations based on subjective assessments assigned to alternative possibilities (for a discussion of these issues see J. Barkley Rosser Jr. 2001; see also Eusepi and Preston, Chapter 3, Schweighofer-Kodritsch, Chapter 4, and Nützenadel and Streb, Chapter 8 in this volume).

The prevalence of unquantified uncertainty and the idiosyncratic assessment of potential outcomes by individuals undermine a statistical or probabilistic approach to expectations. While it was, for instance, conceivable that the Volcker shock could have been foreseen and the potential occurrence of a debt crisis anticipated, accurately predicting their timing presented a notably more complex challenge. Furthermore, the empirical evidence on market prices and computations of the likelihood of defaults is at odds with the rational expectations and efficient market hypotheses. Conversely, the adaptive expectations framework, where economic agents consider recent trends, current events, and market confidence, appears to offer a better explanatory fit for sovereign lending decisions. The dynamics of widespread positive and negative expectations regarding profit prospects and borrowers' repayment conditions, as described in Kindleberger (1978), seem to have influenced bankers during the lending boom and subsequent bust of the 1970s and 1980s. Under this framework, expectations emerge as a central driving force of market behavior and a significant source of instability: dramatic shifts in expectations are indeed responsible for the surge in lending, credit retrenchment, and subsequent crises. Yet, this does not explain the spontaneous change from optimism to fear during periods of increased uncertainty or shocks, without resorting to the concept of so-called (irrational) "animal spirits."

No matter the empirical underpinnings of the various expectations approaches, their prominent role in discussions at the Federal Reserve Board elevated their importance in policymaking. The precise channels through which credibility and expectations influenced the reduction of inflation within the economic system may not be fully understood, but the integration of these factors into the FOMC agenda and deliberations when defining and designing monetary policy institutionalized their role. The progressive incorporation of macroeconomic models that explicitly accounted for expectations in the decision-making process, along with the implementation of new communication strategies and indicators to influence market signals and shape agents' behavior, represented further steps in this direction (see Brayton et al. 1997; Sargent 1999; and in this volume Nützenadel and Streb, Chapter 8 and Müller, Chapter 13).²⁵ Nevertheless, while the Fed's keen interest in addressing expectations more directly may have been influenced by the Lucas Critique to account for individuals' capacity to foresee the effects of policy changes, the relationship could have gone the other way. Given the lack of clarity in the Fed's monetary policy framework, it is hard to fathom how individuals could calibrate their expectations in line with an economic model that even experts in the field found challenging to decode. Rather than "a decision rule that map[ped] its information into its actions, a rule that everyone inside and outside a macroeconomic model kn[ew]" as Thomas Sargent conceived the FOMC (Sargent 2022, 284), it is plausible that market players ended up adapting to, and learning from, the Fed's

new policy regime as they assessed their decision-making in terms of the new measures and resulting outcome.

What both the adaptive and rational expectations frameworks overlook is the role of history in expectations formation. In the context of the international fallouts of the 1980s, Guttentag and Herring (1986) developed their concept of *disaster myopia* to illustrate the difficulty in accurately assessing the probability of infrequent yet significant shocks. Concerning financial crises, they argued that if the previous crisis occurred a long time ago and the market structures have significantly changed, the past is likely to be regarded as less relevant, reducing the perceived likelihood of a similar event. By the time of the 1982 debt crises, half a century had passed since the last major global financial shock, and the IMF functioned as a conditional lender of last resort, fostering an environment conducive to myopia. However, the “Apocalypse Now” study discussed above demonstrates that policymakers did not disregard history but rather drew crucial insights from it to anticipate future outcomes. In recent work, Cassis and Schenk (2021a, 2021b) investigate the relationship between business leaders, policymakers, and the past, examining how historical experiences during financial crises have informed their understanding of economic phenomena. Institutional changes following crises, such as new legislation, regulatory frameworks, firms’ internal procedures, and organizational structures, among others, represent critical mechanisms through which the past has contributed to shaping and framing decision-making processes. Nevertheless, determining the extent to which individual and collective memories of past crises, and learning from historical experiences, influence how economic agents project the future and form their expectations remains challenging.

In the final analysis, while the notion that expectations and economic outcomes are interconnected is widely accepted, the acknowledgment of significant gaps between the theoretical frameworks and empirical explanations of the financial processes at the core of these developments calls for introspection and reflection. For the expectations theorists and neoclassical economists, the apparent failure to account for the success of a monetary rule that aimed to integrate some of the main insights derived from their theories and policy recommendations raises concerns about the epistemological foundations of their methodological pursuits. For Post-Keynesians, the formulation of economic programs and the implementation of macroeconomic policies, heavily influenced and shaped by the rejection of rational expectations ideas, prompt the question of whether there is a need for an analytical framework that transcends the limitations of the unwieldy *animal spirits* hypothesis.

In recent years, inflation has consistently surpassed the targets set and announced by central banks within their inflation targeting programs. Despite this persistent trend, central banks have maintained their focus on these inflation targets as a means to stabilize expectations. The surge in wage demands in response to both current and expected rises in the cost of living has contributed to inflationary pressures, posing a threat to the efficacy of this anchor. After the immediate Covid-19 crises receded, labor shortages in various sectors of multiple economies, attributed to migration constraints and heightened demand especially in health-related service sectors, have further intensified this issue (on expectation formation in the Covid-19 pandemic see Dovern and Krüger, Chapter 33 in this volume). For central bankers, the risk of eroding confidence and exacerbating pressures through higher inflationary expectations is too crucial to ignore. The targets and policymaking processes implemented by central banks to manage expectations have become embedded in the business models and decision-making procedures of economic entities and market players. Although the mechanisms and underlying dynamics remain not fully comprehended, they seemingly

grant this regime substantial leverage and impact. Moreover, this influence persists despite the acknowledgment that achieving *ex ante* announced targets in the medium term is highly improbable and contradicts the current available information and economic policies, which is in conflict with the Lucas Critique and the central insights of the rational expectations approach that motivated the adoption of this policymaking framework in the first place.

Finally, for economic historians the exploration of primary sources and archival records remains a promising avenue for gaining insights into the dynamics of these various developments. From understanding public opinion to examining the perspectives of business leaders and policymakers, delving into these sources can shed light on how these entities navigated issues like future inflation and investment yields. Crucially, it allows for an identification and assessment of shifts in the way these actors and institutions envision and conceptualize the future, particularly in the context of the influence of the rational expectations revolution. The integration of digitization tools and AI has ushered in new methods for managing contemporary historical sources, prompting the potential for more comprehensive understanding of flows of information, expectations, and rationality (see Svetlova, Chapter 11 in this volume). Scholars have actively sought to bridge the gap between theoretical frameworks and real-world dynamics, using historical episodes as a lens of study. The interaction of theory and history remains a rich topic in the field of economic history.

Notes

- 1 See Kantor (1979). Some applications in the field include the so-called peso problem (Rogoff 1977), currency crisis first generation models (Krugman 1979), bank runs and panics (Diamond and Dybvig 1983), and inflation (Fischer 1980; Sargent 1986), among others.
- 2 Expectations are barely mentioned in the most authoritative books on the crisis and international financial processes of the period such as Griffith-Jones (1984), Devlin (1989), Cline (1995), James (1996), and Boughton (2001).
- 3 To quote but a few of their works see Sachs (1989), Eichengreen (1991), and Dornbusch (1989).
- 4 See the work of ECLAC economists, such as Robert Devlin and Ricardo Ffrench-Davis, as well as William Cline from the BI-IE and the occasional paper series by the IMF as Nowzad and Williams (1981), among others.
- 5 Board of Governors of the Federal Reserve System: Meeting of the FOMC on September 18, 1979, 17 and 28.
- 6 Board of Governors of the Federal Reserve System: Meeting of the FOMC on January 9, 1980, 45.
- 7 Board of Governors of the Federal Reserve System: Meeting of the FOMC on January 9, 1980, 59.
- 8 Board of Governors of the Federal Reserve System: Meeting of the FOMC on November 20, 1979, 30.
- 9 Board of Governors of the Federal Reserve System: Meeting of the FOMC on November 20, 1979, 14.
- 10 On credibility and rational expectations see Sargent (1986), Chapter 2.
- 11 Goodfriend and King (2005, 996) stress that “a remarkable feature of the October and November FOMC meetings is the extent to which members discuss market psychology in general and inflation expectations in particular.” See also Silber (2012), 155–156.
- 12 Pre-crisis inflation targets were retained but under-performed during quantitative easing and then have been far exceeded in the inflationary years after the Covid-19 pandemic and during the Ukraine-Russia war.
- 13 To be sure, as his biographer William L. Silber states, Paul Volcker never identified himself with the extreme rational expectation theorists, but his approach to inflationary expectations and central bank credibility was closer to rational expectations than to mainstream monetarism. See Silber (2012), 177.
- 14 See Sargent (1999). Mazumder (2012) finds that the Phillips curve remains highly robust between different Volcker–Greenspan–Bernanke monetary policy regimes.

- 15 As early as September 1974, the IMF was concerned by the risk posed to the international financial system. See “Immediate Issues in the Euro-Currency Market,” September 24, 1974, IMF Archives. SM/74/232.
- 16 Another contributing factor could have been that authorities engaged in forbearance, allowing all participants to continuously roll over the debt until they could inflate it away, and banks could rebuild their balance sheets enough to assign a realistic price. This approach doesn’t apply in a market context where asset prices are not determined administratively.
- 17 Kahler (1985) argues, for instance, that the IMF was regarded as a lender of last resort within the system of bank sovereign lending to developing countries, and the increase of its resources through quota enlargements and borrowing in the late 1970s encouraged moral hazard on both the debtor and lender sides.
- 18 Altamura and Flores Zendejas (2016), Folkerts-Landau (1985), Vaubel (1983), and Guttentag and Herring (1985) have also evoked the possibility of moral hazard among lenders through a herd behavior pattern. Wellons (1985, 1987) has emphasized the importance of the links between banks and their national governments.
- 19 Guth was formerly an Executive Director at the IMF. He gave the IMF’s Per Jacobsson Lecture in 1977, calling for more official lending to finance payments deficits, so he may have been more frank with his IMF interviewers than other bankers. See “Note on a visit to commercial banks in Frankfurt and Munich,” October 18, 1977, BIS Archive File 6.61, Vol. 5. Sgard (2016) emphasizes the symbiotic relationship between lending banks and the IMF, potentially offering creditors more valuable information to assess countries’ payment capacity and improve market efficiency.
- 20 “Immediate Issues in the Euro-Currency Market,” September 24, 1974, IMF Archives SM/74/232.
- 21 Alvarez (2019), 160–161; Schenk (2021). Possible consequences of a default by a major borrowing country (Apocalypse Now/Apocalypse How), Bank of England’s Archives 3A143–International Division Files.
- 22 “Apocalypse Now.” Paper draft, June 1980, Bank of England Archives 3A143/1–International Division Files.
- 23 “Apocalypse Now.” Paper draft, June 1980, Bank of England Archives 3A143/1–International Division Files.
- 24 Guttentag and Herring (1986) develop their concept of disaster myopia to describe the inability to accurately assess the probability of infrequent but large shocks and therefore the tendency to accumulate excessive risk.
- 25 Similar paths were followed by other central banks and international organizations, such as the Bank of Canada and the International Monetary Fund (Dorich et al. 2013).

Archival Sources

International Monetary Fund Archives and Records Management, Washington, DC, United States. Staff Memoranda.

The US National Archives and Records Administration, College Park, MD, United States. Records of the Federal Reserve System, 82.4. <https://www.archives.gov/research/guide-fed-records/groups/082.html>.

Bank of England Archive, London. 3A143—International Division Files.

References

- Aliber, Robert Z., Charles P. Kindleberger, and Robert N. McCauley. 2023. *Manias, Panics, and Crashes: A History of Financial Crises*. 8th ed. Cham: Palgrave Macmillan.
- Altamura, Carlo Edoardo, and Juan Flores Zendejas. 2016. “On the Origins of Moral Hazard: Politics, International Finance and the Latin American Debt Crisis of 1982.” *Working Paper of the Paul Bairoch Institute of Economic History* No. 1. URL: <https://archive-ouverte.unige.ch/unige:82509>.
- Alvarez, Sebastian. 2019. *Mexican Banks and Foreign Finance: From Internationalization to Financial Crisis, 1973–1982*. Cham: Palgrave Macmillan.
- Ayres, João, Gaston Navarro, Juan Pablo Nicolini, and Pedro Teles. 2018. “Sovereign Default: The Role of Expectations.” *Journal of Economic Theory* 175: 803–812.

- Bernanke, Ben S., and Frederic S. Mishkin. 1997. "Inflation Targeting: A New Framework for Monetary Policy?" *The Journal of Economic Perspectives* 11, no. 2: 97–116.
- Bernanke, Ben S., and Michael Woodford, eds. 2004. *The Inflation-Targeting Debate*. Chicago, IL: Chicago University Press.
- Blanchard, Olivier J. 1984. "The Lucas Critique and the Volcker Deflation." *The American Economic Review: Papers and Proceedings* 74, no. 2: 211–215.
- Blinder, Alan S. 2022. *A Monetary and Fiscal History of the United States, 1961–2021*. Princeton, NJ: Princeton University Press.
- Boughton, James M. 2001. *Silent Revolution: The International Monetary Fund, 1979–1989*. Washington, DC: International Monetary Fund.
- Braun, Benjamin. 2005. "Governing the Future: The European Central Bank's Expectation Management during the Great Moderation." *Economy and Society* 44, no. 3: 367–391.
- Brayton, Flint, Eileen Mauskopf, David Reifschneider, Peter Tinsley, and John Williams. 1997. "The Role of Expectations in the FRB/US Macroeconomic Model." *Federal Reserve Bulletin* 227, April: 227–245.
- Bulow, Jeremy, and Kenneth Rogoff. 1989. "A Constant Recontracting Model of Sovereign Debt." *Journal of Political Economy* 97, no. 1: 155–178.
- Cassiss, Youssef, and Catherine Schenk, eds. 2021a. *Remembering and Learning from Financial Crises*. Oxford: Oxford University Press.
- Cassiss, Youssef, and Catherine R. Schenk. 2021b. "Memories and Uses of the Past." In *Remembering and Learning from Financial Crises*, edited by Youssef Cassiss, and Catherine R. Schenk, 1–17. Oxford: Oxford University Press.
- Cline, William R. 1984. *International Debt: Systemic Risk and Policy Response*. Washington, DC: Institute for International Economics.
- Cline, William R. 1995. *International Debt Reexamined*. Washington, DC: Institute for International Economics.
- Cobham, David, Øyvind Eitrheim, Stefan Gerlach, and Jan F. Qvigstad, eds. 2010. *Twenty Years of Inflation Targeting : Lessons Learned and Future Prospects*. Cambridge: Cambridge University Press.
- Cruces, Juan J., and Christoph Trebesch. 2013. "Sovereign Defaults: The Price of Haircuts." *American Economic Journal: Macroeconomics* 5, no. 3: 85–117. DOI: 10.1257/mac.5.3.85.
- Devlin, Robert. 1989. *Debt and Crisis in Latin America: The Supply Side of the Story*. Princeton, NJ: Princeton University Press.
- Diamond, Douglas W., and Philip H. Dybvig. 1983. "Bank Run, Deposit Insurance, and Liquidity." *The Journal of Political Economy* 91, no. 3: 401–419.
- Dorich, José, Michael Johnston, Rhys Mendes, Stephen Murchison, and Yang Zhang. 2013. "ToTEM II: An Updated Version of the Bank of Canada's Quarterly Projection Model." Bank of Canada Technical Report 100, Bank of Canada, Ottawa. DOI: 10.34989/tr-100.
- Dornbusch, Rüdiger. 1989. "Debt Problems and the World Macroeconomy." In *Developing Country Debt and the World Economy*, edited by Jeffrey D. Sachs, 299–312. Chicago, IL: University of Chicago Press.
- Eaton, Jonathan, and Mark Gersovitz. 1981. "Debt with Potential Repudiation: Theoretical and Empirical Analysis." *The Review of Economic Studies* 48, no. 2: 289–309.
- Edwards, Sebastian. 1984. "LDC Foreign Borrowing and Default Risk : An Empirical Investigation, 1976–80." *The American Economic Review* 74, no. 4: 726–734.
- Edwards, Sebastian. 1986. "The Pricing of Bonds and Bank Loans in International Markets: An Empirical Analysis of Developing Countries' Foreign Borrowing." *European Economic Review* 30, no. 3: 565–589. DOI: 10.1016/0014–2921(86)90009-7.
- Eichengreen, Barry J. 1991. "Historical Research on International Lending and Debt." *The Journal of Economic Perspectives* 5, no. 2: 149–169.
- Eichengreen, Barry, and Peter H. Lindert, eds. 1991. *The International Debt Crisis in Historical Perspective*. Cambridge: The MIT Press.
- Feder, Gershon, and Richard E. Just. 1977. "An Analysis of Credit Terms in the Eurodollar Market." *European Economic Review* 9, no. 2: 221–243.
- Fischer, Stanley, ed. 1980. *Rational Expectations and Economic Policy*. Chicago, IL: University of Chicago Press.
- Fisher, Irving. 1930. *The Theory of Interest*. New York: The Macmillan Company.

- Folkerts-Landau, David. 1985. "The Changing Role of International Bank Lending in Development Finance." *Staff Papers—International Monetary Fund* 32, no. 2: 317–363.
- Friedman, Irving Sigmund. 1983. *The World Debt Dilemma: Managing Country Risk*. Washington, DC, and Philadelphia: Council for International Banking Studies & Robert Morris Associates.
- Friedman, Milton. 1968. "The Role of Monetary Policy." *American Economic Review* 58, no. 1: 1–17.
- Gibson, William E. 1970. "Price-Expectations Effects on Interest Rates." *The Journal of Finance* 25, no. 1: 19–34.
- Goodfriend, Marvin, and Robert G. King. 2005. "The Incredible Volcker Disinflation." *Journal of Monetary Economics* 52: 981–1015.
- Griffith-Jones, Stephany. 1984. *International Finance and Latin America*. London: Routledge.
- Guttentag, Jack M., and Richard Herring. 1985. "Commercial Bank Lending to Developing Countries: From Overlending to Underlending to Structural Reform." In *International Debt and the Developing Countries*, edited by Gordon W. Smith, and John T. Cuddington, 129–150. Washington, DC: The World Bank.
- Guttentag, Jack M., and Richard Herring. 1986. "Disaster Myopia in International Banking." Essays in International Finance 164. International Finance Section, Department of Economics, Princeton University.
- J. Barkley Rosser Jr. 2001. "Alternative Keynesian and Post Keynesian Perspective on Uncertainty and Expectations." *Journal of Post Keynesian Economics* 23, no. 4: 545–566.
- James, Harold. 1996. *International Monetary Cooperation Since Bretton Woods*. Washington, DC: International Monetary Fund.
- Kahler, Miles. 1985. "Politics and International Debt: Explaining the Crisis." *International Organization* 39, no. 3: 357–382.
- Kantor, Briant. 1979. "Rational Expectations and Economic Thought." *Journal of Economic Literature* 17, no. 4: 1422–1441.
- Kapstein, Ethan B. 1994. *Governing the Global Economy: International Finance and the State*. Cambridge, MA: Harvard University Press.
- Keynes, John M. 1937. "The General Theory of Employment." *The Quarterly Journal of Economics* 51, no. 2: 209–223. DOI: 10.2307/1882087.
- Kindleberger, Charles Poor. 1978. *Manias, Panics, and Crashes: A History of Financial Crises*. New York: Basic Books.
- Krugman, Paul R. 1979. "A Model of Balance-of-Payments Crises." *Journal of Money, Credit, and Banking* 11, no. 3: 311–325.
- Lipson, Charles. 1979. "The IMF, Commercial Banks, and Third World Debts." In *Debt and Less Developed Countries*, edited by Jonathan David Aronson, 317–333. Boulder, CO: Westview Press.
- Lucas, Robert. 1972. "Expectations and the Neutrality of Money." *Journal of Economic Theory* 4, no. 2: 103–124.
- Lucas, Robert. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 1: 19–46.
- Lucas, Robert, and Thomas J. Sargent. 1979. "After Keynesian Macroeconomics." *Federal Reserve Bank of Minneapolis Quarterly Review* 3, no. 2: 1–16.
- Mazumder, Sandeep. 2012. "The Volcker–Greenspan–Bernanke Phillips Curve." *Applied Economics Letters* 19, no. 4: 387–391.
- McCallum, Bennett T. 2004. "Consistent Expectations, Rational Expectations, Multiple-Solution Indeterminacies, and Least-Squares Learnability." In *Money Matters: Essays in Honour of Alan Walters*, edited by Patrick Minford, 11–24. Cheltenham: Edward Elgar Publishing.
- Minsky, Hyman P. 1972. "Financial Instability Revisited: The Economics of Disaster." *Reappraisal of the Federal Reserve Discount Mechanism* 3: 97–136.
- Modigliani, Franco, and Robert J. Shiller. 1973. "Inflation, Rational Expectations and the Term Structure of Interest Rates." *Economia* 40, no. 157: 12–43.
- Moffitt, Michael. 1984. *World's Money: International Banking from Bretton Woods to the Brink of Insolvency*. New York: Simon and Schuster.
- Mundell, Robert. 1963. "Inflation and Real Interest." *Journal of Political Economy* 71, no. 3: 280–283.
- Needham, Duncan. 2014. *UK Monetary Policy from Devaluation to Thatcher, 1967–82*. Cham: Palgrave Macmillan.

- Nowzad, Bahrain, and Richard C. Williams. 1981. "External Indebtedness of Developing Countries." International Monetary Fund Occasional Paper No. 3. DOI: 10.5089/9781451935875.084.
- Özler, Şule. 1993. "Have Commercial Banks Ignored History?" *American Economic Review* 83, no. 3: 608–620.
- Panizza, Ugo, Federico Sturzenegger, and Jeromin Zettelmeyer. 2009. "The Economics and Law of Sovereign Debt and Default." *Journal of Economic Literature* 47 (September): 651–698. DOI: 10.1257/jel.47.3.651.
- Pepper, Gordon T., and Michael J. Oliver. 2001. *Monetarism Under Thatcher: Lessons for the Future*. Cheltenham: Edward Elgar Publishing.
- Phelps, Edmund S. 1967. "Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time." *Economica* 34, no. 135: 254–281.
- Rockerbie, Duane W. 1995. "Explaining Interest Spreads on Sovereign Eurodollar Loans: LDCs versus DCs, 1978–84." *Applied Economics* 25, no. 5: 609–616.
- Rogoff, Kenneth. 1977. "Rational Expectations in the Foreign Exchange Market Revisited." Unpublished manuscript, Massachusetts Institute of Technology.
- Sachs, Jeffrey D., ed. 1989. *Developing Country Debt and the World Economy*. Chicago, IL: The University of Chicago Press.
- Sargent, Thomas J. 1972. "Rational Expectations and the Term Structure of Interest Rates." *Journal of Money, Credit and Banking* 4, no. 1: 74–97.
- Sargent, Thomas J. 1979. "A Note on Maximum Likelihood Estimation of the Rational Expectations Model of the Term Structure." *Journal of Monetary Economics* 5, no. 1: 133–143.
- Sargent, Thomas J. 1986. *Rational Expectations and Inflation*. New York: Harper and Row.
- Sargent, Thomas J. 1999. *The Conquest of American Inflation*. Princeton, NJ: Princeton University Press.
- Sargent, Thomas J. 2022. "Rational Expectations and Volcker's Disinflation." In *Essays in Honor of Marvin Goodfriend: Economist and Central Banker*, edited by Robert G. King, and Alexander L. Wolman, 279–287. Richmond, VA: Federal Reserve Bank of Richmond.
- Schwartz, Anna. 1989. "International Debts: What's Fact and What's Fiction." *Economic Inquiry* 27, no. 1: 1–29.
- Sgard, Jérôme. 2011. "The IMF Meets Commercial Banks: Sovereign Debt Restructuring between 1970 and 1989." Sciences Po Publications. URL: <https://sciencespo.hal.science/hal-03473808>.
- Sgard, Jérôme. 2016. "How the IMF Did It—Sovereign Debt Restructurings between 1970 and 1989." *Capital Market Law Journal* 11, no. 1: 103–125.
- Sheffrin, Steven M. 2012. *Rational Expectations*. Cambridge: Cambridge University Press.
- Shiller, Robert J. 1981. "Alternative Tests of Rational Expectations Models: The Case of the Term Structure." *Journal of Econometrics* 16, no. 1: 71–87.
- Silber, William L. 2012. *Volcker: The Triumph of Persistence*. London: Bloomsbury Press.
- Tomz, Michael. 2007. *Reputation and International Cooperation: Sovereign Debt across Three Centuries*. Princeton, NJ: Princeton University Press.
- Vaubel, Roland. 1983. "The Moral Hazard of IMF Lending." *The World Economy* 6, no. 3: 291–304.
- Volcker, Paul A., and Toyoo Gyohten. 1992. *Changing Fortunes: The World's Money and the Threat to American Leadership*. New York: Times Books.
- Volcker, Paul A. 1983. "How Serious Is U.S. Bank Exposure?" *Challenge* 26, no. 2: 11.
- Wallace, Neil, and Thomas J. Sargent. 1981. "Some Unpleasant Monetarist Arithmetic." *Federal Reserve Bank of Minneapolis Quarterly Review* 5 (Fall): 1–17.
- Walter, Timo. 2020. "The Janus Face of Inflation Targeting: How Governing Market Expectations of the Future Imprisons Monetary Policy in a Normalized Present." In *Futures Past. Economic Forecasting in the 20th and 21st Century*, edited by Ulrich Fritzsche, Roman Köster, and Laetitia Lenel, 105–137. Berlin: Peter Lang.
- Wellons, Philip A. 1985. "International Debt: The Behavior of Banks in a Politicized Environment." In *The Politics of International Debt*, edited by Miles Kahler, 95–125. Ithaca, NY: Cornell University Press.
- Wellons, Philip A. 1987. *Passing the Buck: Banks, Governments, and Third World Debt*. Boston, MA: Harvard Business School Press.
- Wionczek, Miguel S. 1979. "The LDC External Debt and the Euromarkets: The Impressive Record and the Uncertain Future." *World Development* 7, no. 2: 175–187.

GOVERNMENT-MADE HOUSE PRICE BUBBLES? AUSTERITY, HOMEOWNERSHIP, RENTAL AND CREDIT LIBERALIZATION POLICIES, AND “IRRATIONAL EXUBERANCE” ON HOUSING MARKETS

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Excessive house price increases and housing bubbles that burst, particularly when accompanied by credit booms, are catastrophic events in modern societies, with high economic costs: significant housing wealth, one of the most widely held assets, is destroyed through dispossessions and price crashes (Rosnick and Baker 2010), mortgage defaults put the financial system at risk, and foreclosure waves feed back into the real economy through higher unemployment (Mian and Sufi 2016) and business cycle downturns (Jordà et al. 2016). Thus, theoretically, the housing market is one further case where both fundamental and rational expectation theories have a difficult time dealing with “irrational exuberance” (Shiller 2015), i.e. the decoupling of (expected) prices from fundamentals. Therefore, alternative approaches typically focus on “narrative economics,” where narratives, rumors, or social imaginaries (Beckert 2016), as they are circulating in the media, may drive expectations of seemingly infinite price increases (see also Tuckett, Chapter 5, and Müller, Chapter 13 in this volume). Other approaches highlight the importance of risk in housing investments as well as psychological and behavioral factors (Brzezicka 2021).

This study adds to the many commentaries (Norberg 2009) and studies (McCarty et al. 2013) that see governmental policies as the originator of (expectations about) housing bubbles, but goes beyond studying the effects that run through fiscal (Agnello and Sousa 2013) or monetary (Mishkin 2007) channels. It does so by combining long-run (beginning in 1870) price and rent data from 16 countries with a unique set of independent variables reflecting new regulation indices regarding rent regulation, credit, and homeownership taxation policies (Cerutti et al. 2017; Kholodilin and Kohl 2021; Kholodilin et al. 2023). As the very definition of what makes a bubble is itself contested, we combine three

different bubble definitions, where bubbles are (1) moments of fundamental price-to-rent decoupling¹ of (2) excessive house price developments (booms). We further define bubbles qualitatively through (3) narrative historic case inspection (Baron et al. 2019). These different definitions inform our binary-dependent variable—discussed in detail below—of years experiencing (or not) a housing bubble that is used to estimate logit models on bubble likelihood in a given country and year.

We generally find that tighter rent and credit controls—which were most prevalent between 1914 and 1960 in Europe—reduced the likelihood of excessive house prices, while their post-1960 deregulation, particularly in Anglophone countries, together with increasing tax support for homeowners (particularly, capital gains tax exemptions), was followed by more boom and bubble episodes. Rent control reduces the prospects of future returns on housing investments in general and from the regulated rental segment in particular. It may divert capital away from the housing sector, whereas tax breaks for homeowners incentivize more people to buy, thus driving demand. Yet not all homeownership subsidies have price-driving effects, as they may also make housing cheaper by reducing costs through the provision of cheaper loans, land plots, and construction materials.

Beyond the known effects of a tighter, boom-restricting monetary and fiscal policy (through higher interest rates and less mortgage lending), we also document that decreasing housing construction and government austerity tend to inflate bubbles, as a reduced supply of government bonds leads investors to shift to other assets including stock or residential real estate (Korevaar 2018). The presence of demand-side subsidies like housing allowances, on the other hand, have inflationary effects. We illustrate the mechanisms qualitatively with historical case studies of the price-conservative tenant countries of Germany and Switzerland between 1914 and the 1960s, and the price-excessive homeownership regime in the US in the run-up to the housing bust of 2006.

The chapter is structured as follows: in the next section, we review the existing literature of studies explaining excessive house prices. The subsequent section introduces the unique long-run data set. While the methods section explains the construction of the dependent variable, the result section presents different combinations of logit regressions. The discussion section illustrates the findings by presenting two short historical case studies, before a conclusion summarizes our findings.

Literature Review

This section introduces, first, quantitative studies of house price bubbles and, second, qualitative historical accounts of singular bubbles. Quantitative studies on speculative house price bubbles can be subdivided into two groups. Studies in the first group focus on the detection of speculative bubbles and the analysis of their temporal properties as well as, sometimes, interregional or international co-movements (e.g., Yiu et al. 2013; Caspi 2016; Engsted et al. 2016). Studies in the second group investigate the impact of various macroeconomic variables on the formation of speculative bubbles (for instance, Beltratti and Morana 2010; Agnello and Schuknecht 2011; Igan et al. 2011; Cesa-Bianchi et al. 2015; Punzi 2016; Cerutti et al. 2017; Vogiazas and Alexiou 2017; Kholodilin and Michelsen 2019). While the vast majority of studies concentrate on the period that started in the 1970s, Jordà et al. (2015) were the first to extend the sample back to 1870. The most important determinants of housing prices throughout this literature are demographic factors, income, interest rates, and credit.

There is an extensive literature on potential effects of governmental regulation on property prices generally (not necessarily bubbles). Almost half of these studies consider the impact of land-use regulations. For example, Huang and Tang (2012), using the data on 327 US cities and the Wharton Residential Land Use Regulatory Index of Gyourko et al. (2008), find that restrictive land-use regulations exacerbate the volatility of house-price cycles. They explain their finding by a reduction of supply elasticity in housing markets due to regulation. In addition, Malpezzi (1996) develops a more extensive regulatory environment index that is based on various housing market regulation measures, including rent control, land use and zoning regulations, and infrastructure policies, as well as building and subdivision codes. This index is then used by Malpezzi (1999) to investigate the determinants of house-price-to-income ratios in 133 US metropolitan areas; findings show that the regulatory environment index exerts a positive effect on the equilibrium value of the price-to-income ratio. However, when the endogeneity issue is accounted for using an instrumental variable approach, the effect turns out to be insignificant. Nevertheless, he finds that the stringency of regulation negatively affects the speed of adjustment to equilibrium.

The potential relationships between housing prices and other types of housing policy (including rent control or housing allowances) are mainly estimated using microdata at the level of individual dwellings or residential blocks. Figure 31.1 summarizes the results of empirical research in this area.

Figure 31.1 and Table A1 in the Online Appendix² report the number of empirical studies on the effects of seven types of housing policies: eviction protection, housing allowances,

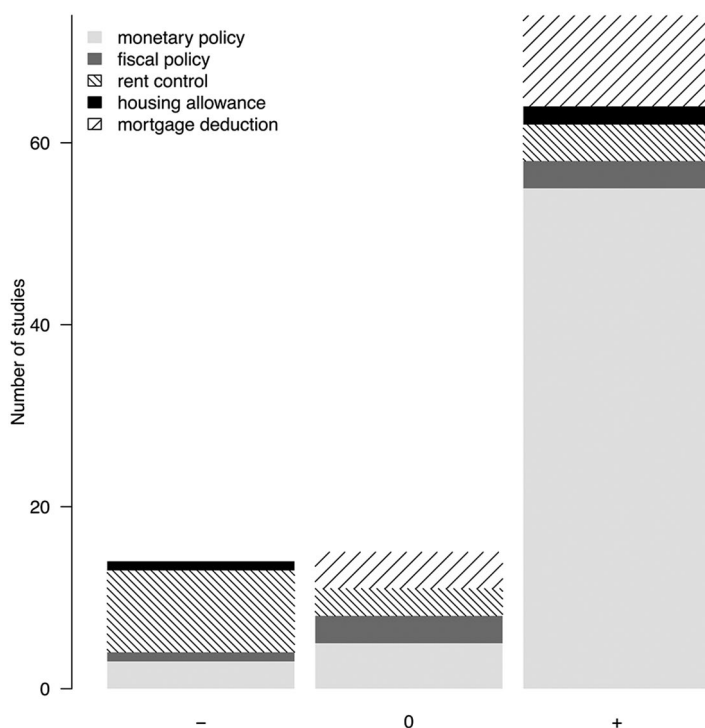


Figure 31.1 Effects of housing policies on property prices.

Source: Author creation.

housing rationing, land-use regulations, mortgage interest deduction, rent control, and social housing—as defined, for example, in Kholodilin (2020). As the right-hand bar shows, most studies find positive effects of housing policies on housing prices. Three policies contribute most to rising property prices: land-use regulations, mortgage interest deductions, and housing allowances.

The negative effect is especially strong in the case of rent control and housing rationing. The rent control effect appears to depend on the generation of rent control. St. John (1990), for example, finds that stricter first-generation controls dampen housing prices, while the second generation exerts no impact. By contrast, Malpezzi and Ball (1993), using a sample of 51 countries and their own index of rent control stringency, calculate that countries with stricter rent control tend to have higher housing prices. There are fewer studies that find *no* statistically significant or negative significant effects of regulations on housing prices, though this may be a publication bias. Housing allowances appear to exert a mainly positive impact on housing prices.

Besides these quantitative studies of house prices and bubbles, several qualitative in-depth studies exist, often motivated by recent major crises, of major housing bubbles. The bursting of the bubble in Japan in 1990, as well as, in particular, the subprime mortgage crisis and the resulting 2007/2008 financial crisis, has given a strong impetus to the study of real estate markets. The broader social, economic, and political contexts of the crisis are analyzed by numerous researchers (e.g., Tooze 2018) and are compared to earlier crises, particularly the Great Depression of 1929–1939 (Reinhart and Rogoff 2009). However, overall, we still know surprisingly little about the socioeconomic and political drivers of historical housing bubbles. The discussion is dominated by quantitative economic historians, while in-depth studies of historical housing crises before 1970 remain a research gap (Yates 2021). Although the history of urbanization (Jackson 1985; Almandoz 2002; Haiyan and Stapleton 2006; Pinol and Walter 2012; Lenger 2013), urban planning (Hein 2017; Glendinning 2021), housing policy (Pooley 1992; Schulz 1993), transnational reform movements (Bullock and Read 1985; Rodgers 1998; Wagner 2016), the promotion of homeownership (Kwak 2015; Kohl 2017), and social housing (Harloe 2008) are addressed in a large body of research, real estate markets as a research topic are largely neglected by historians (Weiss 1989; Kramper 2022), even though housing bubbles are hardly a new phenomenon.

Already the rise of the metropolis in the nineteenth century was characterized by volatile construction cycles, speculative behavior, and bubbles, with serious consequences for the financial sector and real economy (Nützenadel 2011). As a result of globalization, local real estate bubbles already had the potential to develop into transnational crises in the nineteenth century. Local bubbles seem to have increasingly expanded from local to global crises over time (Shiller 2015). Yet, beyond a few case studies (e.g. Yates 2015; Führer 2016), we still know very little about the history of these bubbles or of the actors, institutions, and practices that kept the real estate markets running over the centuries. Our narrative approach below will heavily build on these.

Data

The real and nominal house prices and rent indices as well as the resulting price-to-rent ratios are taken from four different sources: the Bank of International Settlements (BIS),³ the International House Price Database of the Federal Reserve Bank Dallas,⁴ the *Macrohistory*

database,⁵ and the Organisation for Economic Cooperation and Development (OECD).⁶ Table A2 in the Appendix reports the availability of nominal house price data for each of these four sources by country and time. To make the indices more comparable they are all set to the base year 2010. All values of the quarterly indices are divided by the average of the four quarters of 2010 of this index. Based on the different price indices, a combined house price index is constructed as the median of the alternative price indices. In general, the original house price indices are strongly correlated among each other, whereby the correlations between nominal house price indices are higher than between the real house price indices, owing to the difference in the overall price indices used as deflators. Moreover, the *Macrohistory* house price indices have weaker correlations with other indices. To preserve information from all indices, the combined house price-to-rent index is also computed as the median of the OECD and *Macrohistory* indices. The price-to-rent ratios of the OECD appear to be more volatile, which can be explained by their original higher frequency.

Our main explanatory variables are regulatory indices based on the coding of legal documents regarding rent control, homeownership taxation, and credit regulation.

Rent control: The intensity of rent control is approximated by an index that is based on a thorough analysis of the corresponding legal acts and mapped into numeric values, as explained in detail in Kholodilin (2020). Based on a set of questions, each related to a specific aspect of the rental price regulations, binary variables are constructed that equal 1, if regulation is more stringent, and 0 otherwise:

$$I_{jt} = \begin{cases} 1, & \text{if restriction } j \text{ is present } \in \text{period}_t \\ 0, & \text{otherwise} \end{cases}$$

where t is the date on which the law containing such provision is enacted. Thus, each binary variable represents an answer to a question characterizing a particular aspect of the corresponding regulation. If the answer is “yes,” then the binary variable takes value 1; if the answer is “no,” then the variable takes the value 0. Typically, the positive answer corresponds to more limitations from the standpoint of landlords.

Following Weber (2017), we define six binary variables: “Real rent freeze” (the rents are not allowed to grow faster than inflation), “Nominal rent freeze” (the rents are frozen in nominal terms), “Rent level control” (some government body, arbitration council, or court fixes the rent level at the beginning of new contracts), “Intertenant decontrol” (if the rent control ceases with a change of tenant), “Other specific rent decontrol” (certain types of dwellings or settlements are no longer subject to the rent control), and “Specific rent recon- trol” (certain types of dwellings or settlements are subject to more stringent controls).

Housing allowances: Instead of relying solely on rent control, governments have the option to implement subsidies to alleviate the rental burden on households. These subsidies are granted based on specific criteria, primarily household income and rent-to-income ratio. Eligibility is typically evaluated annually. In this study, we approximate this policy by allowance- introduction dummy variables, inspired by a similar approach used by Seelkopf et al. (2021) in their examination of modern taxes. The index is equal to 1 from the moment of introduction of housing allowances on and is set to 0 before that moment; see Appendix Table A3 for the corresponding laws and dates of introduction. Unfortunately, a long-run data set of housing allowances-to-GDP ratio is only available for shorter time periods (Nelson et al. 2020).

Homeownership taxation: Homeownership can be taxed and exempted from taxation in various ways. In the existing literature, the following four types of instruments are mainly considered: the tax on imputed rent, the interest relief on mortgage repayments, the capital gains tax on housing, and the value added tax on the new dwellings (e.g., Wolswijk 2009; Figari et al. 2012). We draw on an existing study that codes the results of existing literature and historical fiscal codes into binary indices of whether a specific tax code promotes homeownership or not (Kholodilin et al. 2023). The four individual binary items are themselves averages and standardized in a composite index that displays the preference a tax system gives to homeowners.

Credit regulation: To approximate how tightly credit markets are regulated, we draw on a set of regulation variables developed by Cerutti et al. (2017), most notably the maximum loan-to-value ratio (LTV), the primary source of mortgage finance (covered bonds versus deposits), and whether there is a full recourse for homeowners.

Finally, we follow the few existing multi-country studies (see Appendix Table A4) for including macroeconomic control variables, most notably GDP and population development, mortgage, government debt, interest rates, and new construction (see Table A5 in Appendix for source details).

Identification of Speculative Price Booms and Bubbles

The empirical tests for speculative exaggerations in real estate prices are based on the assumption that these—provided that market participants are fully informed and rational—are determined exclusively by their expectation of the present value of future rental income. This means that house prices are linked to expected rent development in the long term. Since it is assumed that all known information is immediately reflected in the valuation, the relationship between prices and rents follows a so-called random walk, so it only deviates unsystematically from the fundamentally justified value. If the prices are not a perfect reflection of the income, the price dynamics in this way of thinking can only be explained by speculation. This means that the price development—in addition to the expected development in real demand—is also determined by the pure expectation of rising property prices in the future. When such assessments become the consensus of market participants, a speculative bubble develops in which prices are increasingly decoupled from demand.

Explosive Roots Approach

The so-called Phillips-Shi-Yu test (PSY) was developed to identify multiple, unusually strong, price increases (Phillips et al. 2011). This method, which is used on the basis of quarterly data series on the purchase price-to-rent ratios, makes it possible to determine turning points in house price cycles. The PSY test is based on a rolling regression model:

$$\Delta y_t = \hat{\alpha}_{r_1 r_2} + \hat{\beta}_{r_1 r_2} y_{t-1} + \sum_{k=1}^K \hat{\gamma}_{r_1 r_2}^k \Delta y_{t-k} + \varepsilon_t$$

where y_t is the housing price-to-rent ratio, K is the number of lags, α , β , and γ are the parameters to be estimated, and ε_t is the disturbance term. The subsample used to estimate this

regression using a rolling window starts with r_1 -th fraction and ends with the r_2 -th fraction of the total sample (T). Here, $r_2 = r_1 + r_w$ and $r_w > 0$ define the size of this window in terms of fractions of the sample. The null hypothesis of the tests is a random walk process, where $\hat{\beta}_{r_1 r_2} = 1$

This is tested against the alternative hypothesis of explosive dynamics, where $|\hat{\beta}_{r_1 r_2}| > 1$.

Based on this regression, an augmented Dickey-Fuller test (ADF) is calculated for a sequence of the forward expanding subsamples. The size of the window r_w expands from r_0 through 1, where r_0 is the smallest and 1 is the largest window as fraction of the total sample, the latter corresponding to the total sample size. The point of departure of the sequence of subsamples r_1 is fixed at 0. The end of each subsample (r_2) is equal to r_w and varies between r_0 and 1. The PSY test is then the supremum of the following sequence of the ADF statistics:

$$\text{SADF}(r_0) = \sup_{r_2 \in [r_0, r_1]} \text{ADF}_0^{r_2}$$

Where $\text{ADF}_0^{r_2}$ is the ADF statistic for a sample between 0 and r_2 . The asymptotic critical values for this test are computed using Monte Carlo simulations (Phillips et al. 2015). A big advantage of the PSY tests is that it allows identification of multiple bubbles. By contrast, other tests focus on identification of a single speculative bubble.⁷ The test is applied to each country separately. As a threshold, we use the p -value corresponding to 0.99.

The test is applied to the combined price-to-rent ratio using the package *psymonitor*, which implements the Philips-Shi-Yu test in the programming language R (Phillips et al. 2019). In addition, we impose two further restrictions. First, since the test also identifies “negative bubbles” characterized by decreasing price-to-rent ratio, we speak about speculative bubbles only when the price-to-rent ratio is increasing. Second, we impose the minimum duration of the bubbles of 12 quarters. The resulting chronologies are shown in Figure 31.2.

Ad Hoc Approach

As a second approach and robustness check, we use an ad hoc method of dating the speculative price bubbles. We take advantage of the approach suggested by Goodhart and Hofmann (2008), as it is widely used in the literature and is applicable to quarterly data. In fact, it identifies housing price booms, not bubbles. In other words, it focuses on periods of strongly increasing house prices that are not necessarily decoupled from fundamental values such as rents.

As input, the approach uses real house price indices and comprises three steps. In the first step, we apply the Hodrick-Prescott filter with $\lambda = 100,000$ to the real house price index in order to decompose it into the trend and cyclical components. Second, the potential booms are identified as periods when the relative deviation of the cycle from the trend exceeds 5 percent. In the third step, the minimum duration restriction is imposed: all potential boom phases are removed, if they are shorter than 12 quarters. Figure 31.3 depicts the housing boom dates obtained using this approach. As a rule, the boom episodes are longer and take place more often than the speculative bubble periods.

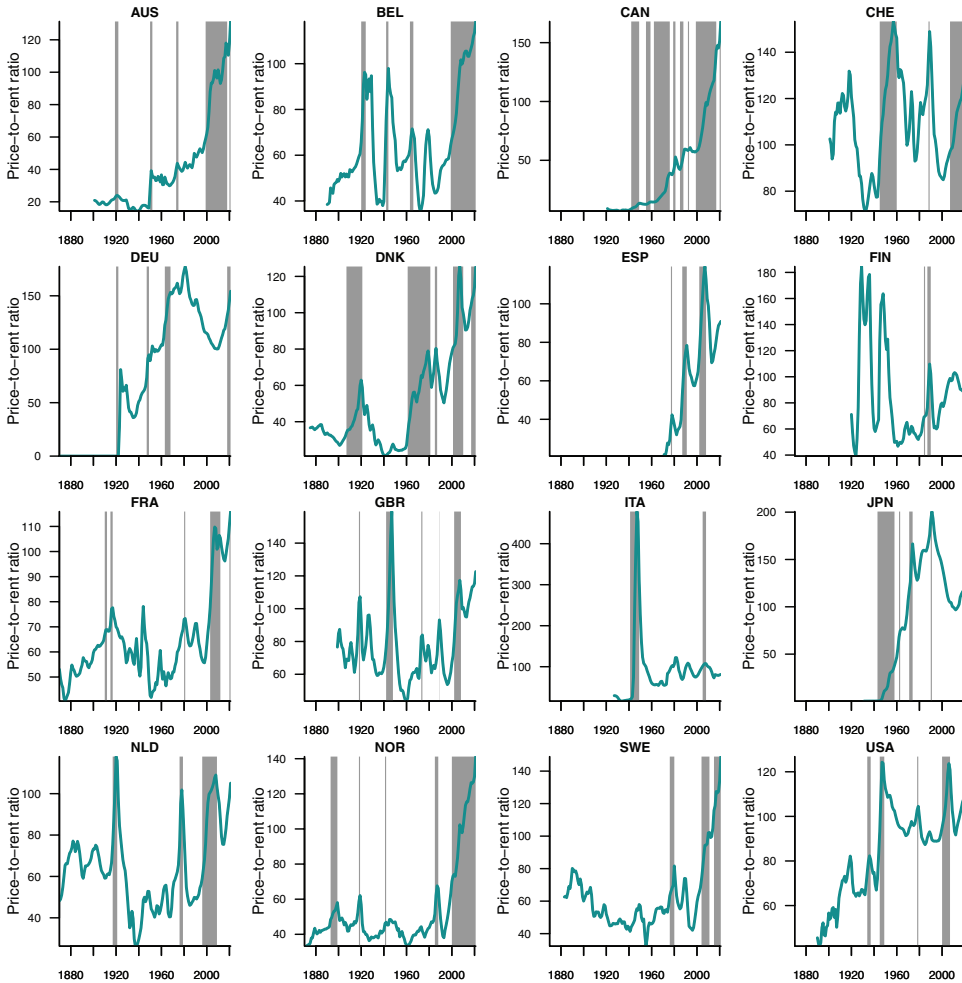


Figure 31.2 Explosive-root chronologies of speculative price bubbles, 1870–2020.

Source: Author creation.

Narrative Approach

Third, and finally, we conduct a qualitative, narrative research into the bubble and housing boom periods identified by the above two approaches to give additional credence to the quantitative identification strategy. We conduct a systematic literature search of the housing historiography in the respective countries to validate that bubbles or booms identified in the data correspond to real housing events and are not merely data residuals. The narratives are presented in the Appendix.

Estimation Results

The probability of a speculative house price bubble as a result of a joint action of various external determinants (such as real GDP, real interest rate, and population growth)⁸ can be estimated using the panel logit model. Logit models are widely used for the identification

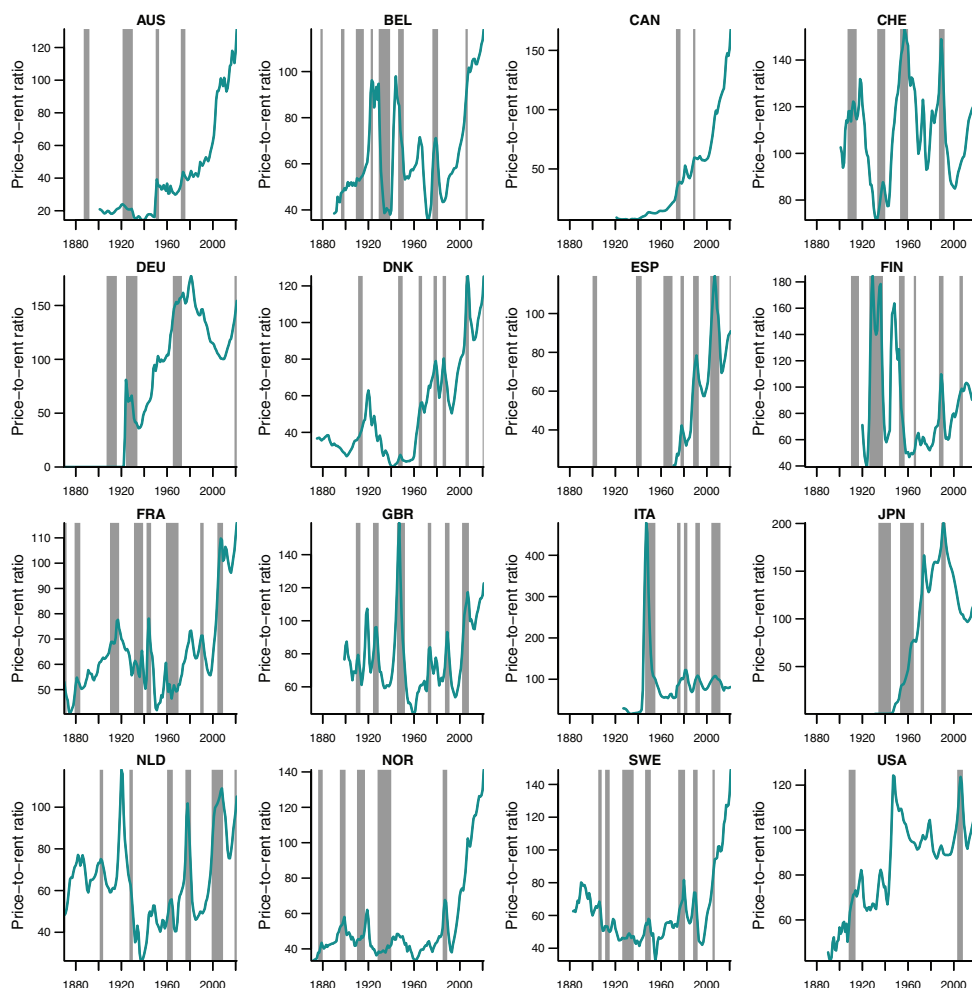


Figure 31.3 Ad hoc chronologies of speculative price bubbles, 1870–2020.

Source: Author creation.

and prediction of economic recessions, currency crises, and speculative bubbles in different asset markets, and estimate the likelihood for a bubble to occur in a given year.⁹ These models allow for determining the statistical significance and the sign of the coefficients of the relevant variables and, hence, to identify under what conditions the build-up of speculative price bubbles is likely. Since speculative bubbles are relatively rare events, the logit models are more appropriate in such a context than the probit models (Kumar et al. 2003). The panel logit model with fixed effects is formulated as follows:

$$\Pr(B_{it} = 1 | X_{it}) = \frac{1}{1 + \exp(-(\alpha_i + X_{it}\beta))}$$

where $\Pr(\cdot)$ is the conditional probability of a speculative price bubble, B_{it} is a binary variable (1 corresponds to the speculative bubble period, while 0 corresponds to the non-bubble

period). This can either be a speculative bubble chronology obtained using the PSY test or the housing boom chronology. X_i is a country-specific fixed effect that accounts for the specific characteristic of the corresponding country that remains constant over time. X_{it} is a vector of explanatory variables and $i = 1, \dots, N$; $t = 1, \dots, T$; N is the number of countries and T is the number of periods. In order to account for endogeneity, all time-variant variables are included as lagged variables. Given that we deal with annual data, only one lag is used (Wooldridge 2012, 658). The panel logit model with fixed effects has two central advantages: it accounts for the unobservable heterogeneity (the omitted variables or variables that are difficult to measure and no restrictions of the correlation between explanatory variables) and reduces the omitted variable bias. The model is estimated using the R-package *bife* (Stammann et al. 2016).

Table 31.1 reports the results for the panel logit with fixed effects estimated for the speculative bubble chronology. It covers the longest period and thus has a restricted set of variables: while GDP exerts no significant effect and interest rates exert a significantly

Table 31.1 Estimation results of models with speculative bubble chronologies based on the PSY-test, 1902–2019

	Model 1	Model 2	Model 3	Model 4
Real GDP Growth _{<i>t-1</i>}	-0.015 (0.015)	-0.012 (0.015)	0.025 (0.019)	0.028 (0.019)
Population Growth _{<i>t-1</i>}	0.634*** (0.133)	0.640*** (0.138)	0.801*** (0.185)	0.892*** (0.192)
Long-term interest rate _{<i>t-1</i>}	-0.095*** (0.021)	-0.097*** (0.022)	-0.052* (0.028)	-0.060** (0.029)
Govt debt-to-GDP ratio _{<i>t-1</i>}			-0.969*** (0.293)	-1.135*** (0.303)
Mortgage debt-to-GDP ratio _{<i>t-1</i>}			2.700*** (0.489)	2.195*** (0.528)
New construction _{<i>t-1</i>}			-0.425*** (0.145)	-0.583*** (0.147)
Rent control _{<i>t-1</i>}	0.813*** (0.229)	0.943*** (0.241)	1.551*** (0.300)	1.666*** (0.316)
Housing allowance introduction _{<i>t-1</i>}	1.489*** (0.167)	1.300*** (0.191)	1.497*** (0.241)	1.506*** (0.255)
Owner tax bias _{<i>t-1</i>}	-0.539 (0.439)		-1.074** (0.536)	
Imputed rent tax exemption _{<i>t-1</i>}		0.342 (0.223)		0.269 (0.276)
Mortgage interest deduction _{<i>t-1</i>}		0.930*** (0.296)		0.807** (0.375)
VAT exemption _{<i>t-1</i>}		-0.554*** (0.180)		-0.836*** (0.228)
Capital gains tax exemption _{<i>t-1</i>}		-0.054 (0.264)		-0.364 (0.332)
Log Likelihood	-828.884	-817.506	-633.810	-623.737
Number of observations	1713	1713	1430	1430

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

negative effect on bubble likelihood, the regulation of the rental and ownership sector is more complex. The introduction of housing allowances as demand-side subsidies significantly increases price booms, whereas the rent control effect is largely insignificant or, where it is significant, has a positive effect on bubble likelihood in the long-run analysis. Upon closer inspection of the war-unaffected sample starting in 1950 (Table 31.2), this effect seems to be entirely driven by the pre-1950 period of high rent control, when rent control may have reduced the denominator of the price-to-rent ratios and, hence, increased the bubble likelihood, offsetting the negative effect from lowering expectation of future rental revenues. The explanation might be that rent control was expected to remain temporary and, thus, real house prices did not fall to the same extent as real rents. The increase in the price-to-rent ratio during this period might thus indicate more of a crisis than a housing bubble. In the post-1950 period, by contrast, the situation seems to be reversed, where the expectation effect prevails over the price-to-rent-ratio effect. The general effect of homeowner-biased taxation systems (or high scores on the neutrality index), in turn, is one of fueling the bubble, but the decomposition of the index into

Table 31.2 Estimation results of models with speculative bubble chronologies based on the PSY-test, 1950–2018

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
Real GDP Growth _{<i>t</i>-1}	0.091*** (0.033)	0.110*** (0.033)	0.085** (0.041)	0.090** (0.041)
Population Growth _{<i>t</i>-1}	1.037*** (0.179)	1.099*** (0.185)	0.908*** (0.225)	0.921*** (0.229)
Long-term interest rate _{<i>t</i>-1}	-0.050** (0.024)	-0.033 (0.026)	-0.055* (0.032)	-0.039 (0.033)
Govt debt-to-GDP ratio _{<i>t</i>-1}			-3.612*** (0.558)	-3.821*** (0.580)
Mortgage debt-to-GDP ratio _{<i>t</i>-1}			3.257*** (0.606)	2.913*** (0.640)
New construction _{<i>t</i>-1}			0.393 (0.423)	0.409 (0.252)
Rent control _{<i>t</i>-1}	-1.623*** (0.408)	-1.114** (0.434)	-1.826*** (0.470)	-1.591*** (0.489)
Housing allowance introduction _{<i>t</i>-1}	1.417*** (0.250)	1.298*** (0.257)	1.239*** (0.303)	1.170*** (0.310)
Owner tax bias _{<i>t</i>-1}	0.175 (0.555)		-0.540 (0.682)	
Imputed rent tax exemption _{<i>t</i>-1}		0.768*** (0.293)		0.465 (0.339)
Mortgage interest deduction _{<i>t</i>-1}		0.596 (0.377)		-0.209 (0.458)
VAT exemption _{<i>t</i>-1}		-0.633*** (0.237)		-0.674** (0.282)
Capital gains tax exemption _{<i>t</i>-1}		0.203 (0.389)		0.394 (0.447)
Log Likelihood	-573.170	-565.639	-461.838	-458.378
Number of observations	1226	1226	1105	1105

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 31.3 Estimation results of models with speculative bubble chronologies based on the PSY-test (pooled models), 1970–2012

	Model 1	Model 2
Intercept	-7.300*** (1.616)	-1.762 (1.859)
Real GDP Growth _{t-1}	0.126** (0.050)	0.132** (0.053)
Population Growth _{t-1}	2.076*** (0.340)	2.369*** (0.384)
Long-term interest rate _{t-1}	-0.106*** (0.040)	-0.159*** (0.044)
Govt debt-to-GDP ratio _{t-1}	-0.639 (0.451)	-3.117*** (0.653)
Mortgage debt-to-GDP ratio _{t-1}	1.749*** (0.535)	1.665*** (0.609)
New construction _{t-1}	0.601** (0.296)	0.546* (0.323)
Rent control _{t-1}	-1.805*** (0.530)	-1.418** (0.587)
Housing allowance introduction _{t-1}	0.755*** (0.281)	1.496*** (0.343)
Full mortgage recourse _t	-1.083* (0.615)	-1.957*** (0.734)
Maximum LTV _t	0.042*** (0.008)	-0.015 (0.011)
Retail mortgages _t	1.896*** (0.495)	3.531*** (0.625)
Mortgage bonds _t	3.840*** (0.730)	5.950*** (0.888)
MBS _t	-0.801 (0.803)	0.939 (0.943)
Owner tax bias _{t-1}	-0.595 (0.629)	
Imputed rent tax exemption _{t-1}		-0.501 (0.319)
Mortgage interest deduction _{t-1}		-0.389 (0.338)
VAT exemption _{t-1}		-1.521*** (0.290)
Capital gains tax exemption _{t-1}		2.258*** (0.352)
AIC	706.389	642.413
BIC	774.677	724.359
Log Likelihood	-338.194	-303.207
Number of observations	701	701

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

its distinct items in Model 3 and Model 5 shows that this is mainly driven by exempting homeowners from imputed rent and full mortgage interest payments. The VAT exemption, which may incentivize housing construction generally, tends on the other hand to take the air out of the bubble.

The next specification in Table 31.3 includes more explanatory variables but covers a substantially shorter period (after the Second World War). While mortgage indebtedness adds to the effects of lower interest rates in increasing bubble likelihood, it is government debt that has the opposite effect by potentially crowding out private demand via capital markets. This also implies that austerity programs may add to more investor demand for private housing and fuel bubble activity. Rather than deflating house price increases, new housing construction, private or public, rather seems to positively affect prices in the short run by further fueling speculation. While most other effects behave similarly—with population and GDP growth driving bubble activity significantly—the capital gains tax exemption for homeowners becomes significantly positive, privileging housing over other capital investments, making the total effect of owner taxation bias ambiguous. Introducing stricter capital gains taxation would lower the risk of strong house price growth.

As a robustness check, we present the same long-run and short-run estimations for the housing market boom in a chronology based on the Goodhart and Hofmann (2008) approach (Tables A6 and A7 in the Appendix), where rent prices are not taken into account. Generally, the results point in the same direction, though at lower significance levels, where the ownership bias of housing taxation systems remains an ambiguous variable.

Discussion

In the following, we discuss the significance of governmental interventions for housing booms by looking qualitatively at three exemplary regulations—rent control, homeownership taxation, and credit regulation—in two exemplary periods, the earlier from 1914 to the 1960s with low boom likelihood and the later period from the 1960s up to and including the 2010s, during which the majority of booms and bubbles occurred. In our brief historical case studies, we first focus on the two price-conservative tenant countries *par excellence*, Germany and Switzerland, and show how rent regulation, housing subsidies, and more conservative credit regulations and homeownership taxation restrained real house prices and the formation of bubbles. For the post-1960 period, by contrast, we focus on the US mortgage crisis as prime example for how regulations made the biggest house price bubble possible in 2001–2007.

Case 1: Price-Conservative Tenant Countries

The impact of interventions between 1914 and the 1960s is well illustrated by the examples of Germany and Switzerland. These neighboring countries are well suited for comparison, as only Germany was directly involved in the world wars, but both countries experienced periods of precarious housing shortages. House prices fell sharply in both countries during the crises—in Germany, real prices remained at low levels for decades, while in Switzerland they fell sharply during each of the two wars but subsequently recovered. In Switzerland, it took until the 1950s and in Germany until the 1960s for them to return to their pre-First World War levels (see Figure 31.3). Germany and Switzerland were unequally affected by the wars in terms of housing and Switzerland returned temporarily to the liberal

housing market in the interwar period. However, in both countries the housing markets were strongly influenced by government interventions, and the housing question was considered to be “political issue No. 1,” as Swiss Federal Councilor Ernst Brugger put it in 1970 (Müller 2022). Rent control and construction subsidies lowered house prices whereas by contrast, tenure-neutral homeowner taxation and credit controls deflated the likelihood of bubbles.

From 1914 to the 1960s, both homeownership taxation and credit controls tended to have rather moderate effects on house prices. The introduction of taxes, such as taxes on imputed rent in 1920 (Germany) and 1934 (Switzerland), prevented the emergence of a “hidden homeownership welfare state” (Kholodilin et al. 2023), as it developed in countries like Ireland (Norris 2016) and the US (Howard 1999). Furthermore, as loan-to-value ratios were often limited to home buyers, mortgage debt growth was reduced to a certain extent, with speculative, highly leveraged, transactions discouraged (Fischer 1955; Kohl 2017; Sattler 2022). Tenant protection and rent control, along with construction subsidies, were among the key housing policy measures of those years. Whereas in countries like the US homeownership was strongly promoted, housing policy in Germany and Switzerland was relatively tenure-neutral (Kurz 1993; Kornemann 1996; von Beyme 1999). The subsidies strongly benefited the (for profit and non-profit) rental housing market. Simultaneously, rental markets were subject to substantial regulation. Rent controls cap rent increases or, in their strict form, even freeze rents. This typically leads to lower rent increases for regulated dwellings, albeit the rents for non-regulated dwellings can increase at a stronger pace. However, as a rule, in the beginning, the uncontrolled sector is very small compared to the controlled one. Typically, newly-built and sometimes luxury dwellings are exempted from rent control and their proportion in the total housing stock is tiny.

As in many other countries, in both Germany and Switzerland, rent control was first introduced in the wake of the First World War together with other interventions in the housing market. After hitting highs in the early 1910s, housing construction had already fallen before 1914, subsequently collapsing during the war (Saitzew 1920; Wischermann 1997). War and crisis lowered investors’ expectations, with rent control making investment even less attractive, which resulted in housing shortages and precarious housing conditions. In Germany, there was a consensus among almost all political parties that tenants needed to be protected. Between 1920 and 1923, a series of laws were passed by the Weimar Republic that would shape rental policy for decades to come. Strict rent control and inflation led to a sharp reduction in the rent burden for tenants (Führer 1995b). In neutral Switzerland, rent control was weaker, but a severe housing shortage by the end of the war forced the corporatist-liberal government to introduce housing subsidies for the first time (Zitelmann 2018).

Both countries witnessed a collapse in real house prices, but housing markets developed in very different directions during the interwar period. In general, in the countries surveyed in this chapter, the interwar years were characterized by an upswing in the 1920s and the downturn of the Great Depression. In Germany, recovery was slow, and ended after the outbreak of the Great Depression. Low returns, high construction costs, and high interest rates, as well as rent control (temporarily relaxed from 1924), kept investors on the sidelines, with new construction strongly driven by subsidies (Führer 1995a). As a result, real house prices remained far below their 1914 levels. In Switzerland, the recovery was stronger and resulted in a speculative boom. Investing in real estate was much more profitable than in Germany. Interventions in the rental market were lifted by the mid-1920s, and

the need for shelter, a liquid capital market, rising rents and high profitability made investing in residential buildings attractive, resulting in a flood of domestic and foreign capital into real estate assets (Christen 1964). Although the Swiss Builders' Association warned of a real estate crisis in 1927, the housing bubble did not reach its peak until 1932 and construction remained relatively high until it crashed after 1934, with real house prices again climbing to pre-First World War levels (Müller 2022). Such a short-lived boom could also be observed in numerous other—both continental European and Anglophone—countries. Alongside economic recovery and (partial) deregulation of rent control, a boom—often speculative—developed, which collapsed during the Great Depression.

The short rise and subsequent fall in the price-to-rent ratio in the war and interwar periods in many countries can be explained by house prices not falling to the same extent as regulated rents, as a recovery and deregulation were expected. The expectation of rising prices in the future seems to have prevented house prices from falling to the extent that we would expect as a result of rent control. This may explain the surprising pre-1950 result discussed below of rent control increasing bubble likelihood, as estimated by our model.

During the Second World War, the housing situation worsened. Nazi Germany had already frozen rents in 1936 and Switzerland had reintroduced rent control in the wake of the devaluation of the Swiss franc in 1936. Subsequently, the outbreak of the war led to stronger regulation (Schulz 1986; Zimmermann 1997). While house prices in Germany remained at low levels, they collapsed in Switzerland. Expected returns fell as the war endured and construction costs rose. Alongside rent control, material and labor shortages inhibited new construction in Switzerland, even though it was not directly involved in the military conflict. To stimulate new construction, the federal government introduced a housing construction subsidy program in 1942 for the second time in its history (Müller 2021).

The situation remained precarious after the war. Rent control and tenant protection continued, whereby subsidy programs were intended to address the housing shortage (although in Switzerland subsidies were already strongly reduced in 1950). With the beginning postwar boom, house prices began to rise again, but pre-First World War levels were not reached until the 1950s in Switzerland and not even until the 1960s in Germany. As shown below, the slow recovery of house prices post-Second World War correlated with rent control. Rent controls slowed down price increases. But rising construction costs and land prices as well as economic growth drove up the prices of new dwellings. With rents for new, non-subsidized dwellings deregulated in the early 1950s, the gap between rents of the old and the new stock grew strongly (Hausmann 2016). As new housing became a larger share of the stock, eventually the old stock was also deregulated; ultimately prices rose rapidly. This effect is particularly evident in Germany, where prices increased dramatically after deregulation in the 1960s (Schulz 1993; Kühne-Büning et al. 1999). Coupled with a prospering economy, rising incomes, population growth, and a persistent housing shortage, deregulation led to rent and house price increases far above the rate of inflation, giving rise to a controversial public debate about speculative housing (Führer 2016; Müller 2022; on the impact of inflation expectations, see more generally D'Acunzio and Weber, Chapter 7 in this volume). Even in other countries, house prices increased significantly in parallel with (partial) liberalization of the housing markets; for instance, in France from 1948, in Australia from 1949, and in Norway from 1954 (Eitrheim and Erlandsen 2005; Stapledon 2007; Friggit 2009). However, our results below suggest that second generation rent control, which replaced stricter controls, prevented house prices from rising even more sharply

post-1950. The case of Germany is furthermore well suited to illustrate on how strict price controls may reduce the risk of bubbles in the short run but can increase it in the long run through effects of liberalization. Deregulation fueled price increases. Strict rent control was highly effective, but the time-limited design of price controls and the exclusion of certain categories entailed risks in the long run, as it led to a divided housing market, but held out the prospect of freeing up rents of the old stock in the long term. When deregulation was finally adopted, the prices of the “old” apartments quickly adjusted to the level of the free sector in anticipation of rising rental income, which greatly increased the risk of exploding prices and speculative buyers in the short term.

Case 2: Price-Exuberant Homeownership Country

The US subprime mortgage crisis was probably the biggest housing wealth destruction in history (Schwartz 2009). Between 1950 and 1970, home prices had remained remarkably stable, Glaeser (2013) describing the situation as a “bubble that didn’t happen.” Starting in the 1980s, however, the United States had already experienced a series of boom-bust cycles characterized by high volatility, leading to the Savings and Loans crisis in the early 1980s (Mason 2004) and a house price bust in the early 1990s (Wheelock 2006). But the subprime mortgage crisis of the 2000s was still unprecedented (Nicolaidis and Wiese 2017). Whereas the bubbles that emerged in California in the 1970s and that occurred in the Northeast, particularly Greater Boston, and California in the 1980s were still regional in scope (Shiller 2015), the bursting of the bubble in 2006 occurred throughout the United States, with global consequences.

The regulatory environment in rent and mortgage regulation as well as homeowner policies were all important contributory factors for the perfect storm. In the US, nationwide rent control tends to be the exception (Brown 2009). It was applied during and shortly after the Second World War and in the early 1970s in reaction to high inflation. Further, over the later twentieth century, more and more states even preempted their cities from implementing local rent control, with some of the traditionally rent-controlled cities like Boston lifting their regulations (Sims 2007). Thus, the run-up to the burst of the housing bubble in 2006 was one of the least rent-regulated periods in US history.

Simultaneously, both political parties had started to implement a homeownership-only housing regime by loosening credit restrictions (higher LTVs and longer maturation periods) and expanding credit supply through government guarantees for private mortgages including mortgage-backed securities (MBS). MBS were probably the most crucial financial innovation associated with the 2006 house price crash, as they made foreign capital—including capital from credit-conservative countries—available to lower-income US households (Hellwig 2009). This explains why the credit boom could be sustained despite rising US government debt. The political “infatuation with homeownership” (Norberg 2009) of governments, also reflected in liberal housing capital gains and imputed-rent taxation, was often seen as an important precondition for the “political bubble” (McCarty et al. 2013). Some of the worst foreclosure and price crash incidents occurred in zip codes where subprime mortgages had been issued (Mian and Sufi 2016). As mortgages were issued to households with low incomes and little real income growth in sight, it was only the government-sustained expectation that prices would grow that still made investment rational. Consequently, the price boom was accompanied by a building boom peaking at more than 2 million units in 2006.

Conclusion

The trend in real house prices over the twentieth and early twenty-first centuries has been described as a hockey stick pattern (Knoll et al. 2017), where real prices were surprisingly constant from the late nineteenth to the mid-twentieth-century until they exploded in the later twentieth century. Yet, as local long-run studies suggest, real house prices tend to display cycles with episodes of rising and falling prices, with rises in house prices in the second half of the nineteenth century comparable to those since the 1960s, with rather weak growth in the long run (Eichholtz 1997; Monnery 2011; Edvinsson et al. 2021), and severe downturns due to the world wars. Both periods saw periods of sharp and fast-rising house prices in conjunction with speculative bubbles as well as severe downturns after the bubble burst. Viewed from this perspective, the period of stagnating prices from the end of the nineteenth century through the 1960s represented a long period of crisis, interrupting two periods of booming house prices. Taking a closer look at the period between the First World War and the 1960s further reveals that the development was not constant, but has temporally rather been characterized by sharp declines, as well as a U-shape in many countries—particularly pronounced in continental European countries such as Germany and France. Overall, the evolution of real house prices since the beginning of the twentieth century, with its downward trend since the First World War and its sharp increase since the 1960s, is reminiscent of the trend lines of inequality in many countries. Not coincidentally, research in the 2010s argues that a large part of the rising inequality since the 1970s is due to rising property values (Piketty and Zucman 2014; Rognlie 2014).

Research has put forward various reasons for house price trends, e.g., demographics and economic growth, and the stagnation of house prices from the First World War to the 1960s is to be viewed within the context of the crisis of the two world wars and the Great Depression. However, as our results show in line with other studies (Eichholtz 1997; Kholodilin and Kohl 2023), the trend is also strongly correlated with government interventions and regulations. The introduction of tenant protection and rent controls since 1914 have typically lowered real house prices. By contrast, austerity policies, rental and credit liberalization policies, as well as certain homeowner subsidies, have increased the risk of price excesses since the second half of the twentieth century.

Recurrent housing booms and bubbles are consequential, at times catastrophic, events for economies and societies. These are difficult to understand based on a pure rational expectations model. This study contributes to existing literature on house prices by looking more systematically into the effects of different kinds of housing regulation on house prices in the long run. Using different definitions of house price booms and bubbles, we find that the liberalization of rent and credit regulation was as much an enabling condition for house price growth as the promotion of certain kinds of homeownership subsidies. These governmental interventions may have made the expectation of infinitely growing house prices more likely and, hence, may explain the long periods during which house prices and housing construction were able to grow to record heights. In longer historical perspective, volatile housing markets may rather be the norm, with the rent-controlled period between 1914 and 1960 being an exceptional time with a low likelihood of extreme house price growth.

Notes

- 1 This definition hinges most clearly on the violation of the rational expectation assumption that rational actors compute prices as the sum of discounted future rental incomes.

- 2 See https://www.diw.de/documents/publikationen/73/diw_01.c.887933.de/dp2061.pdf.
- 3 https://www.bis.org/statistics/pp_detailed.htm.
- 4 <https://www.dallasfed.org/institute/houseprice>.
- 5 <http://www.macrohistory.net/data/>.
- 6 <https://data.oecd.org/price/housing-prices.htm>.
- 7 See, for example, Homm and Breitung (2012) and Phillips et al. (2011).
- 8 See Table A5 for data description.
- 9 See, for example, Herwartz and Kholodilin (2014); Xiaoli L et al. (2014); Jordà et al. (2015); Caspi (2016); Kholodilin and Michelsen (2019).

References

- Agnello, Luca, and Ludger Schuknecht. 2011. "Booms and Busts in Housing Markets: Determinants and Implications." *Journal of Housing Economics* 20, no. 3: 171–190.
- Agnello, Luca, and Ricardo M. Sousa. 2013. "Fiscal Policy and Asset Prices." *Bulletin of Economic Research* 65, no. 2: 154–177.
- Almandoz, Arturo. 2002. *Planning Latin America's Capital Cities 1850–1950*. London: Routledge.
- Baron, Matthew E., Emil Verner, and Wei Xiong. 2019. "Salient Crises, Quiet Crises." Unpublished manuscript. URL: <https://www.sipa.columbia.edu/sites/default/files/2023-02/Salient%20Crises%2C%20Quiet%20Crises.pdf>.
- Beckert, Jens. 2016. *Imagined Futures: Fictional Expectations and Capitalist Dynamics*. Harvard MA: Harvard University Press.
- Beltratti, Andrea, and Claudio Morana. 2010. "International House Prices and Macroeconomic Fluctuations." *Journal of Banking and Finance* 34, no. 3: 533–545.
- Brown, Michael E. 2009. "A Brief Survey of Rent Control in America: Past Mistakes and Future Directions." In *Housing America: Building Out of a Crisis*, edited by Randall G. Holcombe, and Benjamin Powell, 131–155. London: Routledge.
- Brzezicka, Justyna. 2021. "Towards a Typology of Housing Price Bubbles: A Literature Review." *Housing, Theory and Society* 38, no. 3: 320–342.
- Bullock, Nicholas, and James Read. 1985. *The Movement for Housing Reform in Germany and France, 1840–1914*. Cambridge: Cambridge University Press.
- Caspi, Itamar. 2016. "Testing for a Housing Bubble at the National and Regional Level: The Case of Israel." *Empirical Economics* 51, no. 2: 483–516.
- Cerutti, Eugenio, Jihad Dagher, and Giovanni Dell'Ariccia. 2017. "Housing Finance and Real-Estate Booms: A Cross-Country Perspective." *Journal of Housing Economics* 38: 1–13.
- Cesa-Bianchi, Ambrogio, Luis Felipe Céspedes, and Alessandro Rebucci. 2015. "Global Liquidity, House Prices, and the Macroeconomy: Evidence from Advanced and Emerging Economies." *Journal of Money, Credit and Banking* 4, no. S1: 301–335.
- Christen, Alfred. 1964. *Bauwirtschaft und Bautätigkeit in der Schweiz: 1920–1955*. Frankfurt/Main: Polygraph Verlag.
- Edvinsson, Rodney, Kristoffer Eriksson, and Gustav Ingman. 2021. "A Real Estate Price Index for Stockholm, Sweden 1818–2018: Putting the Last Decade's Housing Price Boom in a Historical Perspective." *Scandinavian Economic History Review* 69, no. 1: 83–101.
- Eichholtz, Piet M. A. 1997. "A Long Run House Price Index: The Herengracht Index, 1628–1973." *Real Estate Economics* 25, no. 2: 175–192.
- Eitheim, Øyvind, and Solveig K. Erlandsen. 2005. "House Prices in Norway, 1819–1989." *Scandinavian Economic History Review* 53, no. 3: 7–33.
- Engsted, Tom, Simon J. Hviid, and Thomas Q. Pedersen. 2016. "Explosive Bubbles in House Prices? Evidence from the OECD Countries." *Journal of International Financial Markets, Institutions and Money* 40: 14–25.
- Figari, Francesco, Alari Paulus, Holly Sutherland, Panos Tsakoglou, Gerlinde Verbist, and Francesca Zantomio. 2012. "Taxing Home Ownership: Distributional Effects of Including Net Imputed Rent in Taxable Income." IZA Discussion Paper No. 6493. URL: <https://www.iza.org/publications/dp/6493/taxing-home-ownership-distributional-effects-of-including-net-imputed-rent-in-taxable-income>.
- Fischer, Ernst. 1955. "Finanzierung des Wohnungsbaus." In *Handbuch der schweizerischen Volkswirtschaft*, Vol. 2, edited by S. G. für Statistik und Volkswirtschaft, 627–630. Bern: Bentelli-Verlag.

- Friggit, Jacques. 2009. "Le prix des logements sur longue période." *Informations sociales* 5, no. 155: 26–33.
- Führer, Karl Christian. 1995a. "Managing Scarcity: The German Housing Shortage and the Controlled Economy 1914–1990." *German History* 13, no. 3: 326–354.
- Führer, Karl Christian. 1995b. *Mieter, Hausbesitzer, Staat und Wohnungsmarkt: Wohnungsmangel und Wohnungszwangswirtschaft in Deutschland*. Stuttgart: Franz Steiner.
- Führer, Karl Christian. 2016. *Die Stadt, das Geld und der Markt. Immobilienspekulation in der Bundesrepublik Deutschland*. Berlin, Munich, and Boston, MA: De Gruyter.
- Glaeser, Edward L. 2013. "A Nation of Gamblers: Real Estate Speculation and American History." *American Economic Review* 103, no. 3: 1–42.
- Glendinning, Miles. 2021. *Mass Housing: Modern Architecture and State Power—A Global History*. London: Bloomsbury Visual Arts.
- Goodhart, Charles, and Boris Hofmann. 2008. "House Prices, Money, Credit, and the Macroeconomy." *Oxford Review of Economic Policy* 24, no. 1: 180–205.
- Gyourko, Joseph, Albert Saiz, and Anita Summers. 2008. "A New Measure of the Local Regulatory Environment for Housing Markets: The Wharton Residential Land Use Regulatory Index." *Urban Studies* 45, no. 3: 693–729.
- Haiyan, Liu, and Kristin Stapleton. 2006. "Chinese Urban History: State of the Field." *China Information* 20, no. 3: 391–427.
- Harloe, Michael. 2008. *The People's Home? Social Rented Housing in Europe and America*. Hoboken, NJ: John Wiley and Sons.
- Hausmann, Urs. 2016. *Vertragsfreiheit im Schweizer Mietrecht von 1804 bis 2014 unter besonderer Berücksichtigung des Mietzinses—Rechtshistorischer und rechtspolitischer Hintergrund der heutigen Vertragsschranken im Mietrecht*. Zurich: Dike.
- Hein, Carola. 2017. *The Routledge Handbook of Planning History*. London: Routledge.
- Hellwig, Martin F. 2009. "Systemic Risk in the Financial Sector: An Analysis of the Subprime-mortgage Financial Crisis." *De Economist* 157: 129–207.
- Herwartz, Helmut, and Konstantin A. Kholodilin. 2014. "In-sample and Out-of-sample Prediction of Stock Market Bubbles: Cross-sectional Evidence." *Journal of Forecasting* 33, no. 1: 15–31.
- Homm, Ulrich, and Jörg Breitung. 2012. "Testing for Speculative Bubbles in Stock Markets: A Comparison of Alternative Methods." *Journal of Financial Econometrics* 10, no. 1: 198–231.
- Howard, Christopher. 1999. *The Hidden Welfare State: Tax Expenditures and Social Policy in the United States*. Princeton Studies in American Politics 214. Rev. ed. Princeton, NJ: Princeton University Press.
- Huang, Haifang, and Yao Tang. 2012. "Residential Land Use Regulation and the US Housing Price Cycle between 2000 and 2009." *Journal of Urban Economics* 71, no. 1: 93–99.
- Igan, Deniz, Alain Kabundi, Francisco Nadal De Simone, Mika Pinheiro, and Natalia Tamirisa. 2011. "Housing, Credit, and Real Activity Cycles: Characteristics and Comovement." *Journal of Housing Economics* 20, no. 3: 210–231.
- Jackson, Kenneth T. 1985. *Crabgrass Frontier: The Suburbanization of the United States*. Oxford: Oxford University Press.
- Jordà, Òscar, Moritz Schularick, and Alan M. Taylor. 2015. "Leveraged Bubbles." *Journal of Monetary Economics* 76: S1–S20.
- Jordà, Òscar, Moritz Schularick, and Alan M. Taylor. 2016. "The Great Mortgaging: Housing Finance, Crises and Business Cycles." *Economic Policy* 31, no. 85: 107–152.
- Kholodilin, K. A., and Claus Michelsen. 2019. "Zehn Jahre nach dem großen Knall: wie ist es um die Stabilität der internationalen Immobilienmärkte bestellt?" *Zeitschrift für Immobilienökonomie* 5, no. 1: 67–87.
- Kholodilin, Konstantin A. 2020. "Long-term, Multi-Country Perspective on Rental Market Regulations." *Housing Policy Debate* 30, no. 6: 994–1015. DOI: 10.1080/10511482.2020.1789889.
- Kholodilin, Konstantin A., and Sebastian Kohl. 2021. "Social Policy or Crowding-out? Tenant Protection in Comparative Long-run Perspective." *Housing Studies* 38, no. 4: 707–743.
- Kholodilin, Konstantin A., and Sebastian Kohl. 2023. "Rent Price Control —Yet Another Great Equalizer of Economic Inequalities? Evidence from a Century of Historical Data." *Journal of European Social Policy* 33, no. 2: 169–184.

- Kholodilin, Konstantin A., Sebastian Kohl, Artem Korzhenevych, and Linus Pfeiffer. 2023. "The Hidden Homeownership Welfare State: An International Long-term Perspective on the Tax Treatment of Homeowners." *Journal of Public Policy* 43, no. 1: 86–114.
- Knoll, Katharina, Moritz Schularick, and Thomas Steger. 2017. "No Price Like Home: Global House Prices, 1870–2012." *American Economic Review* 107, no. 2: 331–353.
- Kohl, Sebastian. 2017. *Homeownership, Renting and Society: Historical and Comparative Perspectives*. London: Taylor and Francis.
- Korevaar, Matthijs. 2018. "The First Housing Bubble? House Prices and Turnover in Amsterdam, 1582–1810." Working Paper. URL: <https://api.semanticscholar.org/CorpusID:202606312>.
- Kornemann, Rolf. 1996. "Gesetze, Gesetze... Die amtliche Wohnungspolitik in der Zeit von 1918 bis 1945 in Gesetzen, Verordnungen und Erlässen." In *Geschichte des Wohnens 4, 1918–1945: Reform—Reaktion—Zerstörung*, edited by Gert Kähler, 599–723. Stuttgart: Deutsche Verlags-Anstalt.
- Kramper, Peter. 2022. "Immobilienmärkte in der historischen Forschung." *Jahrbuch für Wirtschaftsgeschichte/Economic History Yearbook* 63, no. 1: 1–17.
- Kühne-Büning, Lidwina, Werner Plumpe, and Jan-Otmar Hesse. 1999. "Zwischen Angebot und Nachfrage, zwischen Regulierung und Konjunktur. Die Entwicklung der Wohnungsmärkte in der Bundesrepublik, 1949–1989/1990–1998." In *Geschichte des Wohnens 5, 1945 bis heute: Aufbau—Neubau—Umbau*, edited by Ingeborg Flagge, 153–232. Stuttgart: Deutsche Verlags-Anstalt.
- Kumar, Mohan, Uma Moorthy, and William Perraudin. 2003. "Predicting Emerging Market Currency Crashes." *Journal of Empirical Finance* 10, no. 4: 427–454.
- Kurz, Daniel. 1993. "'Den Arbeiter zum Bürger machen' — Gemeinnütziger Wohnungsbau in der Schweiz 1918–1949." In *Wohnungspolitik im Sozialstaat: deutsche und europäische Lösungen. 1918–1960*, edited by G. Schulz, 285–304. Düsseldorf: Droste.
- Kwak, Nancy H. 2015. *A World of Homeowners: American Power and the Politics of Housing Aid*. Chicago, IL: University of Chicago Press.
- Lenger, Friedrich. 2013. *Metropolen der Moderne. Eine europäische Stadtgeschichte seit 1850*. Munich: C.H. Beck.
- Malpezzi, Stephen. 1996. "Housing Prices, Externalities, and Regulation in US Metropolitan Areas." *Journal of Housing Research* 7, no. 2: 209–241.
- Malpezzi, Stephen. 1999. "A Simple Error Correction Model of House Prices." *Journal of Housing Economics* 8, no. 1: 27–62.
- Malpezzi, Stephen, and Gwendolyn Ball. 1993. "Measuring the Urban Policy Environment: An Exploratory Analysis Using Rent Controls." *Habitat International* 17, no. 2: 39–52.
- Mason, David L. 2004. *From Buildings and Loans to Bail-outs: A History of the American Savings and Loan Industry, 1831–1995*. Cambridge: Cambridge University Press.
- McCarty, Nolan, Keith T. Poole, and Howard Rosenthal. 2013. *Political Bubbles: Financial Crises and the Failure of American Democracy*. Princeton, NJ: Princeton University Press.
- Mian, Atif, and Amir Sufi. 2016. *House of Debt. How They (and You) Caused the Great Recession, and How We Can Prevent It From Happening again*. Chicago, IL: University of Chicago Press.
- Mishkin, Frederic S. 2007. "Housing and the Monetary Transmission Mechanism." *NBER Working Paper No. 13518*. DOI: 10.3386/w13518.
- Monnery, Neil. 2011. *Safe as Houses? A Historical Analysis of Property Prices*. London: London Publishing Partnership.
- Müller, Florian. 2021. "Neoliberale Wohnungspolitik avant la lettre? Staatliche Regulierung und private Interessen im Wohnungsbau in der Schweiz (1936–1950)." *Traverse: Zeitschrift für Geschichte* 28, no. 1: 92–116.
- Müller, Florian. 2022. "Mieter:innenland Schweiz. Siedlungsprojekte, politische Regulierung und private Interessen im schweizerischen Wohnungsbau." Doctoral diss., University of Zurich. DOI: 10.5167/uzh-223765.
- Nelson, Kenneth, Daniel Fredriksson, Tomas Korpi, Walter Korpi, Joakim Palme, and Ola Sjöberg. 2020. "The Social Policy Indicators (SPIN) Database." *International Journal of Social Welfare* 29, no. 3: 285–289.
- Nicolaides, Becky, and Andrew Wiese. 2017. "Suburbanization in the United States after 1945." *Oxford Research Encyclopedia of American History*. URL: <https://oxfordre.com/amERICANhistory/display/10.1093/acrefore/9780199329175.001.0001/acrefore-9780199329175-e-64>.

- Norberg, Johan. 2009. *Financial Fiasco. How America's Infatuation with Homeownership and Easy Money Created the Economic Crisis*. Washington, DC: Cato Institute.
- Norris, Michelle. 2016. *Property, Family and the Irish Welfare State*. Cham: Palgrave Macmillan. URL: <https://link.springer.com/book/10.1007/978-3-319-44567-0>
- Nützenadel, Alexander. 2011. "Städtischer Immobilienmarkt und Finanzkrisen im späten 19. Jahrhundert." *Jahrbuch für Wirtschaftsgeschichte/Economic History Yearbook* 52, no. 1: 97–114.
- Phillips, Peter C. B., Shuping Shi, and Itamar Caspi. 2019. Package "psymonitor." URL: <https://github.com/itamarcaspi/psymonitor>.
- Phillips, Peter C.B., Shuping Shi, and Jun Yu. 2015. "Testing for Multiple Bubbles: Historical Episodes of Exuberance and Collapse in the S&P 500." *International Economic Review* 56, no. 4: 1043–1078.
- Phillips, Peter C. B., Yangru Wu, and Jun Yu. 2011. "Explosive Behavior in the 1990s NASDAQ: When Did Exuberance Escalate Asset Values?" *International Economic Review* 52, no. 1: 201–226.
- Piketty, Thomas, and Gabriel Zucman. 2014. "Capital is Back: Wealth-income Ratios in Rich Countries 1700–2010." *Quarterly Journal of Economics* 129, no. 3: 1255–1310.
- Pinol, Jean-Luc, and François Walter. 2012. *Histoire de l'Europe urbaine*. Vol. 4, *La ville contemporaine jusqu'à la Seconde Guerre mondiale*. Paris: Points Histoire.
- Pooley, Colin G. 1992. *Housing Strategies in Europe, 1880–1930: Towards a Comparative Perspective*. Leicester: Leicester University Press.
- Punzi, Maria Teresa. 2016. "Financial Cycles and Co-movements between the Real Economy, Finance and Asset Price Dynamics in Large-Scale Crises." FinMaP–Working Papers 61. URL: <https://ideas.repec.org/p/zbw/fmpwps/61.html>.
- Reinhart, Carmen M., and Kenneth S. Rogoff. 2009. *This Time is Different. Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.
- Rodgers, Daniel T. 1998. *Atlantic Crossings: Social Politics in a Progressive Age*. Cambridge, MA: Belknap Press of Harvard University Press.
- Rognlie, Matthew. 2014. "A Note on Piketty and Diminishing Returns to Capital." Unpublished manuscript, Massachusetts Institute of Technology. URL: http://class.povertylectures.com/Rognlie_piketty_diminishing_returns.pdf
- Rosnick, David, and Dean Baker. 2010. "The Impact of the Housing Crash on the Wealth of the Baby Boom Cohorts." *Journal of Aging and Social Policy* 22, no. 2: 117–128.
- Saitzew, Mikhail. 1920. *Die Bekämpfung der Wohnungsnot: Gutachten erstattet dem Schweiz*. Zurich: Verband zur Förderung des gemeinnützigen Wohnungsbaus.
- Sattler, Frieder. 2022. "Deutsche Hypothekenbanken zwischen Sicherheitsdenken und Spekulationsfieber: Immobilienfinanzierung im Bauboom des späten 19. Jahrhunderts." *Jahrbuch für Wirtschaftsgeschichte/Economic History Yearbook* 63, no. 1: 105–134.
- Schulz, Gerhard. 1986. "Kontinuitäten und Brüche in der Wohnungspolitik von der Weimarer Zeit bis zur Bundesrepublik." In *Städtewachstum, Industrialisierung, Sozialer Wandel, Berlin*, edited by Jeffrey. Teuteberg. H., 135–173. Cologne: GESIS Datenarchiv.
- Schulz, Gerhard. 1993. *Wohnungspolitik im Sozialstaat. Deutsche und europäische Lösungen, 1918–1960*. Düsseldorf: Droste.
- Schwartz, Herman M. 2009. *Subprime Nation. American Power, Global Capital, and the Housing Bubble*. Ithaca, NY: Cornell University Press.
- Seelkopf, Laura, Moritz Bubek, Edgars Eihmanis, Joseph Ganderson, Julian Limberg, Youssef Mnaili, Paula Zuluaga, and Philipp Genschel. 2021. "The Rise of Modern Taxation: A New Comprehensive Dataset of Tax Introductions Worldwide." *Review of International Organizations* 16: 239–263.
- Shiller, Robert J. 2015. *Irrational Exuberance*. Revised and expanded 3rd ed. Princeton, NJ: Princeton University Press.
- Sims, David P. 2007. "Out of Control: What Can We Learn from the End of Massachusetts Rent Control?" *Journal of Urban Economics* 61, no. 1: 129–151.
- St. John, Michael. 1990. "The Impact of Rent Controls on Property Value." *UC Berkeley Fisher Center Working Papers* No. 90–178: 1–44.
- Stammann, Amrei, Florian Heiss, and Daniel McFadden. 2016. "Estimating Fixed Effects Logit Models with Large Panel Data." VfS Annual Conference 2016 (Augsburg): Demographic Change,

- Verein für Socialpolitik / German Economic Association. URL: <https://econpapers.repec.org/RePEc:zbw:vfsc16:145837>.
- Stapledon, Nigel David. 2007. "Long Term Housing Prices in Australia and some Economic Perspectives." PhD diss., University of New South Wales Sydney, Australian School of Business. URL: <https://hdl.handle.net/1959.4/29488>.
- Tooze, Adam. 2018. *Crashed: How a Decade of Financial Crises Changed the World*. London: Allen Lane.
- Vogiazas, Sofoklis, and Constantinos Alexiou. 2017. "Determinants of Housing Prices and Bubble Detection: Evidence from Seven Advanced Economies." *Atlantic Economic Journal* 45, no. 1: 119–131.
- von Beyme, Klaus. 1999. "Wohnen und Politik." In *Geschichte des Wohnens 5, 1949 bis heute: Aufbau—Neubau—Umbau*, edited by Ingeborg Flagge, 81–153. Stuttgart: Deutsche Verlags-Anstalt.
- Wagner, Phillip. 2016. *Stadtplanung für die Welt? Internationales Expertenwissen 1900–1960*. Göttingen: Vandenhoeck und Ruprecht.
- Weber, Jan Philip. 2017. "The Regulation of Private Tenancies—A Multi-Country Analysis." Doctoral diss., published as *Schriften zu Immobilienökonomie und Immobilienrecht* 83, University of Regensburg International Real Estate Business School.
- Weiss, Marc A. 1989. "Real Estate History: An Overview and Research Agenda." *Business History Review* 63, no. 2: 241–282.
- Wheelock, David C. 2006. "What Happens to Banks when House Prices Fall? US Regional Housing Busts of the 1980s and 1990s." *Federal Reserve Bank of Saint Louis Review* 88, no. 5: 413–429.
- Wischermann, Clemens. 1997. "Mythen, Macht und Mängel: Der deutsche Wohnungsmarkt im Urbanisierungsprozeß." In *Geschichte des Wohnens 3, 1800–1918: Das bürgerliche Zeitalter*, edited by Jürgen Reulecke, 335–636. Stuttgart: Deutsche Verlags-Anstalt.
- Wolswijk, Guido. 2009. "Fiscal Aspects of Housing in Europe." In *Housing Market Challenges in Europe and the United States*, edited by P. Arestis, P. Moosleschner, and K. Wagner, 158–177. London: Palgrave Macmillan.
- Wooldridge, Jeffrey. M. 2012. *Introductory Econometrics: A Modern Approach*. Boston, MA: Cengage Learning.
- Yates, Alexia. 2021. *Real Estate and Global Urban History*. Cambridge: Cambridge University Press.
- Yates, Alexia M. 2015. *Selling Paris: Property and Commercial Culture in the Fin-De-Siècle Capital*. Cambridge, MA: Harvard University Press.
- Yiu, Matthew S., Jun Yu, and Lu Jin. 2013. "Detecting Bubbles in Hong Kong Residential Property Market." *Journal of Asian Economics* 28: 115–124.
- Zimmermann, Clemens. 1997. *Europäische Wohnungspolitik in vergleichender Perspektive: 1900–1939/European Housing Policy in Comparative Perspective 1900–1939*. Stuttgart: Fraunhofer-IRB.
- Zitlmann, Reto. 2018. "Nackte, feuchte Mauerwände' und das Dach 'stellenweise undicht': Wohnverhältnisse der Arbeiterschaft, Wohnungsnot und Wohnpolitik." In *Der Landesstreik: Die Schweiz im November 1918*, edited by Roman Rossfeld, Christian Koller, and Brigitte Studer, 61–78. Zurich: Hier und Jetzt Verlag für Kultur und Geschichte.

THE POLITICS OF EXPECTATIONS IN LOCAL GOVERNMENT. (DE-)FINANCIALIZATION PROCESSES IN THE US AND GERMANY

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While the financialization of the economy, firms, and households has been established as a major research topic in political economy and sociology for some time (Krippner 2005; van der Zwan 2014), a multi-disciplinary literature has only recently begun to systematically investigate processes of state financialization (Fastenrath et al. 2017; Amable et al. 2019, 24; Karwowski 2019; Trampusch 2019; Schwan et al. 2021). As these newer studies demonstrate, state actors in all capitalist democracies have transferred logics and practices characteristically found in the private finance industry into public-sector financial policy-making. One of the most salient dimensions of this phenomenon concerns the financial management of local governments. Municipalities on both sides of the Atlantic have discovered financial engineering as an opportunity to create new financial, and thus political scope in times of fiscal consolidation and austerity (Pacewicz 2013; Trampusch and Spies 2015; Fastenrath et al. 2018; Deruytter und Möller 2020; Løding 2020; Mertens et al. 2021; Fastenrath 2023). From the abundant supply of financial products, it is so-called interest rate management instruments known as *swaps*—heavily marketed by private and public banks—that have been most frequently employed by cities intending to generate extra cash or to reduce the interest burden on existing debt (Kirkpatrick 2016; Fastenrath et al. 2018; Fastenrath 2023). In many cases, however, the high expectations of financial relief have not been fulfilled; on the contrary, in the course of the financial crisis of 2008 these opaque transactions often led to enormous losses which placed the adopting cities in a crisis situation. These swap disasters, which have been widely reported in regional, national, and international media outlets, were also the starting point for several studies exploring the characteristics and causes of local government financialization (Hendrikse and Sidaway 2014; Lagna 2015; Trampusch and Spies 2015).

This chapter also takes the swap crises as the subject of analysis.¹ However, the purpose is not to trace back why cities entered into the complex transactions, which in many cases barely any local politician understood, but to examine the economic and political

consequences of local government financialization. In this vein, we attempt to address the puzzle of why swap crises in some cities lead to the definancialization of local financial policies, while in others they did not. Whereas several cities implemented a *de facto* ban on these instruments, others have continued to rely on swaps, demonstrating the resilience of a financial logic once it has entered the public sector.

To approach this puzzle, we combine insights from political economic research on policy change after crisis (Widmaier et al. 2007; Baker 2015) with recent economic-sociological approaches to uncertainty and expectation formation (Beckert 2016). Bringing these strands of research together, we argue that the mode of policy change after crisis depends on changes in policymakers' expectations, which are highly contested. In this chapter, we employ a sociological concept of expectation formation as articulated by Beckert (2014, 2016), which he characterizes as "fictional." Beckert introduces the notion of "fictional expectations" when expectations need to be shaped under conditions of Knightian uncertainty (Knight 1921). Knightian uncertainty entails scenarios where the calculation and assignment of probabilities to the outcomes of a course of action become unattainable. Consequently, expectations become inherently socially constructed. Thus, "fictional expectations" can be understood as imaginaries or mental constructs of future scenarios and causal relationships (Beckert 2014, 9), which, while potentially flawed, guide actors' behavior as if they were true. Crises represent one of the contexts where uncertainty is exceptionally elevated. This extends to uncertainty regarding the origins of the crisis and the strategies employed to manage or navigate it in the future. In these situations, expectations are fiercely contested, as they serve as instruments for representing the underlying interests of different actors, a concept described by Beckert (2016) as the "politics of expectations." This is particularly applicable to the political arena. Varying actors try to influence the indeterminate expectations of policymakers in their own interest because it is policymakers who determine policy outcomes. The extent of the shift in expectations in turn depends on the cultural and economic capacities that actors mobilize to win the struggle to influence policymakers' post-crisis expectations. These affect which new imaginaries will emerge as dominant from the expectation formation process and which will shape the action course chosen by decision-makers (Beckert 2016, 11). Consequently, we suggest that crises induce major policy change (definancialization) if the dominant pre-crisis imaginaries change direction during the post-crisis expectation formation process. If pre-crisis imaginaries are reinforced, policy change will be incremental, if at all (resilient financialized fiscal policies).

Through comparative case studies of one US (Philadelphia) and one German (Würzburg) city we demonstrate these different patterns of local government (de-) financialization. In order to reconstruct the two processes, we have triangulated our sources by complementing the consultation of minutes of city council sessions and hearings, comprehensive annual financial reports of the studied cities, and the regional and national press, with six in-depth semi-structured expert interviews with city officials and actors involved in the processes (hereinafter referenced as INT_1, INT_2, etc.).

The two main contributions of the article are, first, the initial analysis of the conditions for state (de-) financialization at the local level and, second, the conceptualization of a micro-foundation of policy change after crises with a focus on the formation of expectations by policymakers.

Our study is structured as follows: after a short summary of the literature on local government financialization—combining the literature on crises, uncertainty, and policy change with the literature on expectation formation from economic sociology—, the second section

theorizes the causal processes that help to explain (de-) financialization. In section three, we explain the pre-crisis swap policies in Philadelphia and Würzburg respectively. In line with Rohlffing's (2013, 36) recommendation for process tracing and adopting a paired comparison research design (Tarrow 2010, 249), in section four we explain the different dynamics of policy change in the two cities in the context of our theoretical argument. The fifth section presents the implications of our analysis for state financialization and political economy in general.

Local Government Financialization, Crisis, and the Politics of Expectations

Local Government Financialization

Financialization has long been established in the social sciences as a multidisciplinary research paradigm (van der Zwan 2014; Amable et al. 2019). Recently, a growing number of authors have been examining the role of the state in this process under the concept of state financialization, i.e. the state itself becoming an object of financialization (Wang 2015; Lagna 2016; Fastenrath et al. 2017; Karwowski 2019; Trampusch 2019; Schwan et al. 2021), which has so far received less attention. As these studies reveal, not only has the state facilitated the financialization of the economy through deregulatory financial policies (financialization *by* the state), but state actors have also themselves increasingly adopted logics and practices that we typically find in private financial institutions (financialization *of* the state) (Livne and Yonay 2015; Fastenrath et al. 2017; Deruytter and Möller 2020). These developments have taken place in many areas and at many levels of the public sector in many countries (Aalbers 2019). Not least in the course of the financial crisis of 2008, it became particularly evident that not only national governments but also cities have turned to the practices of global financial markets (Hendrikse and Sidaway 2014). In the US (as early as the mid-1980s) and throughout Europe (since the late 1990s) local authorities have discovered financial engineering to create room for maneuver in times of budget consolidation and austerity. One widespread facet of this has been the introduction of financial innovations (so-called derivative financial instruments) in local debt management. Banks and consulting firms have been lobbying hard for local governments to be legally authorized to engage in derivatives known as *swaps* (see, for example, Fastenrath et al. 2018; Trampusch and Fastenrath 2021; Fastenrath 2023). In theory, swap transactions enable local financial officers to actively manage and optimize a debt portfolio by minimizing the interest costs on the existing debt. As a financial derivative, a swap is a discrete contract that relates to an existing credit transaction (i.e. an existing loan or bond). The swap contract stipulates that a municipality and a swap partner (usually a bank) exchange (or “swap”), for example, fixed and variable interest payments on the notional amount of the underlying loan transaction for a specified period of time.

Previous qualitative studies have demonstrated that swaps are a central component of a changed rationality and culture towards “active” local debt management heavily promoted and marketed by private and public banks (Fastenrath et al. 2018; Deruytter and Möller 2020). In addition, quantitative studies indicate that the probability of cities introducing derivative instruments correlated to a significantly positive degree with the degree of indebtedness, economic deprivation, and power of the financial industry in the relevant city, and also with the political color of the local majority parties (Trampusch and Spies 2015; Khumawala 2016; Mertens et al. 2021). The conclusion of swap transactions is based on the premise that local financial officers can correctly anticipate future interest rate

developments. However, it has become clear that this was a naïve assumption, as a swap is a complex undertaking that involves considerable uncertainty. The massive miscalculations—which were often also due to incorrect advice from financial experts—led to many cities ending up with losses in the millions instead of the hoped-for interest savings. Thus, a financialized debt management approach led several cities into crisis situations. As research on state financialization has not yet understood when, how, and why municipalities reacted to these negative economic consequences with the (de-) financialization of financial policies, in the following we will develop a theoretical argument and deduce a causal process to approach these questions.

Crisis, Uncertainty, and the Politics of Expectations

In political economy, crises can be understood as “moments of decisive intervention” during which unintended consequences and contradictions are perceived (Hay 1999). Political economists argue that economic crises generate uncertainty, which breaks up established ways of thinking and paves the way for radical policy change (Blyth 2003; Widmaier et al. 2007; Culpepper 2008; Baker 2015). Following this, the reduction of uncertainty through a process of sense-making precedes the adoption of policies because actors first need to know how the unintended consequences came about and which alternatives are available. However, we still lack an understanding of how different patterns of policy change are shaped by uncertainty. Although the literature largely agrees that the three levels (change in settings, instruments, and objectives) proposed by Peter Hall (1993) are well suited to characterize the different types of policy change,² there is little consensus on the reasons why crises sometimes lead to transformative and sometimes only to incremental policy changes (Nohrstedt 2008, 257–263; Boin et al. 2009, 82; Baumgartner 2012; Birkland 2016, 117; van der Heijden and Kuhlmann 2017; Neep 2018). We combine the political economic literature on policy change after crises (Hay 1999, 2001; Blyth 2003; Seabrooke 2007; Widmaier et al. 2007) with the economic sociological literature on expectation formation under uncertainty (Beckert 1996, 2016) to develop a theoretical argument which helps to explain transformative and incremental policy change respectively, and thus the reasons for either definancialization or the resilience of a financialized financial policy-making. While scholars have already accentuated that sense-making processes matter in times of crisis and uncertainty, exactly how new expectations emerge and thus, how courses of action are formed remains a black box. And, as Beckert (2016) noticed—although mainly focusing on the “market struggle”—the political character of expectations or the “politics of expectations” has been overlooked “even by authors who acknowledge the centrality of uncertainty and expectations” (Beckert 2016, 80f).

The process of policy change after crises usually consists of three general steps: the emergence of uncertainty, a sense-making process to reduce this uncertainty, and a process of policy formulation (Hay 1999, 2001; Blyth 2002; Widmaier et al. 2007; Culpepper 2008; Baker 2015). However, a future-oriented sense-making process has received little attention so far. This is now reflected in more detail in our causal model. We argue that the sense-making process can be regarded as a process which consists of the reformulation of expectations in moments of crisis because previous expectations break down and various actors try to affect policymakers’ imaginaries. The result is a new dominant view of possible future outcomes and courses of action that forms the basis of new policies. Each step of this argument will now be discussed in turn.

Step one: crisis and uncertainty. A crisis means that actors perceive contradictions due to unintended consequences (Hay 1999). When unintended policy consequences arise and hence expectations are not met, then existing understandings about how the economy and policies work fall apart (Blyth 2003, 29; Culpepper 2008, 5). In this situation of uncertainty, actors do not know the causes of the failures, which courses of action are now available, and with what consequences (Blyth 2002, 37). “Instead, agents face a fundamental uncertainty in forming expectations” that necessitates a common understanding of the experienced failure (Widmaier et al. 2007, 750). This uncertainty creates the need to reformulate expectations, which are here understood as actors’ beliefs about the consequences of various alternative courses of action (Shackle 1964, 13; Esser 1999, 7).

Step two: the politics of expectations. After uncertainty has emerged, the process of expectation formation begins whereby a variety of actors try to influence others’ (here: policymakers’) expectations by “defining situations and the imaginaries of probable or desired future presents” (Beckert 2016, 80). This process is strategic, as actors will gain or lose from the winning expectation. Usually, actors “want to set the new shared understandings in a way that favors them” (Culpepper 2008, 7). Hence, expectation formation is a real struggle between actors with varying imaginaries and resources (Beckert 2016, 185). The various resources drawn upon by actors affect which and whose expectations win the struggle and become the new expectation of policymakers. Besides economic resources such as money and personnel, cultural resources employed in the sense-making process determine which expectations become relevant and dominant. Cultural resources work by shaping belief systems. Here, moral arguments and expert knowledge affect the expectations of policymakers. Because actors are uncertain about the consequences of various courses of action, cultural resources in particular gain in weight (Blyth 2003; Culpepper 2008; Beckert 2016). These resources include expertise as well as (moral) beliefs held by laypeople (Beckert 2016, 80). Various studies show how financial or monetary theories shape the expectations and financial decisions of public agencies and the state (Babb and Fourcade 2002; Fastenrath et al. 2017; Fligstein et al. 2017). For example, actors are more likely to accept arguments put forward by experts or by their professional network with which they identify (Kwak 2013; Woll 2014, 50–56). Likewise, moral narratives and the moral expectations of the public shape what is regarded as desirable in finance and sometimes even force state elites to perceive alternatives (Seabrooke 2010; Trumbull 2012; Orban 2016). All types of such cultural resources help agents to “reduce uncertainty by narrowing possible interpretations of the crisis, and hence courses of action” (Blyth 2002, 37) because they tell agents “what possible futures to expect” (Blyth 2002, 41; see also Fastenrath et al. 2018).

Step three: a change in expectations and policy. The outcome of step two is reduced uncertainty, because a new dominant understanding about how the economy and policies work has emerged (Hay 1999, 2001; Blyth 2002; Widmaier et al. 2007; Culpepper 2008). Policies will be adjusted by policymakers to reflect these new expectations. Hence, policy change will tend to be incremental if expectations are altered only incrementally and will be transformative if expectations are altered radically. Specifically, transformative policy change is a “third order effect,” i.e. a change of a policy paradigm and its hierarchy of goals, whereas incremental change comprises change in the policy instruments (second order) and their settings (first order) (Hall 1993).

After having outlined the argument, it is also important for the empirical analysis to decide what would count as a major change of expectations. Here, we focus on the

intensity of changes in expectations that we define on the basis of how far the expectations change direction. Transformative change can occur if expectations move from positive (positive pay-offs of swap transactions) to negative (excessive risks or potential losses). Hence, small changes, for example in the content of positive expectations or movements from positive to neutral, are not counted as transformative (third order change) but only as incremental (second and first order change). From this follows, finally, that a change from positive to negative expectations (defined in the above sense) leads to transformative (third order) change, while relatively resilient positive expectations precondition incremental policy change (second and first order change). In this case, those involved “may be well prepared to change their beliefs and practices with regard to technical, instrumental, ‘non-core’ aspects of a policy” (Boin et al. 2009, 90). Consequently, they change the policy instruments or settings only insofar that they still transpose the old policies’ underlying paradigm into neutral or adapted positive anticipations of the intended policy outcomes.

Pre-Crisis Swap Policies and Expectations

A description of the relevant legal, political, and fiscal context of Philadelphia and Würzburg’s swapping activities respectively is described in the appendix. This provides some background information and justifies our paired comparison research design: the two cases are “comparable but exhibit different processes and outcomes” (Tarrow 2010, 249). Before we provide evidence for each step of the model, this section describes the pre-crisis expectations in each city.

Initially, swaps were perceived in both Würzburg and Philadelphia as a legitimate financial instrument and introduced as the key policy of an active debt management paradigm. In the mid-1990s, German cities greeted the swap innovation with unwarrantedly optimistic expectations (see Fastenrath et al. 2018). The Free State of Bavaria was the first German federal state to legalize the use of municipal derivatives (Frischmuth and Richter 2007, 45). Würzburg introduced the financial instruments in 1999 (WVV 2004; Main-Post 2006b). Between 1999 and 2006 the *Würzburger Versorgungs- und Verkehrs-GmbH* (Public Utility and Transport Company, WVV), in which the city is the only shareholder and members of the council have the majority on the supervisory board, entered into at least 15 swaps (WVV Annual Reports 2003–2006; Landgericht Würzburg [LG, Regional Court Würzburg] 2008). The swaps differed in type, complexity, maturity, and counterparty. WVV signed simple payer swaps, but also entered into derivatives with more complex interest formulae such as quanto swaps or CMS spread ladder swaps with Deutsche Bank, Bayerische Hypovereinsbank, Commerzbank, and Bayerische Landesbank (WVV 2004). In Würzburg, the pre-crisis expectations of city officials were positive (INT_4). The WVV emphasized that it had used swaps since 1999, hoping to avoid interest rate risks, optimize the debt portfolio, and maintain flexibility and leeway in liquidity procurement (Annual Report 2004; WVV 2005, 99). In 2002, the city council adopted the treasurer’s proposal to use derivatives in order to secure low interest rates (Main-Post 2002b). In the same year, the then city treasurer proposed the option of using interest rate swaps in the city’s debt management in the expectation of saving money on the city’s debt (Main-Post 2002a). Swaps to the notional value of approximately €50 million Euros were used to reduce the funding costs of the construction of the €50 million, first combined gas and steam plant in Würzburg, which was intended to produce cleaner energy for the city (Main-Post 2006b; Przybilla 2008; HKW 2013).

In 1990, Philadelphia was the first major US city to execute a swap (Dickson 1990), but swaps were increasingly embraced only in 2003 after the passing of an act that explicitly legalized municipal interest rate swaps.³ Since then, the city has entered into several swap agreements with large investment banks. From 1990 to 2007, the city entered into 20 separate swap transactions for a total notional amount of \$3.3 billion US dollars.⁴ When trying to reconstruct the city officials' expectations at the later Senate hearing, the former city treasurer, Nancy Winkler, noted the following reasons for entering the over-the-counter (OTC) swap market:

In going back and looking at the swap transactions and trying to imagine specifically why the City of Philadelphia used these swaps, we believe there were three reasons. The first was to save interest costs versus fixed rate bonds. The second was to lock in interest rates today for a financing that they wanted to do at some point in the future where they weren't able (...). And then the third option was to front-load savings; that is, to extract a cash payment up front, sometimes tens of millions of dollars, which was taken into the budget at that time and used for other purposes. So those were the three reasons that the City entered into swaps.⁵

The school district of Philadelphia likewise hoped to lock in savings, according to the swap advisor of the district during that time.⁶ As with Wurzburg, expectations were positive.

After having outlined the cities' pre-crisis swap policies and city officials' positive expectations, the next section discusses the crises and how they generated moments of uncertainty (step 1), which in turn launched a struggle between different actors to influence expectations of policy-makers (step 2) resulting in different degrees of policy change (step 3).

Crisis, Expectation Formation, and Policy Change

Step 1: Crisis and Uncertainty in Wurzburg and Philadelphia

Indeed, in both cities the initially positive expectations were soon confronted with unintended consequences. The risks inherent in the swap deals materialized due to unforeseen adverse interest rate developments.

In the City of Wurzburg, a currency swap that was used in the early 2000s developed other than anticipated.⁷ The interest rate swaps, which were expected to save the city massive borrowing costs, became a huge liability, at the latest from 2005. Instead of the expected gains, losses were piling up (WiWo 2008).⁸ A reasonable estimate of the value of the WVV swap portfolio in 2004 amounted to minus €1.5 million Euros, which had grown to minus €4.8 million by the end of 2005. The blow came when the spread between short- and long-term interest rates developed inversely from that expected in 2005 (the spread became smaller instead of larger), so that the CMS spread ladder swaps alone produced huge losses, to the sum of €2.8 million. The impending losses became real and other accruals amounting to €3.5 million were used entirely for termination payments to Deutsche Bank among others; the city sustained a total loss of €4.1 million (WiWo 2008).⁹ This meant a direct reduction of profits distribution to the city of approximately €3 million in 2006 (*Main-Post* 2006a). These unintended consequences and the associated regional and national media reports evoked uncertainty in the council as to how this could have happened and whether these transactions were appropriate as a way of financing the city

(INT_4, INT_6), as demonstrated by a council hearing held in November 2008. In April 2008, former treasurer Christian Schuchardt had given a presentation asking the council for permission to expand the use of swaps in a new active portfolio management framework. However, the council was deeply uncertain because of the recent swap scandal, and so the councilors asked for an information hearing;¹⁰ based on their prior experience, they were uncertain whether swaps were the right instruments for city finances and dealing with debt (see also *Main-Post* 2008a; INT_4).¹¹ As in Philadelphia, city councilors were not able to explain the exact causes of the policy failure, and the instruments were so complicated that no one could see what exactly the ramifications were (INT_4).

Similarly in Philadelphia, in the course of the global financial crisis interest rates dropped. Instead of saving money, the use of swaps significantly increased the city's costs on bonds compared with issuing fixed-rate bonds (DiStefano 2012c).¹² In order to avoid further losses, the city wanted to get out of the swap transaction agreements. However, only its counterparties had the right to terminate the interest rate swap contracts, so that the City of Philadelphia and its component units had to pay large sums in termination payments—between 2004 and 2011, about \$269 million in termination payments alone. Facing these unexpected outcomes of their swap transactions, of which city councilors were also made aware by the regional press, the policymakers were uncertain about how exactly the losses were produced, the level of losses, and how they should proceed with swaps (INT_3). Our interviewees confirmed that this uncertainty was fostered by the complexity of the products and the opposing statements about losses that made it impossible to come to a rational decision (INTs_1, 3). The actual determination of the pay-offs of swaps before maturity was impossible, as not all swaps had been terminated and their outcomes would be realized only in the future. Based on the use of different methods and assumptions in their calculations, the council was confronted with different possible future loss scenarios. The Pennsylvania Budget and Policy Center estimated a loss of about \$170 million on the city's outstanding and terminated swaps in July 2011 and projected further losses of approximately \$244 million (Ward 2012). These numbers were contested by calculations presented by the city's financial department; according to deputy treasurer James Laham, the possible loss (present value) ranged between \$2.6 and \$45 million.¹³ Even if this estimate of maximum losses was much lower, the wide range of possible outcomes underlines the high degree of uncertainty of the situation in which the policymakers found themselves.

Step 2: The Politics of Expectations in Wurzburg and Philadelphia

The perceived crisis, uncertainty, and the resulting contingency of policymakers' expectations regarding swaps triggered a struggle between different actors, who had different interests and were therefore either clearly opposed to or in favor of the further use of swaps. The policy decisions of the city council—as the main policymaking body—were fundamentally based on city councilors' expectations. Consequently, the aim of each actor was to influence policymakers' expectations in its own interest. The different results of these struggles led to varying changes in the expectations of policymakers in the two cities.

Good Swaps, Bad Swaps in Wurzburg

In Wurzburg, the struggle began with the information hearing, which was only the start of many long and heated debates that took place primarily between the city council and

the new treasurer of the city (INT_4, INT_6). Immediately after their realization of the losses, due to negative media coverage and the pending court cases against individual council members, the city council had a clearly negative attitude towards further use of those financial instruments (INT_4, INT_5, INT_6). At first, they agreed that the speculative, gambling nature of swaps, as it was also conveyed through the media, was not a suitable and appropriate way of handling public funds in the city: “after the scandal we thought interest rate swaps were a kind of bet, they were gross, we thought we shouldn’t do that anymore (...) the word ‘swaps’ gave us goose bumps” (INT_5; author’s translation). This critical attitude was also supported by recurrent references to losses from swap transactions on the part of the outraged citizenship whenever a budget-saving measure was proposed as unavoidable (INT_6).

It was the newly elected treasurer, Christian Schuchardt, who made the councilors tremble with his suggestion of systematic swap use, which would have been an expanded use of the class of instruments that brought them into crisis in the first place. However, Schuchardt’s initiative comes as less of a surprise when one considers his professional background. Before making municipal finance his profession, he was employed by the Hessische Landesbank (HELABA) for 12 years, where he worked in the municipal finance branch. In particular, he developed an “active” approach toward municipal debt management based on the systematic use of financial innovations. Based on this experience in the banking sector, Schuchardt was convinced that if done in the right way, such active debt management could form an essential part of every city’s financial management, and swaps could bring the hoped-for financial benefits—implying the adoption of a sophisticated risk management approach that he has called “debt management 2.0” (Schuchardt 2013). Thus, his clear interest was also to pursue such an approach in Würzburg, which presupposed, however, that he could convince the city council that the financial innovations were capable of bringing advantages in the future.

How was he able to impose his interest in the future use of swaps on the city council? To influence the expectations of policymakers in his own interest, he successfully combined the use of two different cultural resources: expertise on the one hand, and the moral expectations of the public on the other. This made it possible for him to agree with the councilors that the crisis did indeed exist, but at the same time convincingly demonstrate that a general renunciation of the swap instrument would be similarly reprehensible. He was able to do this through distinguishing between “hedging” and “speculation”, a distinction that is still viewed as valid in professional finance circles (Engel 2013). Diagnosing the crisis through the lens of these technical, but at the same time “moral” categories (Orban 2016) enabled him to reference the prevailing, value-laden narrative of crisis among the public (according to which swaps were “gambling” with tax-payers money) that the council had initially shared; in this way, he was able to present himself as part of a unified front in the diagnosis of the crisis without changing his overall optimistic expectations regarding swap use.

Schuchardt applied the “hedger/speculator” distinction through differentiating between appropriate (“good”) swaps using risk management tools or hedging devices, and inappropriate (“bad”) swaps based on speculative financial products such as CMS spread ladder swaps. He emphasized that the council would only use simple swaps for hedging purposes in the future, while excluding the type of speculative swaps that had led to the crisis. In addition, he diagnosed the crisis as a failure of risk management. While the councilors were taking a close look at whether this was really the case, and whether they were convinced by

his arguments, Schuchardt proceeded to engage in a comprehensive explanation of how to use swaps and other derivatives correctly, as well as defining “bad” transactions, and identifying the swaps that might enable the municipality to save on interest payments (INT_4, INT_5, INT_6).

Schuchardt further drew on a moral argument that inaction (a passive debt management approach) would be tantamount to a misuse of public funds:

He convinced me when he argued that if you leave money lying around and don’t take care of the money you have at your disposal, or if you don’t try to actively reduce debt, then this is also a form of disloyalty and comes at the expense of the city budget.

(INT_4, *see also* INT_5)

According to the interviewees, Schuchardt’s perceived expertise (his professional background in the financial sector) played a central role in this persuasive work and were vital in lending credibility to his arguments and expectations. Without this expertise, following the crisis nobody would have dared to propose the expansion of swap use or to talk about good swaps, because the mood in the city council was already so heated (INT_4, INT_6). As one councilor put it: “If a lawyer had proposed the swaps, the city council might not have been convinced” (INT_6).

Deceptive Banks and Illegitimate Swaps in Philadelphia

While in Wurzburg the city councilors were ultimately convinced by the expertise of their treasurer, in Philadelphia there was a clear split between the city council and its finance department which could not be bridged. Like the Wurzburg treasurer, the experts in Philadelphia shared a background in finance and wanted to keep swaps in their toolbox. Nancy Winkler had worked for over 28 years for the financial advisory firm Public Financial Management (PFM) before she was appointed treasurer in Philadelphia. In 2013, Winkler affirmed that the city had “both in-house finance and treasury expertise as well as external independent advisors,”¹⁴ and finance director Rob Dubow stated in the news: “We have financial professionals; we know how to do [swaps] and know how to structure them appropriately” (Varghese 2013). Thus, the city’s finance professionals relied on their expertise to explain the experienced contradictions during the crisis. Just like Christian Schuchardt in Wurzburg, Winkler wanted to keep the possibility of swaps available in the future (Kaske 2010) since she continued to view swaps as “important tools to allow the City to generate savings, reduce risks, manage our investments and access the financial markets effectively.”¹⁵ She furthermore doubted the reports about swap losses, “noting that the damage would be less if we considered the lower bond rates the city was able to secure with swaps contracts” (DiStefano 2012a). Furthermore, the city saved millions at the beginning (DiStefano 2012b). Rob Dubow, too, wanted to retain “access to a useful tool” (Varghese 2013) and even hired a firm to lobby against a possible ban (Varghese 2013). The city did not enter into new swaps, but Winkler expected swaps to be of high importance in the future as they enabled the city to access a “global base of investors” in times when the “traditional investor base for municipal bonds is shrinking and interest costs are pressured to rise.”¹⁶

As in Wurzburg, Winkler and Dubow perceived the crisis as a failure of risk management that could be fixed through a policy shift. How can we explain, then, the failure of

the financial experts in Philadelphia to win the “struggle of influencing expectations” as their German equivalents did in Würzburg? The answer lies in the fact that the struggle in Würzburg was dominated by the finance professional within the council and his cultural resources (expertise), while in Philadelphia it was a struggle involving a variety of experts and laypeople as well as different cultural and economic resources. Civil society actors broadly mobilized economic and cultural resources to alter the expectations of the city council.

The diagnosis of crisis began with a state investigation of what had happened at the Bethlehem Area School District in Pennsylvania, led by Pennsylvania state auditor Jack Wagner. This had a major influence on how the Philadelphia public came to interpret the crisis. Wagner’s report, published in 2009, found that due to fees and termination payments, interest rate swaps had led to much higher costs for the school district taxpayers than if the city had issued a fixed-rate note. Wagner later gave his moral assessment and expectations of swap transactions in his testimony in the 2013 senate hearing when he stated: “swaps are nothing more than a form of gambling with public funds” and “any benefits that these deals may confer (...) pale in comparison with the enormous risks involved, risks that may lurk for literally years in the future.”¹⁷ Wagner further underlined his moral critique by stating that “the fundamental guiding principle in handling public funds is that they should never be exposed to the risk of financial loss. Swaps (...) should have no role in government, where it is the taxpayer’s money that is at stake.”¹⁸ He interpreted the crisis as one of deceptive marketing by investment banks and too-risky instruments, which had been used illegitimately by city officials.

What followed Wagner’s initial report was a planned advocacy campaign. “Fight for Philly” was part of a larger “Fight for a Fair Economy” campaign financed and driven by the Service Employees International Union (SEIU) (INT_1, INT_2, INT_3). The main purpose of the campaign was to make clear to the public “who was to blame for the bad economy, that it was not President Obama’s fault, but rather the greed of Wall Street, and the greed of the financial sector, that was to blame for the state of our economy” (INT_3). SEIU hired Anne Gemmel as a political organizer, and in the anti-swap campaign her role was to make sure that Wagner’s moral narrative was widely heard. In this way, SEIU tried to transfer the conversation on economic inequality into a budget negotiation at the state and local level (INT_1, INT_3). One of the central goals was to put the topic on the agenda through public council hearings. This would require allies among the city councilors and other serious voices to join the chorus, and in this, “Fight for Philly” collaborated with the Pennsylvania Budget and Policy Center (PBPC), with whom they organized a joint press release. PBPC published a report in 2012 to draw attention to the city’s swap problem across the state, which was presented at a briefing of a 2012 Philadelphia city council session. Echoing state auditor Wagner’s report, the PBPC considered the losses under the swap to be the result of the financial service industry’s tactic of encouraging the use of risky financial products on the part of local governments. This “Big Banks: Too Big to Trust” campaign joined Fight for Philly, which likewise argued that greedy banks were to blame for marketing complex financial products. The swap deals gained more attention in the news as a result of the joint activities by PBPC and Fight for Philly, such as a press conference and policy briefing where the findings of the report were discussed with city council members, the media, and citizens (Fight for Philly 2012a, 2012b).

Anne Gemmell succeeded in identifying James Kenney as an ally. Kenney was a councilor who was ready to champion the issue. He put the subject on the council agenda and

initiated public hearings. At the first council hearing in 2012, the different views on the crisis and swaps in general clashed directly. Auditor Jack Wagner was invited as a witness and repeated his moral concerns about swap use by public entities in general and the city in particular. In contrast, Nancy Winkler argued from a financial expert point of view for the maintenance of the instrument, which, according to her, just had to be used correctly—an argument similar to that employed by Christian Schuchardt in Würzburg. She and her colleague from the finance department visibly had problems explaining the complicated financial instruments to the layfolk: “Swaps and their interplay with credit markets is complicated. It’s a complicated subject and not one that many non-financial people find easy to follow, especially as we financial people sometimes may lapse back into financial lingo”¹⁹ (see also INT_1, INT_2). However, the moral arguments against the use of swaps which had now been put forward by some actors, found much greater resonance among non-experts.

In Philadelphia, the lesson for local governments, claimed Wagner in 2013, was to stop using swaps independently of sophistication and expertise.²⁰ Wagner supported a ban on swaps and urged to return to public debt financed with fixed interest rates “that are transparent, reliable, and easily understood by decision-makers and the public.”²¹ Another alternative was formulated by the “Public Banking Institute.” This took advantage of the swap losses to campaign for the idea of public banks in Philadelphia and the US, on the basis that banks “are gouging this city and its people for hundreds of millions of dollars in the interest rate swap swindle.”²² In Philadelphia the alternatives suggested to a financialized handling of debt through the use of interest rate swaps were to stop using swaps and to go back to a passive debt management approach, i.e., taking out fixed interest loans instead of putting public funds at risk. Instead of gambling with taxpayers’ money, the city and its municipal utility companies should act according to their purpose to serve the common good, which implies not putting public funds at risk.

In sum, civil society actors used both cultural resources (moral arguments) and economic resources (campaigns, personnel) to turn the city’s expectations in a negative direction regarding swaps. This provided a significant counterforce to the expertise of the city’s finance professionals, something that Würzburg lacked.

Step 3: Transformative versus Incremental Change in Expectations and Policies

As a result of the expectation formation process that took place largely between the city council and the treasury in Würzburg, the council there was dominated by the expectation that savings could be achieved in the future through the appropriate use of the “right” or “good” swaps. Thus, the positive expectations that had originally been placed in these transactions before the crisis remained largely stable. The observable incremental policy change that followed this slight change in expectations consisted in the fact that these positive economic expectations (reducing debt service cost and/or generate stable yield in the future) now only applied to a certain class of swaps. The council decided to continue using the swaps because they were not the same as before; as one councilor put it, “we had to look at the new instruments, and they were hugely different from the previous products that caused the losses” (INT_6). Consequently, the councilors maintained their positive expectation that swaps would save the city money in the future (INT_4). The WVV entered into new swap deals in 2009 following Treasurer Schuchardt’s proposal for the introduction

of systematic swaps in April 2008. Despite some individual voices being raised against the speculative nature of swaps²³ (see also *Main-Post* 2008a), the city councilors agreed to the proposal because they expected that the swaps would be totally different from those that had caused the crisis (*Main-Post* 2008a, INT_4, INT_5, INT_6). Thus, the expectations of councilors did not concern the core question of the future use of swaps (INT_4, INT_5). Rather, that a modification of the instruments (for example only using swaps for hedging purposes and no speculative swaps) and their settings (for example better risk management and independent professional advice) should enable the treasurer to use swaps to the benefit of the city (INT_4, INT_5, INT_6). As a result, the city council's expectations remained consistent or only changed incrementally (INT_4). The optimistic expectation that swaps would remain a valuable tool in the financial management department's future is best illustrated by the number of new swaps entered into. As well as two new interest rate swaps concluded on behalf of one of its daughter utilities in 2009 and 2010, WVV organized nine commodity swaps in 2009 and forty alone in 2011 (WVV 2009, 2010, 2011). So, after the crisis, the WVV focused on the improvement of risk management instead of the abandonment of swaps; this approach was adopted by the city council and the WVV supervisory board as well (INT_4, INT_5).

In Philadelphia the situation appears to be significantly different. In stark contrast to the treasury, the city council's expectation clearly changed as a result of an expectation formation process between the council, the city finance professionals, and civil society actors initiated by the swap crisis, and eventually the council demanded a termination of existing deals and a stop on any future use of swaps (INT_3). The shift in expectations is nicely illustrated by councilor James Kenney, who was already part of the council when the city entered into the deals in the first place. Kenney stated that while at the time the council was led to believe that swaps were "good deal for the taxpayer,"²⁴ after the crisis he was convinced of likely further losses if the instruments were not prohibited. He evidently opposed Winkler's view when he stated:

I know you said you want to have it as part of your toolbox, but I still think long term we're going to run into the same problem again when everybody forgets about the fiscal calamity we just went through and things get a little greedier, I think things then tend to happen.²⁵

While in her testimony at the Senate Hearing the then treasurer Nancy Winkler, like the city's swap advisor Dubow, spoke out against a state ban (INT_3), Kenney sponsored a city council resolution urging the Pennsylvania State Senate to enact a law that would repeal the ability of municipalities to use swaps (INT_2, INT_3). Based on prior disastrous experiences, he demanded the discontinuation of the practice (INT_3). The city council accepted the moral narrative (DiStefano 2012b; INT_3),²⁶ and in April 2013 unanimously passed a resolution urging against the use of swaps, sponsored by Kenney.²⁷ Although the council did not formally enact a law that would forbid the use of swaps at local level, they banned them de-facto. The financial department would have preferred to enter into new swaps in order to restructure the existing swap portfolio but they knew that the council would not authorize this (INT_1). Table 32.1 summarizes the model and the empirical findings.

The extent of policy change in both cities thus corresponds to the extent of change in policymakers' expectations. The treasurer in Wurzburg dominated the expectation formation process and was able to use his expertise in finance as a cultural resource. This led to

Table 32.1 Transformative versus incremental change in expectations and policies

<i>Step</i>	<i>Würzburg</i>	<i>Philadelphia</i>
<i>Pre-crisis expectation of policy makers</i>	Positive: Cost-saving (but little awareness)	Positive: Cost-saving (but little awareness)
1 Crisis and uncertainty	Uncertainty about cause and level of losses and how to proceed.	Uncertainty about cause and level of losses and how to proceed
2 Expectation formation	Dominated by finance professional (treasurer) using expertise	Struggle between financial professionals (treasurer) using expertise and civil society using moral arguments, money, and personnel in campaigns
<i>Post-crisis expectation of policymakers</i>	Rather positive: “Good swaps” are an efficient risk management tool, which will save the city money and “bad swaps” should be avoided	Negative: Swaps are gambling with taxpayers’ money and using swaps would bring the city the same problems
3 Policy change	2nd order policy change (incremental)	3rd order policy change (transformative)

a slight reformulation of policymakers’ expectations: that is, there are good swaps which will save the city money and there are bad swaps which should be avoided in the future. In Philadelphia however, the expectation formation process was a real struggle involving actors with various interests and resources. Finance professionals were constrained by civil society actors who employed moral arguments which were easily understandable and resonated well with policymakers. Hence, policymakers’ expectations turned from positive to negative (all swaps are gambling with taxpayers’ money) and resulted in transformative policy change.

Conclusion

This chapter represents the first study of why financialized local policy-making is—or is not—resilient and what conditions are conducive to its definancialization. The analysis is based on a comparison of the processes that led to two different policy responses triggered by swap crises in two cities. While previous qualitative and quantitative analyses on local government financialization (Engelen et al. 2014; Lagna 2015; Trampusch and Spies 2015; Kirkpatrick 2016; Fastenrath et al. 2018; Mertens et al. 2021; Trampusch and Fastenrath 2021) have focused on the causes and causal mechanisms that help to explain the initial introduction of financial innovations by cities, this chapter examines the economic and political consequences of their (failed) adoption. Thus, the chapter analyzes the situation in which the utilization of opaque financial instruments in municipal debt management can cause a crisis and the extent to which cities choose on this basis to maintain or abolish financialized practices. By combining the political economic literature on policy change after crisis with recent economic sociological research on expectation formation, this study points to the centrality of the “politics of expectations” in situations of fundamental uncertainty: in one

US city (Philadelphia), the reformulation of expectations after an intense struggle between the city's finance experts and civil society actors resulted in the de facto abandonment of swaps (definancialization), while in Wurzburg, a similar swap fiasco led to only incremental change (resilient financialized practices). The city treasurer was allowed to enter into new but less risky swaps, as expectations changed only slightly. Our analysis reveals that in both cities the swap crises evoked moments of uncertainty, but while in Philadelphia city officials' expectations turned from positive to negative, in Wurzburg the officials' expectations in regard to swap policies remained positive. We explain this with the different expectation formation processes and the cultural and economic resources that were employed by actors to affect policymakers' imaginaries. Finance professionals were constrained by the cultural and economic capacities that those other actors mobilized to win the struggle in influencing policymakers' post-crisis expectations. The findings of our study generate additional contributions and implications that go beyond the study of local government financialization.

First, the study provides important insights for research on the formation of expectations in crisis situations. Taking a sociological approach to expectation formation allows us to emphasize its inherently social character as well as the contested nature and malleability of expectations. It allows us to shed light on the key conduits through which policymakers' uncertainty regarding future courses of action is reduced and prospective political crisis management influenced. This suggests that future research on the political decision-making dynamics of crisis management should not be limited to analyzing the retrospective battles of crisis interpretation, but should also focus more on policymakers' anticipation of potential crisis responses.

Second, in the policy analysis literature, the explanation of the effect of crises on transformative versus incremental policy change is still insufficiently covered. Adopting a three-step causal model, this chapter has highlighted the role of changing expectations, bringing economic sociology into a core debate of political economy, namely policy change. Current economic sociological research enables us to provide a micro-founded explanation for different degrees of policy change based on the expectation formation processes of policymakers in response to crisis.

Our model argues that crises generate moments of uncertainty where expectations are in flux and are likely to change. Policies can be thought of as crystallized expectations, as they represent institutionalized imaginaries. Beckert suggests that crises lead to change because anomalies result in a loss of confidence in existing expectations, which "stimulates new, more persuasive imaginaries" (Beckert 2016, 264). Therefore, policies can change if expectations are altered. Our paired comparison of the municipal swap crises in Philadelphia and Wurzburg has demonstrated the plausibility of the model.

Notes

- 1 The research for this article was conducted in the context of the research project "Municipalities and their Expectations on Pay-Offs of Swap Deals," which was funded by the German Research Foundation (DFG 275362433), priority program "Experience and Expectation: Historical Foundations of Economic Behavior" (SPP 1859).
- 2 According to Hall (1993) the shift in the first two levels represents incremental policy change, while shifts at all levels represents transformative change.
- 3 General Local Government Code (53 PA. C.S.)—Scope of Unfunded Debt, Number of Interest Rates, Treatment of Debt Costs upon Refunding and Interest Rate Risk and Interest Cost Management Act of Sep. 24, 2003, P.L. 110, No. 23 Cl. 53.
- 4 Council of the City of Philadelphia Committee on Rules. Public Hearing Investigating the Use of Qualified Interest Rate Management Agreements by the City and School District.

- Hearing on October 23, 2012, 78–79 (City of Philadelphia 2012). URL: <https://www.transcriptroom.org/tr/CAF/TranscriptsWithoutLogin?serviceName=Transcript+Room+-+Committee+Hearings&selectedCategoryApID=5533079&month=October&date=23&year=2012&searchTx=RESOLUTION+120147+>.
- 5 Council of the City of Philadelphia Committee on Rules. Public Hearing Investigating the Use of Qualified Interest Rate Management Agreements by the City and School District. Hearing on October 23, 89–90.
- 6 Council of the City of Philadelphia Committee on Rules. Public Hearing Investigating the Use of Qualified Interest Rate Management Agreements by the City and School District. Hearing on October 23, 44.
- 7 Oberlandesgericht [OLG] [Higher Regional Court] Bamberg, May 11, 2009, Urteil AZ 4 U 92/08 (Ger.).
- 8 Landesgericht [LG] [Regional Court] Würzburg, March 31, 2013, Urteil 62 O 661/07 (Ger.).
- 9 Landesgericht [LG] [Regional Court] Würzburg, March 31, 2013, Urteil 62 O 661/07 (Ger.).
- 10 An information hearing is a meeting where a governing body, such as a city council, gathers information on a specific issue or topic. During this hearing, experts, stakeholders, and the public are invited to present data, insights, and opinions. The goal is to educate the council members on the matter at hand, enabling them to make more informed decisions.
- 11 City of Würzburg, 7. Sitzung des Hauptausschusses. WP-2008/2014. November 24, 2008, 142 (“City of Würzburg 7. Sitzung”).
- 12 For an extended period, short-term interest rates were approaching zero due to the Fed’s policy after the financial crisis in 2008.
- 13 City of Philadelphia 2012, 113.
- 14 Senate Committee on Local Government, Hearing on SB 901–904 (2013), testimony of Nancy Winkler, Treasurer, City of Philadelphia, 2. URL: <http://local-government.pasenategop.com/files/2013/09/winkler.pdf>.
- 15 Senate Committee on Local Government, Hearing on SB 901–904 (2013), testimony of Nancy Winkler, Treasurer, City of Philadelphia, 1.
- 16 Senate Committee on Local Government, Hearing on SB 901–904 (2013), testimony of Nancy Winkler, Treasurer, City of Philadelphia, 1.
- 17 Senate Committee on Local Government, Hearing on SB 901–904 (2013), testimony of J. Wagner, 1. URL: <http://local-government.pasenategop.com/wp-content/uploads/sites/62/2013/09/wagner.pdf> (“Testimony of J. Wagner”).
- 18 Senate Committee on Local Government, Hearing on SB 901–904 (2013), testimony of J. Wagner, 1. URL: <http://local-government.pasenategop.com/wp-content/uploads/sites/62/2013/09/wagner.pdf> (“Testimony of J. Wagner”).
- 19 City of Philadelphia 2012, 83.
- 20 Testimony of J. Wagner, 2.
- 21 Testimony of J. Wagner, 4.
- 22 City of Philadelphia 2012, 161.
- 23 City of Würzburg 7. Sitzung; 15. Sitzung des Hauptausschusses. WP-2008/2014. December 4, 2008; City of Würzburg 28. Sitzung des Stadtrates. WP-2008/2014, July 23, 2009.
- 24 City of Philadelphia 2012, 6.
- 25 City of Philadelphia 2012, 145–146.
- 26 See also Councilman Bill Green’s comments at the hearing, City of Philadelphia 2012, 133–136.
- 27 City of Philadelphia Resolution No. 130232, adopted April 4, 2013. <https://phila.legistar.com/LegislationDetail.aspx?ID=1324491&GUID=D32F8AA6-51A8-4B20-AADA-F0B8A8A6BFCA&Options=ID|Text|&Search=130232>.

References

- Aalbers, Manuel B. 2019. “Financialization.” In *The International Encyclopedia of Geography: People, the Earth, Environment, and Technology*, edited by Douglas Richardson, Noel Castree, Michael F. Goodchild, Audrey L. Kobayashi, and Richard Marston (online only). Oxford: Wiley. DOI: 10.1002/9781118786352.wbieg0598.pub2.

- Amable, Bruno, Sabina Avdagic, Lucio Baccaro, Jonas Pontusson, and Natascha Van der Zwan. 2019. "New Approaches to Political Economy." *Socio-Economic Review* 17, no. 2: 433–459.
- Baker, Andrew. 2015. "Varieties of Economic Crisis, Varieties of Ideational Change: How and Why Financial Regulation and Macroeconomic Policy Differ." *New Political Economy* 20, no. 3: 342–366.
- Baumgartner, Frank R. 2012. "Ideas and Policy Change." *Governance* 26, no. 2: 239–258.
- Bayrische, Gemeindezeitung. 2008. "Bund der Steuerzahler in Bayern legte Schwarzbuch vor: 'Spitze des Eisbergs' öffentlicher Verschwendung." October 28, 2008.
- Beckert, Jens. 1996. "What is Sociological about Economic Sociology? Uncertainty and the Embeddedness of Economic Action." *Theory and Society* 25, no. 6: 803–840.
- Beckert, Jens. 2014. "Capitalist Dynamics—Fictional Expectations and the Openness of Future." *MPIFG Discussion Paper 14/7*. DOI: 10.2139/ssrn.2463995.
- Beckert, Jens. 2016. *Imagined Futures: Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Birkland, Thomas A. 2016. "Conceptualizing Resilience." *Politics and Governance* 4, no. 4: 117–120.
- Blyth, Mark. 2002. *Great Transformations: Economic Ideas and Institutional Change in the Twentieth Century*. Cambridge: Cambridge University Press.
- Blyth, Mark. 2003. "The Political Power of Financial Ideas: Transparency, Risk, and Distribution in Global Finance." In *Monetary Orders: Ambiguous Economics, Ubiquitous Politics*, edited by Jonathan Kirshner, 239–259. Ithaca, NY: Cornell University Press.
- Boin, Arjen, Paul Hart, and Allan McConnell. 2009. "Crisis Exploitation: Political and Policy Impacts of Framing Contests." *Journal of European Public Policy* 16, no. 1: 81–106.
- Bund der Steuerzahler Deutschland (BdSt). 2008. *Die Öffentliche Verschwendung: Ein Schwarzbuch des Bundes der Steuerzahler*. Wiesbaden: Bund der Steuerzahler Deutschland.
- City of Philadelphia. 2001–2015. *Comprehensive Annual Financial Reports*. URL: https://www.phila.gov/investor/Financial_Reports.html.
- Culpepper, Pepper D. 2008. "The Politics of Common Knowledge: Ideas and Institutional Change in Wage Bargaining." *International Organization* 62, no. 1: 1–33.
- Deruytter, Laura, and Sebastian Möller. 2020. "Cultures of Debt Management Enter City Hall: Financialized Rationalities and Technologies in European Local Government." In *International Handbook of Financialization*, edited by Philip Mader, Daniel Mertens and Natascha van der Zwan, 400–410. London: Routledge.
- Dickson, Steven. 1990. "Philadelphia First Major City to Do Interest Rate Swap Deal." *The Bond Buyer*, March 26, 1990.
- DiStefano, Joseph N. 2012a. "PhillyDeals: Activists Push Philadelphia to Recoup Losses on Interest-Rate Swaps." *The Philadelphia Inquirer*, January 18, 2012.
- DiStefano, Joseph N. 2012b. "PhillyDeals: Interest-Rate Swap Strategy Backfires, Costs City \$186M." *The Philadelphia Inquirer*, October 24, 2012.
- Engelen, Ewald, Rodrigo Fernandez, and Reijer Hendrikse. 2014. "How Finance Penetrates Its Other: A Cautionary Tale on the Financialization of a Dutch University." *Antipode* 46, no. 4: 1072–1091.
- Esser, Hartmut. 1999. *Soziologie. Spezielle Grundlagen 1: Situationslogik und Handeln*. Frankfurt/Main and New York: Campus Verlag.
- Fastenrath, Florian. 2023. "Swaps—Aufstieg und Fall eines Instruments des kommunalen Schuldenmanagements." In *Schulden machen: Praktiken der Staatsverschuldung im langen 20. Jahrhundert*, edited by Laura Rischbieter, Stefanie Middendorf, and Jan Logemann, 155–173. Frankfurt/Main and New York: Campus Verlag.
- Fastenrath, Florian, Michael Schwan, and Christine Trampusch. 2017. "Where States and Markets Meet: The Financialisation of Sovereign Debt Management." *New Political Economy* 22, no. 3: 273–293.
- Fastenrath, Florian, Agnes Orban, and Christine Trampusch. 2018. "From Economic Gains to Social Losses: How Stories Shape Expectations in the Case of German Municipal Finance." *Kölner Zeitschrift für Soziologie und Sozialpsychologie (KZfSS)* 70, no. 1: 89–116.
- Fight for Philly. 2012a. "From City Hall: Press Conference and Policy Debrief on Interest Rate Swaps." January 19, 2012.
- Fight for Philly. 2012b. "Local, National Press Cover Our Swaps Policy Briefing." January 31, 2012.

- Fligstein, Neil, Jonah S. Brundage, and Michael Schultz. 2017. "Seeing Like the Fed: Culture, Cognition, and Framing in the Failure to Anticipate the Financial Crisis of 2008." *American Sociological Review* 82, no. 5: 879–909.
- Hall, Peter A. 1993. "Policy Paradigms, Social Learning, and the State: The Case of Economic Policy-making in Britain." *Comparative Politics* 25, no. 3: 275–296.
- Hay, Colin. 1999. "Crisis and the Structural Transformation of the State: Interrogating the Process of Change." *The British Journal of Politics & International Relations* 1, no. 3: 317–344.
- Hay, Colin. 2001. "The 'Crisis' of Keynesianism and the Rise of Neoliberalism in Britain: An Ideational Institutional Approach." In *The Rise of Neoliberalism and Institutional Analysis*, edited by John L. Campbell, and Ove K. Pedersen, 193–218. Princeton, NJ: Princeton University Press.
- Hendrikse, Reijer P., and James D. Sidaway. 2014. "Financial Wizardry and the Golden City: Tracking the Financial Crisis through Pforzheim, Germany." *Transactions of the Institute of British Geographers* 39, no. 2: 195–208.
- HKW (Heizkraftwerk Würzburg GmbH). 2013. *Umwelterklärung 2013*. Würzburger Versorgungs- und Verkehrs-GmbH. URL: https://www.wvv.de/de/media/downloads/downloadcenter/header/unternehmen/verantwortung/nachhaltigkeit/umwelterklaerungen/hkw/130830_umwelterklärung_hkw.pdf.
- Karwowski, Ewa. 2019. "Towards (De-) Financialisation: The Role of the State." *Cambridge Journal of Economics* 43, no. 4: 1001–1027.
- Kaske, Michelle. 2010. "A Call to Stop Swaps." *The Bond Buyer*, January 29, 2010.
- Khumawala, Saleha, Tharindra Ranasinghe, and Claire J. Yan. 2016. "Why Hedge? Extent, Nature, and Determinants of Derivate Usage in US Municipalities." *Journal of Accounting and Public Policy* 35, no. 3: 303–325.
- Krippner, Greta R. 2005. "The Financialization of the American Economy." *Socio-Economic Review* 3, no. 2: 173–208.
- Kwak, James. 2013. "Cultural Capture and the Financial Crisis." In *Preventing Regulatory Capture: Special Interest Influence and How to Limit it*, edited by Daniel Carpenter and David Moss, 71–98. Cambridge: Cambridge University Press.
- Lagna, Andrea. 2015. "Italian Municipalities and the Politics of Financial Derivatives: Rethinking the Foucauldian Perspective." *Competition & Change* 19, no. 4: 283–300.
- Lagna, Andrea. 2016. "Derivatives and the Financialization of the Italian State." *New Political Economy* 21, no. 2: 167–186.
- Livne, Roi, and Yuval P. Yonay. 2016. "Performing Neoliberal Governmentality: An Ethnography of Financialized Sovereign Debt Management Practices." *Socio-Economic Review* 14, no. 2: 339–362.
- Løding, Tomas H. 2020. "The Financialization of Local Governments—The Case of Financial Rationality in the Management of Norwegian Hydroelectric Utilities." *Socio-Economic Review* 18, no. 3: 725–743.
- Main-Post. 2002a. "Es wird mir zu heiß, das ganz allein zu tragen." September 24, 2002.
- Main-Post. 2002b. "Jetzt günstiger Schulden machen." October 14, 2002.
- Main-Post. 2006a. "Risikoreiche Spekulationen reißen Loch in WVV-Bilanz." June 30, 2006.
- Main-Post. 2006b. "Wolf: Ich bin unaufgeregt und total cool." July 3, 2006.
- Main-Post. 2006c. "Der Wirtschaftsprüfer wird jetzt gefeuert." August 3, 2006.
- Main-Post. 2007. "Das wird uns nicht wieder passieren." February 16, 2007.
- Main-Post. 2008a. "Swaps in Würzburg ein Reizwort." April 22, 2008.
- Main-Post. 2008b. "Verschwendung angeprangert." October 10, 2008.
- Mertens, Armin, Christine Trampusch, Florian Fastenrath, and Rebecca Wangemann. 2021. "The Political Economy of Local Government Financialization and the Role of Policy Diffusion." *Regulation & Governance* 15, no. 2: 370–387.
- Nohrstedt, Daniel. 2008. "The Politics of Crisis Policymaking: Chernobyl and Swedish Nuclear Energy Policy." *Policy Studies Journal* 36, no. 2: 257–278.
- Orban, Agnes. 2016. "Mobilizing Moral Boundaries: The Politics of Derivatives Reform in the US." *New Political Economy* 21, no. 6: 555–573.
- Pacewicz, Josh. 2013. "Tax Increment Financing, Economic Development Professionals and the Financialization of Urban Politics." *Socio-Economic Review* 11, no. 3: 413–440.

- PBPC (The Pennsylvania Budget and Policy Center). 2012. "Bank Swap Deals Continue to Cost Philadelphia City, School District." January 18, 2012.
- Przybilla, Olaf. 2008. "Nachkarten um verzockte Millionen." *Süddeutsche Zeitung*, February 13, 2008.
- Rohlfing, Ingo. 2013. "Varieties of Process Tracing and Ways to Answer Why-Questions." *European Political Science* 12, no. 1: 31–39.
- Rottwilm, Christoph. 2007. "Kommunen verwetten Milliarden Steuergelder." *Manager-Magazin*, August 27, 2007.
- Schuchardt, Christian. 2013. "Die neuerliche Notwendigkeit." *Die Sparkassen-Zeitung*, June 14, 2013.
- Schwan, Michael, Christine Trampusch, and Florian Fastenrath. 2021. "Financialization of, Not by the State. Exploring Changes in the Management of Public Debt and Assets across Europe." *Review of International Political Economy* 28, no. 4: 820–842.
- Seabrooke, Leonard. 2007. "The Everyday Social Sources of Economic Crises: From 'Great Frustrations' to 'Great Revelations' in Interwar Britain." *International Studies Quarterly* 51, no. 4: 795–810.
- Seabrooke, Leonard. 2010. "What Do I Get? The Everyday Politics of Expectations and the Subprime Crisis." *New Political Economy* 15, no. 1: 51–70.
- Shackle, George L. S. 1964. *General Thought-Schemes and the Economist. The Second Woolwich Economic Lecture*. London: Woolwich Polycentric Press.
- Tarrow, Sidney. 2010. "The Strategy of Paired Comparison: Toward a Theory of Practice." *Comparative Political Studies* 43, no. 2: 230–59.
- The Bond Buyer*. 1993. "When Swaps Go Bad: Philadelphia's Deal Provides a Lesson in Basic Risk for Issuers." December 6, 1993.
- The Economist*. 2008. "Snakes and Ladders." February 21, 2008.
- Trampusch, Christine, and Dennis C. Spies. 2015. "Was treibt Kommunen zu Spekulationsgeschäften? Eine Analyse der Swap-Geschäfte von Kommunen in Nordrhein-Westfalen." *Politische Vierteljahresschrift* 56, no. 1: 104–129.
- Trampusch, Christine. 2019. "The Financialization of the State. Government Debt Management Reforms in New Zealand and Ireland." *Competition & Change* 23, no. 1: 3–22.
- Trampusch, Christine, and Florian Fastenrath. 2021. "States' Interests as Limits to the Power Finance: Regulatory Reforms in Early Local Government Financialization in the US and UK." *Regulation & Governance* 15, no. 2: 245–261.
- Trumbull, Gunnar. 2012. *Strength in Numbers: The Political Power of Weak Interests*. Cambridge, MA: Harvard University Press.
- Van der Heijden, Jeroen, and Johanna Kuhlmann. 2017. "Studying Incremental Institutional Change: a Systematic and Critical Meta-Review of the Literature from 2005 to 2015." *Policy Studies Journal* 45, no. 3: 535–554.
- van der Zwan, Natascha. 2014. "Making Sense of Financialization." *Socio-Economic Review* 12, no. 1: 99–129.
- Varghese, Romy. 2013. "Philadelphia Can't Explain its Swaps Yet Fights Ban: Muni Credit." *Bloomberg*, April 5, 2013. URL: <https://www.bloomberg.com/news/articles/2013-04-05/philadelphia-can-t-explain-its-swaps-yet-fights-ban-muni-credit>.
- Wang, Yingyao. 2015. "The Rise of the 'Shareholding State': Financialization of Economic Management in China." *Socio-Economic Review* 13, no. 3: 603–625.
- Ward, Sharon. 2012. *Too Big to Trust? Banks, Schools, and the Ongoing Problem of Interest Rate Swaps*. Harrisburg, PA: Pennsylvania Budget and Policy Center.
- Widmaier, W. Wesley, Mark Blyth, and Leonard Seabrooke. 2007. "Exogenous Shocks or Endogenous Constructions? The Meanings of Wars and Crises." *International Studies Quarterly* 51, no. 4: 747–759.
- Wirtschaftswoche* (WiWo). 2008. "Geld zurückholen." March 19, 2008.
- Woll, Cornelia. 2014. *The Power of Inaction: Bank Bailouts in Comparison*. Ithaca, NY: Cornell University Press.
- Wurzburger Versorgungs- und Verkehrs-GmbH (WVV). 2003–2015. *Annual Reports 2003–2015*.

APPENDIX

Table A1 Legal, political, and economic contexts of the cities' swap activities

	<i>Legal Context</i>	<i>Fiscal Context (1990–2010)</i>	<i>Political Context</i>
Philadelphia	Self-government (Home Rule Charter) State law (Pennsylvania) ^a Swap authorization: Debt Act (amended by Act 23) (2003) Approval by city council Low autonomy of treasurer appointed by mayor	Fiscal crisis starts in 1990 (due to reduction of federal aid) High indebtedness and debt service costs Swaps use since 1990	Domination of Democrats on city council Municipal election every two years Democratic mayor
Wurzburg	Self-government (Basic Law, BayGO) State law (Bavaria) Swap authorization: <i>Derivateerlass</i> (1995) ^b Approval by city council; municipal companies are controlled by city council Low autonomy of treasurer elected by city council	Fiscal distress since late 1990s (due to reduction of business tax) High indebtedness and debt service costs Swaps use since 1999	Diverse city council and partisan politics 2008 Social-Democratic (SPD) mayor ^c

Source: Own compilation.

^a Most relevant sections: Pennsylvania Consolidated Statutes, Title 53, §§3151, 5510, 8002, 8281, 8284, and 8285 (2016).

^b Most relevant sections: BStMI (1995, §§ 5.3, 8); *Bayerische Gemeindeordnung* (GO), articles 71–72 and 108.

^c The change from a CSU to an SPD mayor is not relevant as the mayor has no decision-making power in swap policies.

Interviews

<i>Interviewee</i>	<i>Date</i>	<i>Place</i>	<i>Reference</i>
Philadelphia City Official Administration	November 29, 2017	Telephone	INT_1
Pennsylvania State Official	December 9, 2017	Telephone	INT_2
Fight For Philly political director	February 28, 2018	Telephone	INT_3
Wurzburg City Councilor	January 11, 2018	Telephone	INT_4
Wurzburg City Official Administration	February 12, 2018	Telephone	INT_5
Wurzburg City Councilor	March 7, 2018	Telephone	INT_6

EXPECTATION FORMATION IN THE CORONAVIRUS PANDEMIC

Jonas Dovern and Fabian Krüger

Crises are times of large shocks. Expectations naturally react to these shocks, and the recent coronavirus pandemic is no different in that respect. As we document below, the onset of the pandemic caused large shifts in expectations about, *inter alia*, inflation, the unemployment rate, households' financial situation, and firms' financing conditions. At the same time, the pandemic quickly triggered an unprecedented policy response by governments worldwide, both in terms of public health measures (e.g., "stay at home" policies) and in terms of fiscal stimulus (e.g., cash transfers to households and businesses). Economic expectations during the pandemic, hence, reflect both the pandemic itself and the policy response to it.

The coronavirus pandemic originated in China where, in late 2019, a new respiratory disease emerged and started to spread among humans. In January 2020, it became clear that larger outbreaks would restrain the economy in China as the authorities tried to stop the spread of the virus. One month later the virus had spread to other countries and in March the governments in many developed economies decided on first extensive measures to prevent a large increase in SARS-CoV-2 infections. These measures included first curfews (e.g., Italy), school closures (e.g., Germany and New York), and travel bans (e.g., the US). On March 11, 2020, the World Health Organization declared COVID-19, the disease caused by the virus, a global pandemic.

Economic Effects of the Pandemic

From a macroeconomic point of view, the coronavirus pandemic was a combination of a demand-side shock and a supply-side shock. In terms of demand effects, four main mechanisms seem relevant. First, lockdown measures and fears of coronavirus infections reduced consumption demand, especially in sectors such as food and travel that involve in-person interaction. Second, a decline in income expectations led to a decline in consumption demand. Third, increased uncertainty can lead to demand reduction due to precautionary motives, resulting in lower consumption demand by households and lower investment demand by firms (Bloom 2009). Finally, liquidity constraints due to sudden income losses affected some households and businesses at least at the onset of the pandemic.

Supply-side effects, on the other hand, originated mainly from two sources. First, the governments in many countries implemented various non-pharmaceutical interventions that made business operations less efficient (for example, home office mandates or additional hygiene measures) or even impossible (for example, the mandatory closing of most establishments in the restaurant and tourism sector).¹ Second, and partly as a consequence of the first point, many international supply chains broke down. In many countries, this led to a reduction of potential production because of missing inputs. Immediately after the spread of the coronavirus around the globe, the World Trade Organization (WTO) expected that the global trade volume would fall between 13 percent (optimistic scenario) and 32 percent (pessimistic scenario) in the year 2020.²

Both demand and supply effects potentially affect economic expectations. This is most evident for inflation expectations. An emphasis on negative supply effects would suggest an increase of inflation expectations while an emphasis on negative demand effects would suggest a decline of inflation expectations (on inflation expectations of households, see from a general perspective also D'Acunto and Weber, Chapter 7 in this volume). Below, we discuss further what data on expectations reveal about the predominant nature of economic shocks that were in force during the coronavirus pandemic.

Models of Expectation Formation

From a conceptual point of view, unprecedented crises are likely to lead to very special expectation formation processes under certain conditions. In particular, if no previous experiences are available to guide the formation of expectations during a crisis (e.g., because the crisis is triggered by a shock or event that has never occurred before or because economic or societal structures have changed fundamentally since previous occurrences of similar crises), agents need to use other heuristics to form their expectations than in “normal times.” Beckett's (2016) theory of fictional expectations offers one possibility of thinking about expectation formation in such times. The theory suggests that agents use fictional narratives, such as mental imaginaries, movies, or books (here: potentially about pandemics) to form expectations about real-world events. These narratives serve as a kind of mental shortcut, allowing agents to quickly and easily make sense of what they are experiencing (here: a pandemic in a globalized world and public health policy responses; on narratives and fictional expectation formation, see also Tuckett, Chapter 5, Nützenadel and Streb, Chapter 8, and Müller, Chapter 13 in this volume). As discussed below, one can indeed show that firms' expectations about the progress of the coronavirus pandemic were largely unrelated to observables or industry-specific information but rather sentiment-driven.

Alternatively, rational inattention (Sims 2003) is a common economic framework for thinking about macroeconomic expectations. This framework predicts many features of observed expectations (Dovern et al. 2023; Maćkowiak et al. 2023). It posits that agents will rationally pay more attention to information in times of crisis than during periods with little economic volatility. In contrast to the theory of fictional expectations, however, the rational inattention framework assumes that the structure of the economy within which agents operate does not change and that agents are aware of this structure. However, the information they observe can be imperfect and subject to measurement error (see Duarte, Chapter 2, Schweighofer-Kodritsch, Chapter 4, and especially Lenel and Reichmann, Chapter 16 in this volume).

Scope of this Chapter

This chapter provides an overview of economic expectation formation during the coronavirus pandemic. We focus on expectations as measured by economic survey data. Surveys, which were initially regarded with much skepticism by economists (Manski 2004), have become a simple and popular method to study expectations (Manski 2018; Köhler and Logemann, Chapter 17 in this volume). During the pandemic, their flexibility and timely availability proved especially useful, and they were instrumental in understanding households' economic situations and assessing the effectiveness of alternative fiscal and monetary policy response measures.

While the coronavirus pandemic affected expectations very broadly (including expectations about health outcomes or education outcomes, for example), we focus on economic expectations. The chapter consists of three parts. First, we discuss firms' expectations about real variables and financial conditions, and how shifts of expectations at the beginning of the pandemic influenced firms' business decisions. Second, we consider private households' expectations about unemployment risk and income. Third, we discuss changes in inflation expectations of different groups of agents during the pandemic. Given its specialized scope, the chapter complements broader reviews of the economic aspects of the pandemic, such as Brodeur et al. (2021).

Throughout the chapter, we not only consider expectations in the sense of point forecasts, but also expectation uncertainty, which seems highly relevant due to economic considerations (such as the precautionary motives mentioned above), and the dramatic increase in economic (policy) uncertainty induced by the pandemic (Altig et al. 2020). In terms of timeframe, we mostly focus on the start of the coronavirus pandemic up to the end of 2021. This focus is motivated by the fact that some of the economic impacts of the Russian invasion of Ukraine, which started in February 2022, are hard to separate from potential longer-term effects of the pandemic.

Expectations of Firms and their Effects on Business Decisions

Business Expectations

When the crisis grew beyond China and turned into a pandemic, firms were as surprised as everybody else. Even firms that operate internationally realized the implications of the spread of SARS-CoV-2 on average only when the pandemic gained visibility in their country. Business expectations of firms in Germany, for instance, did not decline substantially until schools were closed in that country (Buchheim et al. 2022b). Hence, it seems that in terms of how quickly firms anticipated a global crisis, there were few differences across industries, and globally-operating firms do not seem to have had an advantage.

When the pandemic unfolded its demand-side and supply-side effects, firms had to adapt rapidly. This included an adaptation of their business operations and an adjustment of their expectations. Business expectations fell off a cliff in the spring of 2020 when it became apparent that the coronavirus pandemic would affect business across the globe, including the major economies. The widely regarded Purchasing Managers' Index for the manufacturing sector in the US, published by the Institute for Supply Management, dropped quickly from values above 50 (that usually indicate an expansion of the economy) to values below 40 that are indicative of a severe recession. Data from the Federal Reserve Bank of Atlanta's

Survey of Business Uncertainty indicate that the average expectation for sales growth over the next four quarters among US firms fell from around 4 percent at the beginning of 2020 to minus 2.1 percent in April. In the EU, the survey-based composite economic sentiment indicator published by the European Commission dropped by almost 50 points from February to April 2020 and reached a record low, substantially below levels observed during previous recessions. Similarly, the business expectations of German firms reached record lows. The expectation component of the ifo Institute's (Leibniz Institute for Economic Research at the University of Munich) Business Climate Index, for instance, fell rapidly in March and April of 2020. Thus, firms around the globe became, on average, very pessimistic very quickly and expected substantial declines in their business activities.

But not all industries suffered, and the aggregate decline in business expectations hides important heterogeneity across industries. Firms providing software and services that made video conferencing (and thus working from home on a large scale) possible are perhaps the most tangible profiteers from the coronavirus pandemic. Based on data from the Survey of Business Uncertainty, Barrero et al. (2021) show that US firms' expectations about future development of employment, at the time, implied a level of reallocation of jobs across industries that substantially exceeds levels observed before the pandemic. In Germany, roughly 10 percent of firms reported in April 2020 that they were positively affected by the crisis and another 10 percent said that the coronavirus pandemic did not affect their business (Buchheim et al. 2022a).

Firms also expected, on average, a decline in the availability of credit lines, bank loans, and trade credit, according to a survey conducted by the European Central Bank (Ferrando and Ganoulis 2020). This deterioration of expectations materialized quickly in the first half of March 2020. Interestingly, small firms were more likely than large ones to expect an improvement in access to loans and credits. Expectations about access to external financing are highly relevant: survey data from the US show that the liquidity situation of firms was very important for their beliefs about whether they would be able to re-open after the initial phase of the pandemic in 2020 (Bartik et al. 2020). Related research shows that unconventional policies, such as quantitative easing by central banks, help to improve expectations of firms about future credit access (Ferrando et al. 2022). Thus, the substantial extension of credit facilities to banks implemented by the ECB after the start of the pandemic probably contributed to a stabilization of corporate expectations regarding financing conditions.

Firms' Perceptions regarding Demand versus Supply-Side Effects

Survey evidence from the initial phase of the pandemic in the spring of 2020 suggests that firms' expectations were initially dominated by concerns about muted demand (see, e.g., Alekseev et al. 2023). According to results from the Federal Reserve Bank of Atlanta's Business Inflation Expectation Survey, US firms were more likely to report severe disruptions to sales than problems with supply chains or other issues hindering production, and even firms that reported supply-side problems expected, on average, to decrease their prices (Meyer et al. 2022). Likewise, an analysis of expectations about price changes of firms in Germany from the same time indicates that demand-side factors prevailed (Balleer et al. 2024). This view is confirmed by an analysis of the transcripts of earning calls from firms from around the globe (Hassan et al. 2023); this found that business leaders mentioned concerns about demand shocks almost twice as often as concerns about supply-side problems.

Expectations about Aggregate Outcomes

Firms did not only recognize that their own businesses were affected by the coronavirus pandemic; they also anticipated that the pandemic and the policy responses would do substantial harm to the economy as a whole. Expectations of German firms for the growth rate of real gross domestic product (GDP) in Germany for the year 2020 fell from an average of 0.8 percent in August 2019 to minus 6.2 percent in April 2020 (Dovern et al. 2023).³

What about firms' expectations about how the pandemic would develop? An April 2020 survey among German firms conducted by the ifo Institute as part of its long-standing business panel revealed that, on average, firms expected the lockdown measures—such as school closings, the closing of certain shops, or curfews—to be in place for another four months (Buchheim et al. 2022a). The expectation dispersion across firms was very high at the time, with an interquartile range from about three months to seven months. A survey among firms in the US revealed a similar distribution of expectations about the duration of the pandemic-induced business restrictions (Bartik et al. 2020).

Interestingly, firms' expectations about the further development of the pandemic were often unrelated to the type of firm and to how a firm was initially affected by the pandemic. For Germany, Buchheim et al. (2022a) show that expectations about how long non-pharmaceutical interventions would remain in place were driven by sentiment and not public or private information. In particular, these expectations were uncorrelated with the local pandemic situation, the self-reported initial impact of the pandemic on firms' business operations, firm size, industry, and the pre-pandemic business situation of firms.

Impact on Firms' Decisions

While firms had to form expectations about the development of the coronavirus pandemic and adjust their economic expectations, they also had to make important business decisions in a situation that most firms perceived as very uncertain (Altig et al. 2020; Bartik et al. 2020). Most firms reacted very quickly. Bartik et al. (2020) document that already in April 2020, 43 percent of businesses in the US were temporarily closed and had, on average, already reduced their employee counts by 40 percent. In Germany, where stronger employment protection laws make it more difficult to quickly adjust employment levels, less than 20 percent of firms had fired employees in response to the pandemic as of April 2020 according to results from the ifo business survey. But around half of the firms reported that they were making use of the short-time-work (*Kurzarbeit*) scheme that allowed firms to temporarily reduce the working hours of their employees while the government compensated the latter for (part of) their loss of earnings; more than 60 percent indicated that they had advised their employees to work from home.

Buchheim et al. (2022a) show that firms' expectations were highly relevant for which business decisions they made. Pessimistic firms that expected a long crisis were significantly more likely to make business decisions that are harder to reverse, such as laying off employees or canceling investment projects. Such behavior of firms is rational if they anticipate that a long crisis might be an existential threat for them. Bartik et al. (2020) document that US firms that expected the coronavirus pandemic to last longer were more likely to expect that they would have to close their business by the end of 2020. They also show that firms with above-average liquidity buffers were more optimistic about the prospects of still being in business at the end of 2020.

Overall, available survey data shows how the coronavirus pandemic took firms by surprise, that it substantially shifted firms' expectations very quickly, and that firms' business decisions reacted to these shifts in expectations. In particular—and in line with the idea of Siegenthaler (1993) that in times of crisis firms postpone forward-looking decisions and avoid putting resources into additional capital stocks—it is evident that firms reacted by cancelling projects with high fixed costs when they acted on the assumption that the pandemic would last for a long time.

Consumer Sentiment and Expectations of Private Households

We now turn to private households as another key group within the economy. Many of households' economic decisions—such as how much to consume versus how much to save, how many hours to work, or whether to buy real estate—take place in an intertemporal context and require households to plan ahead. Households' expectations are hence likely to be an important driver of their actions (see Trentmann, Chapter 22 in this volume).

Panel A of Figure 33.1 displays the time path of subjective probabilities for four economic events: (i) an increase in the unemployment rate, (ii) an increase in stock prices, (iii) the loss of one's own job, and (iv) defaulting on one's own personal debt. While the first two events refer to the economy as a whole, the latter two events refer to the individual

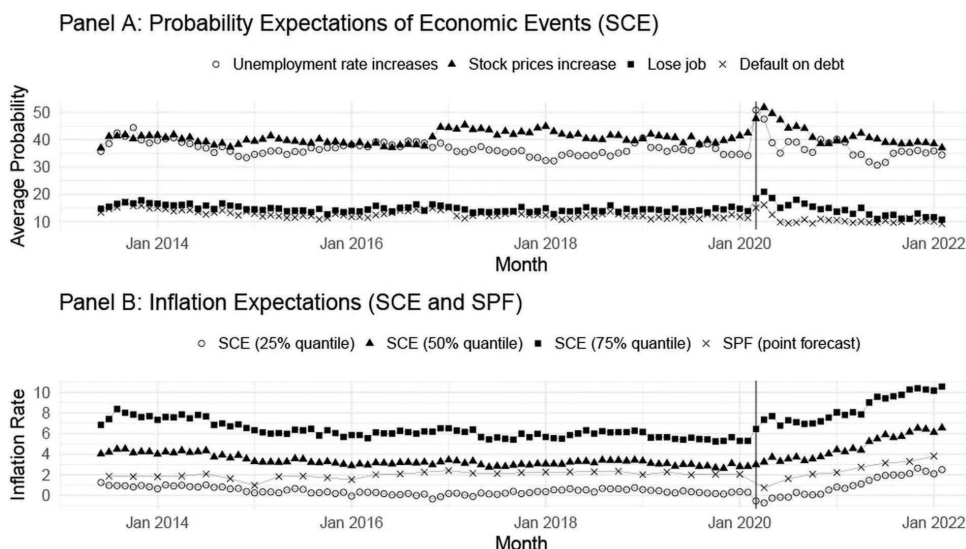


Figure 33.1 Panel A: consumers' probability expectations for various economic events, Panel B: consumers' and professionals' inflation expectations. Panel A shows consumers' probability expectations for various economic events (data source: Survey of Consumer Expectations (SCE), variable names: Q4new, Q6new, Q13new, Q30new). Panel B shows consumers' (SCE) and professionals' inflation expectations. Quantiles refer to consumers' aggregate forecast distribution of inflation. Data source for professionals' expectations: Survey of Professional Forecasters (SPF, Federal Reserve Bank of Philadelphia 2023). See endnote 5 for details on Panel B. In both panels A and B, the forecast horizon is one year.

Source: Author creation.

economic situation of survey participants. All four probabilities refer to a time horizon of one year. The underlying survey questions are part of the Survey of Consumer Expectations (SCE), a monthly internet-based survey run by the Federal Reserve Bank of New York, covering about 1,300 households per month (Armantier et al. 2017). The displayed probabilities are averages across all participants in a given month, using the survey weights provided with the data set to ensure that averages are representative of the population of US households.

Unemployment Expectations

The perceived probability of a future increase of the unemployment rate reaches its largest values in March and April 2020, at the onset of the coronavirus pandemic. The value in March 2020 (50.9 percent, as compared to 34.1 percent in February 2020) is particularly remarkable. That said, the probabilities recorded from May 2020 onward are largely in line with pre-pandemic levels. For the question on personal job loss, we similarly observe a large but short-lived increase in subjective probabilities in March and April 2020.

The observations in March and April 2020 evidence the widespread view that the pandemic would have large negative consequences for the economy. Several projects have tracked consumers' assessment of the pandemic in real time. For example, Fetzner et al. (2021) used data from internet searches and surveys to document rapidly increasing economic and health concerns at the onset of the pandemic. Furthermore, the unemployment expectations reported above mirror the drastic and complex impact that the pandemic had on the labor market. This impact has been extensively studied in the literature. For example, Coibion et al. (2020) provide an early assessment of the pandemic's labor market effects, based on a large household survey that provides a useful complement to official statistics that were not yet available at that time. Chetty et al. (2024) study the development of the US labor market, and the impact of government programs to support the economy, through November 2022. Their use of anonymized microdata on economic activity (e.g., credit card spending) allows for a detailed analysis across geographic and socio-economic subgroups. Both Coibion et al. (2020) and Chetty et al. (2024) emphasize that a large number of individuals dropped out of the labor force at the onset of the pandemic, e.g., due to earlier-than-planned retirement. For example, the labor force participation rate dropped from 63.3 percent in February 2020 to 60.1 percent in April 2020,⁴ a dramatic change given the low historic variability of the time series. In contrast to the unemployment rate, which has returned to its pre-pandemic level in the US at the time of writing, the labor force participation rate has not nearly recovered, standing at 62.3 percent in December 2022.

Financial Expectations

The reported probabilities of defaulting on personal debt are elevated in March and April 2020. However, the values observed thereafter tend to be actually lower than before the coronavirus pandemic. This finding is likely associated with extensive debt relief policies, initiated in response to the pandemic by the government or the private sector. Cherry et al. (2021) argue that such policies prevented a large number of defaults, as compared to what would have been expected given the poor economic fundamentals (e.g., the high unemployment rate) during the pandemic.

Surprisingly, the survey data shows that the average reported subjective probability of increasing stock prices *increased* by five percentage points in March 2020 from one month before. This finding might be explained by participants' belief in rebound effects in response to coronavirus-related stock market turmoil. For example, the Dow Jones index lost almost a third of its value between February 11 and March 20, 2020. Put differently, participants may have expected the worst to be over at the time they answered the survey. This interpretation would be in line with survey results by Hanspal et al. (2021) who find that consumers expected the recovery from the Spring 2020 stock market crash to be faster than recoveries from earlier stock market crashes. On the other hand, in a survey of wealthy retail investors, Giglio et al. (2021) find that investors' beliefs about one-year returns become more pessimistic after the stock market crash induced by the pandemic.

The optimism in the SCE's stock market expectations lasted until June 2020, with subjective probabilities returning to pre-pandemic levels thereafter. Interestingly, though, the elevated probabilities recorded for March 2020 to June 2020 seem more empirically plausible than the lower probabilities observed during the remaining sample period. For example, the average subjective probability of an increase of stock prices over the next year was less than 41 percent during the pre-pandemic period covered by the SCE. By contrast, the Dow Jones index increased in about 85 percent of the one-year windows within this period. This suggests that households underestimated the likelihood of increasing stock prices substantially in normal times.

Impact on Households' Decisions

As suggested earlier, there are various channels through which households' expectations could potentially affect households' consumption and savings behavior. Three channels seem particularly relevant. First, health expectations (fear of coronavirus infections) may reduce households' demand of goods and services that require in-person interaction. Second, a decrease in households' expected income could lead to lower consumption. Third, an increase in households' uncertainty could lead to lower consumption from precautionary motives. While distinguishing between these channels has important policy implications, doing so is challenging since the pandemic led to large simultaneous shocks in all relevant expectations variables (health, expected income, and income uncertainty).

Despite this challenge, several studies have attempted to disentangle (subsets of) these consumption motives. In particular, Immordino et al. (2022) conducted a survey among Italian consumers in the fall of 2020 with the aim of disentangling health versus precautionary savings motives. Their analysis indicates that both motives were relevant at the beginning of the coronavirus pandemic, in that neither crowds out the other in regression analyses. Coibion et al. (2024) consider a large-scale consumer survey in six European countries. They provide randomized information treatments that seek to induce exogenous variation in the first and second moment (i.e., the mean and the dispersion as measured by variance (also referred to as "uncertainty"), respectively) of consumers' expectation distribution for economic growth. Their main finding is that an increase in uncertainty has a meaningful impact on households' consumption of non-durable goods, whereas an increase in mean expectations does not, suggesting that expectation uncertainty can be a dominant factor that influences economic dynamics through precautionary motives during major crises such as the coronavirus pandemic.

Inflation Expectations

Inflation expectations are key in all common macroeconomic models (see D’Acunto and Weber, Chapter 7 in this volume). By determining the perceived real interest rate, they influence, for example, investment and consumption decisions of private households through the Euler equation. Likewise, they influence wage negotiations as well as firms’ price-setting behavior. Inflation expectations are, thus, an important factor for actual inflation and, therefore, an important early warning indicator for monetary policy. Furthermore, nowadays stable inflation expectations are directly relevant for the conduct of monetary policy in many advanced economies because their central banks have mandates to target a certain level of inflation.

As described above, the pandemic (and the policy responses it triggered) had major supply- and demand-side effects, both of which influence inflation dynamics. Disruptions of supply chains led to a reduction of the available volume of goods, and public health measures restricted the provision of services in most countries. Both factors imply upward pressure on inflation. At the same time, however, the consumption demand of private households decreased. These factors imply downward pressure on inflation. Which factors dominated is an empirical question and we will look at survey data to investigate how households and other agents in the economy perceived the relevance of these forces. Furthermore, different industries were affected quite differently—both in terms of reduction in demand (for example, restaurants versus software developers) and negative supply effects (for example, manufacturers with global supply chains versus services). As a consequence, these forces had the potential to trigger substantial movements in relative prices across industries.

Inflation Expectations of Private Households

Inflation expectations of private households increased substantially during the first phase of the coronavirus pandemic. In the US, one-year-ahead inflation expectations had been around 3 percent over the years 2016–2019 as measured by the median expectation constructed from the aggregate probability distribution in the SCE (see Figure 33.1, Panel B).⁵ From January 2020 onward, they climbed steadily, surpassing 6 percent in mid-2021. Likewise, consumers’ expectations of other quantiles (representing scenarios of low and high inflation) increased. The twenty-fifth percentile increased from below 0 percent to above 2 percent over the same period, while the seventy-fifth percentile increased from around 6 percent to above 10 percent. Taken together, these movements imply that inflation uncertainty, as perceived by private households, increased during the pandemic; the interquartile range increased from about 6 percentage points to more than 8 percentage points.

Interestingly, the picture looks different when considering the inflation expectations of private households during the coronavirus pandemic in the European Union (EU). According to the Consumer Expectation Survey conducted by the ECB, mean inflation expectations of households in the euro area with a 12-month horizon declined from just below 5 percent to 3 percent during the first half year of the pandemic.⁶ They only started to climb in the spring of 2021, reaching a maximum of 8 percent in October 2022. The same dynamics, albeit less pronounced, are visible for longer-term inflation expectations (with a horizon of three years). A complementary survey of the Deutsche Bundesbank that focuses on Germany shows a similar profile of households’ inflation expectations. Mean expectations with

a 12-month horizon were constant at a level between 2.5 percent and 3 percent from April 2020 until mid-2021, after which they increased to 9 percent in October 2022.⁷

There are two main potential explanations for the diverging pictures in the US versus Europe. First, when the pandemic started, the US economy was booming, with the unemployment rate at a long-time record low of 3.5 percent and a core inflation rate of about 2.5 percent, while the unemployment rate in the euro area was above 7 percent and core inflation at only 1.2 percent. Second, the Federal Reserve Bank (Fed) increased the money supply in the US by a much greater amount, and faster, by using “unconventional” monetary policy operations compared to what the ECB did in the euro area. From February to May 2020, the Fed increased the monetary base by almost 50 percent.⁸ The euro area’s monetary base rose by less than 20 percent over the same period.⁹ In the following months, the ECB “caught up” and conducted a more expansionary monetary policy (also with respect to the communication about and timing of interest rate increases after the pandemic), which might have contributed to the delayed but stronger increase in inflation expectations of private households in the euro area.¹⁰

Expectations of Firms and Professional Forecasters

Interestingly, when comparing inflation expectations of private households to those of other players in the economy, the picture looks quite different for inflation expectations of firms shortly after the outbreak of the coronavirus pandemic. Firms, in general, did not expect accelerating inflation in early 2020. On the contrary: Alekseev et al. (2023) report, based on a survey among business owners and managers in the US, that almost a quarter of the firms reduced their prices (mostly from sectors that faced strong demand shocks) while very few firms raised prices during the early phase of the pandemic. Similarly, Balleer et al. (2024) document that in Germany especially, firms that were heavily affected by the pandemic were more likely to plan to reduce their prices in the spring of 2020, suggesting that also they did not expect a strongly increasing general price level.

Similarly to firms, professional forecasters also did not expect inflation to rise much during the years 2020 and 2021 (on professional forecasting see Lenel and Reichmann, Chapter 16 in this volume). In the US, the average one-year-ahead inflation expectation of professional forecasters even declined to levels below 2 percent after the start of the pandemic, before gradually increasing to just above 2 percent at the beginning of 2021 (Figure 33.1, Panel B). Then they picked up and reached more than 3 percent at the end of 2021 which, at the time, was substantially below the average expectation of private households. In the euro area, one-year-ahead inflation expectations of professional forecasters, as measured by the ECB’s version of the Survey of Professional Forecasters (SPF), remained well below 1.5 percent throughout 2020 and climbed to 1.7 percent in the fourth quarter of 2021. Similarly, long-term inflation expectations remained low over that period (at 1.7 percent in most quarters) and reached 1.9 percent not before the fourth quarter of 2021.¹¹

What factors explain the diverging paths of inflation expectations during the onset of the pandemic? With respect to the level of inflation expectations, it is widely known that private households tend to have an upward bias in their inflation expectations, meaning that they usually expect higher inflation, as compared to firms or professional forecasters (or actual inflation for that matter). With respect to the dynamics, there is evidence that private households tend to associate bad economic times with higher inflation (see, e.g., Binder and Kamdar 2022; Binder and Makridis 2022) and, thus, tend to increase their inflation

expectations whenever negative shocks hit the economy. Consistent with that narrative, Cato and Schmidt (2023) document for Germany that households increased their inflation expectations whenever a particular region was heavily affected by the pandemic (in terms of the number of coronavirus infections per head). Finally, there is evidence that private households are influenced by the price dynamics of a few (types of) products that they buy frequently when forming inflation expectations (D’Acunto et al. 2023; see also D’Acunto and Weber, Chapter 7 in this volume). At the beginning of the pandemic, the prices of many goods and services that households consume frequently were increased and there is evidence based on credit card transaction data that the pandemic shifted demand toward more expensive goods and services (Seiler 2020; Cavallo 2023). This situation likely contributed to the relative increase in private households’ inflation expectations.

Ex Post Accuracy of Inflation Expectations

So, who turned out to be right from an ex post perspective? Actual inflation remained low and stable throughout 2020 in the US and in the euro area. At the beginning of 2021—almost one year into the pandemic—inflation was at 1.4 percent in the US and below 1 percent in the euro area. Only then—after the discontinuation of most business restrictions in advanced economies and ongoing lockdowns in important industrial centers in China—energy prices as well as prices of other goods started to increase at a more rapid pace. In the run-up to the Russian invasion of Ukraine in February 2022 (the next big crisis that would affect the economy and expectations, especially in Europe), inflation was at 7.6 percent in the US and at 5.1 percent in the euro area. Considering the one-year horizon of the inflation expectations shown in Figure 33.1, consumers’ expectations were more closely aligned with actual inflation than professional forecasters’ expectations during the pandemic. In particular, professional forecasters clearly underestimated the *magnitude* of the increase in inflation that would occur in 2022. However, in the period from 2013 to 2019 (the pre-pandemic period covered by the figure), households’ inflation expectations turned out to be clearly higher than actual inflation, whereas professionals’ expectations were quite accurate. As a consequence, when considering the entire period covered by the figure, households’ and professionals’ forecast accuracy (as measured by the mean absolute forecast error, MAE) is similar, with households attaining an MAE of 1.8 and professionals attaining an MAE of 1.5.

Conclusion

From a bird’s eye viewpoint, the most important and general features of economic expectations during the coronavirus pandemic are the following. First, the pandemic came truly as a surprise and people did not anticipate its economic effects. Second, once the crisis started, expectations shifted very quickly and very substantially. This is especially true for income- and growth-related expectations but also for expectations about financing conditions (mostly relevant for firms) and inflation expectations of private households. Finally, the unprecedented nature of the pandemic led to a large increase in economic uncertainty and expectation heterogeneity (see also Conrad and Lahiri, Chapter 6 in this volume).

This suggests that economic expectations, which are usually thought to be sticky and subject to (rational) inattention during normal times, quickly adjusted to incoming news when the crisis hit. This is good news because it means that allocation of resources was

more efficient *ceteris paribus*. There is hence reason to hope that economic policies which rely on expectation updating (such as forward guidance by monetary policy or unconventional fiscal policy) are more likely to work during crises, which is when they are most needed as macroeconomic stabilization tools.

It is natural to ask how expectations during the coronavirus pandemic compare to expectations during other crises. The global financial crisis of 2007–2009 arguably developed more gradually than the coronavirus pandemic, in that problems in the real estate and credit markets were well-known to exist well before they triggered the financial crisis. In that sense, the origins of the financial crisis were endogenous to the economy, whereas the public health origins of the coronavirus pandemic can be viewed as exogenous. On the other hand, Mishkin (2011, 49) describes that economic policymakers failed to appreciate the severity of the financial crisis as late as mid-2008, only a few weeks before the bankruptcy of Lehmann Brothers. In terms of expectations, this setup—being aware of problems, but not of their implications—is reminiscent of the onset of the coronavirus pandemic discussed above. While it is tempting to classify such expectations as irrational, this would be jumping to conclusions. There are many situations that “look problematic” *ex ante* but do not result in a full-fledged crisis. For the case of inflation expectations, Binder and Kamdar (2022) provide an account of expectation dynamics for a number of crisis periods ranging from the Great Depression of the 1930s to the coronavirus pandemic. They show that the quick adaptation of expectations to a quickly changing crisis environment is not unique to the most recent pandemic but rather, it is observable for other crises too.

Looking ahead, it will be essential for our understanding of the expectation formation process in (macro) economics to investigate to what extent people form expectations in a similar or different way during periods of severe crisis compared to regular times. Do agents switch to a sentiment- or narrative-driven framework of expectation formation when huge unprecedented shocks hit the economy? Or do they stick to more rational expectation formation (subject to information frictions) and just adapt the amount of attention they devote to available information or the frequency of how often they update their expectations, respectively? Evidence for the latter would support the hypothesis of Siegenthaler (1993, 16) that in times of crisis “the world loses transparency and processes become less predictable [and that] individuals remain utility maximizers acting rationally, yet for whom it becomes unclear what [information] remains useful after all” (authors’ translation).

In any case, the coronavirus episode can be used as an example of quasi-random variation in expectations (see, for example, Buchheim et al. 2022a) to identify the effects of expectation shocks on economic decisions at the microeconomic level or on other macroeconomic aggregates. Likewise, one conclusion from the experience of the coronavirus pandemic is that in crisis periods, researchers and policymakers should look at survey-based expectations data (in combination with other real-time data, e.g., from credit card transactions) to grasp economic developments and sentiment, and enable the design of appropriate policies without major time lags.

Notes

- 1 Bodenhorn (2020) shows based on evidence from the Spanish flu in 1918 that mandated closures are likely to be just a coordinated substitute for supply constraints due to worker absenteeism because of either sickness or fear of contracting the virus. In both scenarios, however, it is clear that supply capacities are negatively affected.

- 2 “Trade set to plunge as COVID-19 pandemic upends global economy.” WTO (World Trade Organization), 2020. URL: https://www.wto.org/english/news_e/pres20_e/pr855_e.htm. Retrieved on April 13, 2023.
- 3 Note that expectations about aggregate growth are not available for other countries since business surveys usually only include questions about expectations of firms about their own business rather than the macroeconomic environment.
- 4 US Bureau of Labor Statistics Unemployment Rate [UNRATE], 2023. Retrieved from FRED, Federal Reserve Bank of St. Louis, on January 23, 2023. URL: <https://fred.stlouisfed.org/series/UNRATE>.
- 5 Specifically, the plot’s first three lines show quantiles of the SCE’s aggregate probability distribution of inflation. To construct these quantiles, we first average the individual probability responses using the survey weights provided by the SCE. The relevant SCE variable names are “Q9X,” where $X = 1, 2, \dots, 10$. We then fit a generalized beta distribution (using the R package *forecasthistogram*, see Krüger and Pavlova 2024) from which we compute the quantiles of interest. The plot’s fourth line shows one-year ahead SPF point forecasts that are computed from the cross-sectional means of quarterly forecasts for CPI inflation.
- 6 “Inflation perceptions and expectations.” ECB (European Central Bank). URL: https://www.ecb.europa.eu/stats/ecb_surveys/consumer_exp_survey/results/html/ecb.ces_results_april_2023_inflation.en.html. Retrieved on April 12, 2023.
- 7 “Inflation expectations. Survey on Consumer Expectations.” Deutsche Bundesbank. URL: <https://www.bundesbank.de/en/bundesbank/research/survey-on-consumer-expectations-bop-hh/inflation-expectations-848334>. Retrieved on August 22, 2025.
- 8 Board of Governors of the Federal Reserve System. Monetary Base; Total [BOGMBASE], 2023. <https://fred.stlouisfed.org/series/BOGMBASE>. Retrieved from FRED, Federal Reserve Bank of St. Louis, on April 28, 2023.
- 9 ECB (European Central Bank) Central Bank Assets for Euro Area (11–19 Countries) [ECBASSETSW]. <https://fred.stlouisfed.org/series/ECBASSETSW>. Retrieved from FRED, Federal Reserve Bank of St. Louis, on April 28, 2023.
- 10 There is evidence that unconventional monetary policy measures affect inflation expectations (e.g., Aßhoff et al. 2021; Neri 2023). On the other hand, Binder (2020) presents survey evidence that a clear majority of consumers were unaware of US central bank policy at the beginning of the pandemic.
- 11 Survey of Professional Forecasters, Federal Reserve Bank of Philadelphia, 2023. URL: <https://www.philadelphiafed.org/surveys-and-data/real-time-data-research/survey-of-professional-forecasters>. Retrieved on March 30, 2023.

References

- Alekseev, Georgij, Safaa Amer, Manasa Gopal, Theresa Kuchler, Jesper Wiborg Schneider, Johannes Stroebe, and Nils Wernerfelt. 2023. “The Effects of COVID-19 on US Small Businesses: Evidence from Owners, Managers, and Employees.” *Management Science* 69, no. 1: 7–24. DOI: 10.1287/mnsc.2022.4327.
- Altig, Dave, Scott Baker, Jose Maria Barrero, Nicholas Bloom, Philip Bunn, Scarlet Chen, Steven J. Davis, Julia Leather, Brent Meyer, Emil Mihaylov, Paul Mizen, Nicholas Parker, Thomas Renault, Pawel Smietanke, and Gregory Thwaites. 2020. “Economic Uncertainty Before and During the COVID-19 Pandemic.” *Journal of Public Economics* 191: 104274. DOI: 10.1016/j.jpubeco.2020.104274.
- Armantier, Olivier, Giorgio Topa, Wilbert van der Klaauw, and Basit Zafar. 2017. “An Overview of the Survey of Consumer Expectations.” *Federal Reserve Bank of New York Economic Policy Review* 23, no. 2: 51–72.
- Aßhoff, Sina, Ansgar Belke, and Thomas Osowski. 2021. “Unconventional Monetary Policy and Inflation Expectations in the Euro Area.” *Economic Modelling* 102: 105564. DOI: 10.1016/j.econmod.2021.105564.
- Balleer, Almut, Sebastian Link, Manuel Menkhoff, and Peter Zorn. 2024. “Demand or Supply? Price Adjustment Heterogeneity during the Covid-19 Pandemic.” *International Journal of Central Banking* 20, no. 1: 93–157.

- Barrero, Jose Maria, Nicholas Bloom, Steven J. Davis, Steven J., and Brent H. Meyer. 2021. "COVID-19 is a Persistent Reallocation Shock." *AEA Papers and Proceedings* 111: 287–291. DOI: 10.1257/pandp.20211110.
- Bartik, Alexander W., Marianne Bertrand, Zoe Cullen, Edward L. Glaeser, Michael Luca, and Christopher T. Stanton. 2020. "The Impact of COVID-19 on Small Business Outcomes and Expectations." *Proceedings of the National Academy of Sciences* 117, no. 30: 17656–17666. DOI: 10.1073/pnas.2006991117.
- Beckert, Jens. 2016. *Imagined Futures: Fictional Expectations and Capitalist Dynamics*. Cambridge, MA: Harvard University Press.
- Binder, Carola. 2020. "Coronavirus Fears and Macroeconomic Expectations." *Review of Economics and Statistics* 102, no. 4: 721–730. DOI: 10.1162/rest_a_00931.
- Binder, Carola, and Rupal Kamdar. 2022. "Expected and Realized Inflation in Historical Perspective." *Journal of Economic Perspectives* 36, no. 3: 131–156. DOI: 10.1257/jep.36.3.131.
- Binder, Carola, and Christos Makridis. 2022. "Stuck in the Seventies: Gas Prices and Consumer Sentiment." *Review of Economics and Statistics* 104, no. 2: 293–305. DOI: 10.1162/rest_a_00944.
- Bloom, Nicholas. 2009. "The Impact of Uncertainty Shocks." *Econometrica* 77, no. 3: 623–685. DOI: 10.3982/ECTA6248.
- Bodenhorn, Howard. 2020. "Business in a Time of Spanish Influenza." *NBER Working Paper* no. 27495. DOI: 10.3386/w27495.
- Brodeur, Abel, David Gray, Anik Islam, and Suraiya Bhuiyan. 2021. "A Literature Review of the Economics of COVID-19." *Journal of Economic Surveys* 35, no. 4: 1007–1044. DOI: 10.1111/joes.12423.
- Buchheim, Lukas, Jonas Dovern, Carla Krolage, and Sebastian Link. 2022a. "Sentiment and Firm Behavior during the COVID-19 Pandemic." *Journal of Economic Behavior & Organization* 195: 186–198. DOI: 10.1016/j.jebo.2022.01.011.
- Buchheim, Lukas, Carla Krolage, and Sebastian Link. 2022b. "Sudden Stop: When Did Firms Anticipate the Potential Consequences of Covid-19?" *German Economic Review* 23, no. 1: 79–119. DOI: 10.1515/ger-2020–0139.
- Cato, Misina, and Tobias Schmidt. 2023. "Households' Expectations and Regional COVID-19 Dynamics." *Deutsche Bundesbank Discussion Paper* no. 02/2023. SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4391258.
- Cavallo, Alberto. 2023. "Inflation with Covid Consumption Baskets." *IMF Economic Review* 72, no. 1. DOI: 10.1057/s41308-023-00213-y.
- Cherry, Susan, Erica Jiang, Gregor Matvos, Tomasz Piskorski, and Amit Seru. 2021. "Government and Private Household Debt Relief during Covid-19." *Brookings Papers on Economic Activity* Fall 2021: 141–199. DOI: 10.1353/eca.2022.0002.
- Chetty, Raj, John N. Friedman, Nathaniel Hendren, Michael Stepner, and the Opportunity Insights Team. 2024. "The Economic Impacts of Covid-19: Evidence from a New Public Dataset Built Using Private Sector Data." *The Quarterly Journal of Economics* 139, no. 2: 829–889. DOI: 10.1093/qje/qjad048.
- Coibion, Olivier, Dimitris Georgarakos, Yuriy Gorodnichenko, Geoff Kenny, and Michael Weber. 2024. "The Effect of Macroeconomic Uncertainty on Household Spending." *American Economic Review* 113, no. 3: 645–677. DOI: 10.1257/aer.20221167.
- Coibion, Olivier, Yuriy Gorodnichenko, and Michael Weber. 2020. "Labor Markets During the Covid-19 Crisis: A Preliminary View." *NBER Working Paper* No. 27017. DOI: 10.3386/w27017.
- D'Aacunto, Francesco, Ulrike Malmendier, and Michael Weber. 2023. "What Do the Data Tell Us about Inflation Expectations?" in *Handbook of Economic Expectations*, edited by Rüdiger Bachmann, Giorio Topa, and Wilbert van der Klaauw, 33–161. Academic Press. DOI: 10.1016/B978-0-12-822927-9.00012-4.
- Dovern, Jonas, Lena S. Müller, and Klaus Wohlrabe. 2023. "Local Information and Firm Expectations about Aggregates." *Journal of Monetary Economics* 138: 1–13. DOI: 10.1016/j.jmoneco.2023.03.005.
- Ferrando, Annalisa, and Ioannis Ganoulis. 2020. "Firms' Expectations on Access to Finance at the Early Stages of the Covid-19 Pandemic." *ECB Working Paper* No. 2446. DOI: 10.2866/057681.
- Ferrando, Annalisa, Alexander Popov, and Gregory F. Udell. 2022. "Unconventional Monetary Policy, Funding Expectations, and Firm Decisions." *European Economic Review* 149: 104268. DOI: 10.1016/j.eurocorev.2022.104268.

- Fetzer, Thiemo, Lukas Hensel, Johannes Hermle, and Christopher Roth. 2021. "Coronavirus Perceptions and Economic Anxiety." *Review of Economics and Statistics* 103, no. 5: 968–978. DOI: 10.1162/rest_a_00946.
- Giglio, Stefano, Matteo Maggiori, Johannes Stroebel, and Stephen Utkus. 2021. "The Joint Dynamics of Investor Beliefs and Trading During the Covid-19 Crash." *Proceedings of the National Academy of Sciences* 118, no. 4: e2010316118. DOI: 10.1073/pnas.2010316118.
- Hanspal, Tobin, Annika Weber, and Johannes Wohlfart. 2021. "Exposure to the Covid-19 Stock Market Crash and Its Effect on Household Expectations." *Review of Economics and Statistics* 103, no. 5: 994–1010. DOI: 10.1162/rest_a_01011.
- Hassan, Tarek A., Stephan Hollander, Laurence Van Lent, Markus Schwedeler, and Ahmed Tahoun. 2023. "Firm-Level Exposure to Epidemic Diseases: Covid-19, SARS, and H1N1." *The Review of Financial Studies* 36, no. 12: 4919–4964. DOI: 10.1093/rfs/hhad044.
- Immordino, Giovanni, Tullio Jappelli, Tommaso Oliviero, and Alberto Zazzaro. 2022. "Fear of COVID-19 Contagion and Consumption: Evidence from a Survey of Italian Households." *Health Economics* 31, no. 3: 496–507. DOI: 10.1002/hec.4464.
- Krüger, Fabian, and Lora Pavlova. 2024. "Quantifying Subjective Uncertainty in Survey Expectations." *International Journal of Forecasting* 40, no. 2: 796–810. DOI: 10.1016/j.ijforecast.2023.06.001.
- Maćkowiak, Bartosz, Filip Matějka, and Mirko Wiederholt. 2023. "Rational Inattention: A Review." *Journal of Economic Literature* 61, no. 1: 226–273. DOI: 10.1257/jel.20211524.
- Manski, Charles F. 2004. "Measuring Expectations." *Econometrica* 72, no. 5: 1329–1376. DOI: 10.1111/j.1468-0262.2004.00537.x.
- Manski, Charles F. 2018. "Survey Measurement of Probabilistic Macroeconomic Expectations: Progress and Promise." *NBER Macroeconomics Annual* 32, no. 1: 411–471. DOI: 10.1086/696061.
- Meyer, Brent H., Brian Prescott, and Xuguang Simon Sheng. 2022. "The Impact of the Covid-19 Pandemic on Business Expectations." *International Journal of Forecasting* 38, no. 2: 529–544. DOI: 10.1016/j.ijforecast.2021.02.009.
- Mishkin, Frederic S. 2011. "Over the Cliff: From the Subprime to the Global Financial Crisis." *Journal of Economic Perspectives* 25, no. 1: 49–70. DOI: 10.1257/jep.25.1.49.
- Neri, Stefano. 2023. "Long-Term Inflation Expectations and Monetary Policy in the Euro Area before the Pandemic." *European Economic Review* 154: 104426. DOI: 10.1016/j.euroecorev.2023.104426.
- Seiler, Pascal. 2020. "Weighting Bias and Inflation in the Time of COVID-19: Evidence From Swiss Transaction Data." *Swiss Journal of Economics and Statistics* 156, no. 1: 1–11. DOI: 10.1186/s41937-020-00057-7.
- Siegenthaler, Hansjörg. 1993. *Regelvertrauen, Prosperität und Krisen*. Tübingen: J.C.B. Mohr.
- Sims, Christopher A. 2003. "Implications of Rational Inattention." *Journal of Monetary Economics* 50, no. 3: 665–690. DOI: 10.1016/S0304-3932(03)00029-1.



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