

# **Who Builds the Media Agenda?**

Actors' Influence over German Newspaper Coverage of Climate Change

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## Summary

The meaning of political issues is discursively constructed and influences political and societal responses. Understanding which actors are most successful at defining political issues is thus critical to comprehend the balance of power within democratic societies. This dissertation studies the ability of individual actors to shape public perceptions by pushing their issues and perspectives onto the media agenda under different conditions. While numerous studies have explored the influence of political actors over the media agenda, existing research seldom considers non-political actors. Moreover, this literature tends to describe rather than explain the ability of (political) actors to build the media agenda, largely neglecting the potential impact of contextual variations. Pursuing an actor-centric approach, this dissertation draws on arguments from several related literatures to develop an integrated theoretical framework of ten individual-level factors that explain the ability of four broad actor groups to build the media agenda. The proposed framework accounts for the influence of variations in the media system, issue salience, crises, and the societal consensus on an issue. I test the framework on the German climate change debate, which constitutes a most likely case as climate change is relevant to a broad range of actors, has been an issue of debate for more than four decades, and has recently risen to the top of the public agenda. I use automated text analysis to examine the visibility of 960 individual and collective actors with incentives to shape public perceptions of climate change in over 40,000 newspaper articles published in five German quality dailies between 1976 and 2020. Moreover, I compare the content of over 9,000 press releases and statements released by the most visible actors between 2017 and 2020 to the almost 13,000 newspaper articles published in the same period using soft cosine similarity scores based on context-sensitive word embedding models, as well as dictionary-based sentiment analysis. The findings confirm that the considered agenda-building factors explain actors' influence over the media agenda. The impact of individual factors differs across contexts as well as for different degrees of influence over the media agenda. Moving from the largely descriptive approach applied in previous research toward a generalized explanation, this dissertation contributes to our understanding of actors' ability to build the media agenda and extends the toolkit for automated text analyses.

**Keywords:** agenda-building, actor-centric, context conditions, newspaper coverage, climate change, soft cosine similarity, automated text analysis

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# List of Abbreviations

ACT-RE .....	Random effects for the actor level
AfD .....	Alternative für Deutschland
AGDW .....	Arbeitsgemeinschaft Deutscher Waldbesitzerverbände
BDEW .....	Bundesverband der Energie- und Wasserwirtschaft
BDL .....	Bundesverband der Deutschen Luftverkehrswirtschaft
BUND .....	Bund für Umwelt und Naturschutz
CDU .....	Christlich Demokratische Union Deutschlands
CSU .....	Christlich-Soziale Union in Bayern
CVF .....	Climate Vulnerable Forum
DNR .....	Deutscher Naturschutzring
ECB .....	European Central Bank
EF! .....	Earth First!
EnBW .....	Energie Baden-Württemberg AG
Euro crisis .....	European sovereign debt crisis
EZB .....	Europäische Zentralbank
FAZ .....	Frankfurter Allgemeine Zeitung
FDP .....	Freie Demokratische Partei
FFF .....	Fridays for Future
FR .....	Frankfurter Rundschau
GDR .....	German Democratic Republic
GFC .....	Global Financial Crisis
GRUENE .....	Bündnis 90/Die Grünen
IDE .....	Integrated development environment
IPCC .....	Intergovernmental Panel on Climate Change
IRR .....	Incidence rate ratio
LINKE .....	DIE LINKE
LNG .....	Liquefied natural gas
LP-FE .....	Fixed effects for the legislative periods
NABU .....	Naturschutzbund Deutschland
NER .....	Named entity recognition
NLP .....	Natural language processing
PIK .....	Potsdam-Institut für Klimafolgenforschung
SED .....	Sozialistische Einheitspartei Deutschlands
SPD .....	Sozialdemokratische Partei Deutschlands
SZ .....	Süddeutsche Zeitung
taz .....	die tageszeitung
tf-idf .....	Term frequency-inversed document frequency
WBGU .....	Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen
Welt .....	Die Welt
WMO .....	World Meteorological Organization
WWF .....	World Wide Fund for Nature
XR .....	Extinction Rebellion
ZINB-RM .....	Zero-inflated negative binomial regression models



## Chapter 1: Introduction

*“The definition of the alternatives is the supreme instrument of power, the antagonists can rarely agree on what the issues are because power is involved in the definition.”*

E. E. Schattschneider (1960, p. 66)

### 1.1 Motivation

Political issues are not simple reflections of reality, they are the outcome of an intricate process in which stakeholders contend to define their meaning (e.g., Blumer, 1971; Hilgartner & Bosk, 1988; Spector & Kitsuse, 1973; Stone, 1989). This process determines which issues are considered by policymakers and constrains the range of legitimate responses (e.g., Baumgartner & Jones, 2015; Cobb & Elder, 1983; Green-Pedersen & Walgrave, 2014; Kingdon, 1995). Therefore, whoever succeeds in shaping public perceptions of political issues and their importance gains considerable influence over the policy agenda (Fawzi, 2018; Van Aelst & Walgrave, 2016; Vliegenthart et al., 2016). Once an issue is commonly perceived as political and important, it becomes difficult for policymakers to ignore (e.g., Damore, 2004; Green-Pedersen & Mortensen, 2010). Furthermore, the range of available policy solutions depends on the definition of the problem (e.g., Baumgartner & Jones, 2009; Pralle, 2006; Schattschneider, 1960). In consequence, the redefinition of issues alters the universe of legitimate responses and can lead to policy change (Baumgartner & Jones, 2009; Rocheford & Cobb, 1994). Beyond the political sphere, public perceptions of political issues have implications for people’s responses on the individual level, including their beliefs, attitudes, and behaviors (e.g., Lecheler & de Vreese, 2018; McCombs & Valenzuela, 2021). Stakeholders thus have incentives to maximize public attention for their issue definitions. In light of the profound influence that the definition of political issues exerts over political and individual responses, understanding which actors dominate the discursive construction of political issues under which conditions and to which extent is critical to comprehend the balance of power within democratic societies. Therefore, this dissertation studies the ability of individual actors to shape public perceptions by pushing their issues and perspectives onto the media agenda under different context conditions.

The media play a crucial role in shaping public perceptions, as media coverage provides audiences with easily accessible cues regarding the importance of individual issues and the legitimacy of specific issue definitions (e.g., Boydston, 2013; Iyengar et al., 1982; McCombs & Shaw, 1972; Weaver et al., 2004). The broad literature on agenda-setting shows that audiences perceive issues which are salient in the media as more important and that people tend to construct their issue interpretations around the substantive and affective attributes which are emphasized in media coverage (see McCombs & Valenzuela, 2021 for an overview). Moreover, the solutions presented in the media shape the range of responses that people are prepared to consider (Benford & Snow, 2000). Hence, the media are an important channel for actors striving to shape public perceptions on an issue, especially since it is almost impossible to gain broad public attention for issues or interpretations without coverage in the mass media (Harder et al., 2017; Koopmans, 2004; Mukerjee & Yang, 2021; Parmelee & Roman, 2020). Given the strong link between actors' influence over the media agenda and their ability to shape public perceptions of political issues, explaining which actors succeed in pushing their issues and interpretations onto the media agenda constitutes an important step toward understanding the discursive construction of political issues.

Several strands of literature from different disciplines investigate how issues and specific angles enter the media agenda. This research commonly uses the term media agenda-building to denote the transfer of topics and interpretations from available source materials to the media agenda (e.g., Lang & Lang, 1991; Gandy, 1982), differentiating at least two levels of agenda-building. First-level agenda-building refers to the transfer of topics from source materials to the media agenda and primarily determines the salience of individual issues in media coverage (e.g., Kioussis et al., 2006, 2015; Wu & Coleman, 2009). Second-level agenda-building describes the inclusion of substantive and affective attributes from source materials in the coverage and can thus influence the definition of (political) issues in the media (e.g., Kim et al., 2015; Kioussis & Wu, 2008). While both levels of agenda-building have received considerable scholarly attention, existing research tends to focus on procedural and contentual predictors, explaining the adoption of specific issues and interpretations with the demands of the news production process (e.g., Boesman et al., 2017; Brüggemann, 2014; Gitlin, 2003; Tuchman, 1978), journalistic norms (e.g., Boykoff & Boykoff, 2007; Schudson, 2001; Shoemaker & Reese, 2014), or their news value (e.g., Galtung & Ruge, 1965; Harcup & O'Neill, 2001, 2017; Staab, 1990). The findings from this research offer important insights

regarding the formation of the media agenda but do not directly speak to the ability of different actors to gain media attention for their issues and interpretations.

A largely separate strand of the agenda-building literature has compared the prevalence of topics and attributes in actors' press materials and media coverage, showing that especially political elites are often successful at building the media agenda (e.g., Bennett et al., 2006, 2007; Carmichael & Brulle, 2017; Dekavalla, 2016; T. Meyer et al., 2017; Wolfsfeld, 2022). These studies add to our understanding of the discursive construction of political issues in at least two respects. First, the finding that the media frequently reproduces the selection of issues and attributes presented in source materials shows that external actors, in general, and elite actors, in particular, have considerable influence over the media agenda. This result offers empirical support for an assumption underlying many theories of mass communication (e.g., Bennett, 1990; Herman & Chomsky, 1988; Zaller, 1992) and substantiates the notion that the media are an important channel for actors striving to shape public perceptions. Second, this research shows that political actors holding different offices were able to build the media agenda, suggesting that this actor group may have an advantage over other actors in the discursive construction of political issues. However, few studies have considered the ability of non-political actors such as large companies and business associations, civil society organizations, or scientists to build the media agenda (e.g., Andsager, 2000; Berkowitz & Adams, 1990; Carmichael & Brulle, 2017; Huckins, 1999), and even fewer have systematically compared the influence of different actor groups (Kroon & van der Meer, 2021; Wetts, 2020). Hence, additional research is required to understand which societal groups are most successful at building the media agenda and thus likely have an edge in the discursive construction of political issues.

Non-political actors have always had incentives to influence the public perception of political issues (Andsager & Smiley, 1998; Berkowitz & Adams, 1990; Kroon & van der Meer, 2021; Wetts, 2020), but the transformation of the media system over the last 15 years likely created more opportunities to build the media agenda, especially for actors with limited staff and financial resources (e.g., Jungherr et al., 2019; Pfetsch et al., 2013, 2015). In consequence, the range of actors who can gain sufficient attention for their issues and interpretations to shape public perceptions of political issues may have widened over time, increasing the probability that non-political actors succeed to initiate policy change by (re-)defining political issues and accentuating the importance of considering different actor groups to understand the discursive construction of political issues. On the other hand, the emergence of the hybrid media system

may have changed the ways in which the news production process can be influenced, but not the ability of different actor groups to utilize these possibilities (e.g., Chadwick, 2017). In this case, the transformation of the media systems could have amplified influential actors' abilities to shape public perceptions, reinforcing existing power relations. Whereas the implications of the hybrid media system for actors' ability to build the media agenda have been theoretically elaborated, though not empirically tested, the potential influence of (changes in) other context conditions has not been systematically considered in the existing literature (for an exception, see Jungherr et al., 2019; Pfetsch et al., 2013, 2015).

Moreover, previous research on the ability of individual actors to push their issues and interpretations onto the media agenda has been largely descriptive, with few studies exploring the impact of source characteristics on the probability that selected topics and angles are reproduced in the media (e.g., Berkowitz, 1992; T. Meyer et al., 2017; Wetts, 2020). The knowledge which actors or actor groups were more or less successful at building the media agenda in a specific setting already offers important insights about the balance of power between different societal groups. Yet, a broader understanding which factors allow actors to build the media agenda under which conditions would significantly add to our ability to explain and possibly predict the discursive evolution of political issues. The concept of discursive power developed by Jungherr et al. (2019) marks an important step toward such a broader understanding but is aimed mainly at different media systems and organizational features, considering source characteristics only in passing. Although studies from several fields including agenda-building (e.g., Berkowitz, 1992; Kroon & van der Meer, 2021; T. Meyer et al., 2017; Wetts, 2020), framing (e.g., Entman, 1991, 2003a), issue ownership (Stubager, 2018; Walgrave et al., 2012), and journalism (e.g., Galtung & Ruge, 1965; Harcup & O'Neill, 2001, 2017) point to individual-level factors which can be expected to influence actors' ability to build the agenda, these factors have not yet been integrated into a comprehensive theoretical framework that would enable us to explain which actors are able to influence the media agenda to which extent and under which conditions.

Building on the outlined research, this dissertation focuses on four central questions to advance our understanding of actors' ability to build the media agenda. First, I examine which actors succeed in pushing their issues and interpretations onto the media agenda by identifying political as well as non-political actors with incentives to shape public perceptions on an issue and comparing their influence over the media agenda. The direct comparison between relevant actor groups allows me to draw conclusions regarding the relative advantage of different



societal groups in the discursive construction of political issues, adding to the emerging literature investigating the differential ability of various actor types to shape public perceptions (e.g., Kroon & van der Meer, 2021; T. Meyer et al., 2017; Wetts, 2020). Given that the definition of political issues constrains the range of legitimate policy responses and that the redefinition of issues can initiate policy change (Baumgartner & Jones, 2009; Rocheford & Cobb, 1994), an improved understanding who builds the media agenda also speaks to the question whether stimuli for policy change generally come from within the political domain or originate from other societal domains, and thus contributes to our comprehension of policy agenda-building.

Second, I explore which characteristics can explain actors' influence over the media agenda, considering factors expected to be relevant for all actors as well as characteristics bound to specific actor groups. To identify relevant factors and learn about their relative importance for actors' ability to build the media agenda, I integrate arguments from several literatures and develop a comprehensive theoretical framework that explains the influence of different actor groups over the media agenda. This theoretical framework constitutes an important step toward a causal explanation of the influence of specific actors or actor groups over the media agenda and, by implication, the discursive construction of political issues. It extends the existing agenda-building literature and complements approaches focused on the systemic and organizational level (Jungherr et al., 2019). Moreover, the impact of individual factors on actors' ability to build the media agenda supports conclusions regarding the potential for change in the balance of power between different societal groups. Specifically, the greater relevance of factors attainable for all actor groups could facilitate shifts, whereas the higher importance of characteristics inherently linked to specific positions such as political offices would limit such changes. Finally, accounting for the relevance of specific factors commonly subsumed under the term 'elite' adds to our understanding of the role of political and societal elites in agenda-building as well as the potential for non-elite actors to shape public perceptions.

Third, I study whether the dominance of different actor groups and the effects of individual characteristics change over time to account for the impact of contextual changes. Tracing the influence of actors and their characteristics over time allows me to explore how the emergence of the hybrid media system altered the balance of power between different actor groups, especially with regard to the question whether the transformation of the media system expanded opportunities for new actors to shape public perceptions or reinforced existing power relations (Chadwick, 2017; Jungherr et al., 2019; Pfetsch et al., 2015). Beyond changes in the

media system, I consider how the salience of an issue, the occurrence of crises, and shifts in the societal consensus affect the incentives as well as the ability of different actor groups to push their perspectives onto the media agenda. Within the proposed theoretical framework, recognizing the influence of contextual variations not only nuances our understanding of actors' ability to build the agenda, but is also an essential step toward integrating existing research conducted in various contexts. Findings on the impact of context conditions on the ability of different actor groups to shape public perceptions are also of interest for scholars studying the emergence of windows of opportunity for issue entrepreneurs (e.g., Brunner, 2008; Carter & Jacobs, 2014; Mintrom & Norman, 2009; Pralle, 2009).

Fourth, I examine the extent of actors' influence over the second level of the media agenda, differentiating between coverage that names individual actors, but does not necessarily include their perspective on an issue, and more or less close reproductions of actors' issue interpretations. I further consider the exclusivity of media coverage for actors and their perspectives and journalists' evaluations of presented issue interpretations. This distinction engenders important insights about actors' differential abilities to shape public perceptions through the coverage of their perspectives in the media and is thus directly relevant to explaining the discursive construction of political issues. Moreover, it allows me to detect differences in the relevance of individual characteristics for the probability that actors' perspectives are covered more or less persuasively in the media.

### 1.2 Dissertation Approach

This dissertation pursues an actor-centric approach to explain the ability of different actors to build the media agenda. Specifically, I develop a theoretical framework of factors and context conditions expected to affect individual actors' influence over the media agenda and apply this framework to newspaper articles on climate change published in German quality dailies between 1976 and 2020. From previous research, I identify four broad groups of actors with incentives to shape public perceptions of political issues: political actors, business actors, civil society actors, and scientific actors (e.g., Huckins, 1999; Kioussis et al., 2006, 2015; Kroon & van der Meer, 2021; Merkley, 2020; T. Meyer et al., 2017; Wetts, 2020). However, these incentives cannot be assumed to pertain to all political issues, especially for non-political actors. For the empirical analysis, I thus focus on actors with presumed incentives to shape public perceptions of climate change. Since the universe of actors striving to build the media agenda

cannot be empirically determined within the scope of this dissertation, the selection of actors is based on integral assumptions about their climate change positions and motivations. To account for changes in actors' incentives over time, the set of considered actors varies across the observed legislative periods.

I argue that actors' influence over the media agenda reflects a range of characteristics, some of which are inherently linked to specific positions, whereas others are attainable for all actor groups. Drawing on several related literatures (e.g., Entman, 2003a; Galtung & Ruge, 1965; Shoemaker & Reese, 2014; Van der Brug & Berkhout, 2015), I identify ten factors that are expected to have an independent and additive effect on actors' ability to build the media agenda. Four of these factors, *executive authority*, *issue-specific relevance*, *economic weight*, and *scientific expertise*, are linked to specific actor groups, whereas the other six, *personal expertise*, *issue ownership*, *prominence*, *surprise*, *controversy*, and *consonance*, are attainable for actors with different backgrounds. Although the last three factors are contentual, they can be expected to be more prevalent in the angles of actors with specific characteristics and can thus contribute to our understanding which actors are best equipped to build the media agenda. The presented theoretical argument explicates the proposed mechanism for each identified agenda-building factor, considering journalistic norms, audience interests, and associated monetary incentives to explain why the issues and interpretations of actors with the respective characteristic should be more attractive in the news production process. While some factors are exclusively linked to political offices, many others are relevant for non-political actors. The integration of these factors thus allows me to explain the differential ability of individual political, business, civil society, and scientific actors to build the media agenda within the same theoretical framework.

Furthermore, I argue that the relevance of the individual factors for actors' ability to build the media agenda varies with several context conditions, including the media system, the salience of an issue, the presence or absence of crises, and the societal consensus on an issue. Consequently, I theorize that the relative importance of the considered factors depends on the issue at hand and changes over time, favoring different actors in different settings. Together with the agenda-building factors, the contextual dimension may account for some of the inconsistencies in previous findings regarding the influence of specific actor groups over the media agenda (e.g., Carmichael & Brulle, 2017; Eide & Ytterstad, 2011; Granado, 2011; Kroon & van der Meer, 2021; Shehata & Hopmann, 2012). For the analysis, I focus on the second level of the media agenda, considering the visibility of individual actors in the media, the

similarity between actors' press materials and newspaper articles, the exclusivity of the received coverage, and the tonality of the newspaper articles.

I apply the proposed theoretical framework to German newspaper coverage of climate change, which is an interesting case to study the ability of different actor groups to build the media agenda for theoretical as well as substantive reasons. Climate change is among the most important political issues of our time and its discursive construction is inherently relevant to the political and societal responses to this challenge. How to deal with climate change is also fiercely contested (cf. Berker & Pollex, 2021; McCright et al., 2016; von Zabern & Tulloch, 2021), suggesting that it is a most likely case to find different actor groups competing to define its meaning. In addition, the long history of the issue and its rise in salience over the past fifteen years allow me to study the ability of different actor groups to build the media agenda under changing context conditions. In contrast to the frequently studied Anglo-American media systems, the German media system is relatively non-partisan and consensus-oriented (Schäfer, 2016), offering different stakeholders a more level playing field, which may have been leveled further through the emergence of the hybrid media system (Jungherr et al., 2019; Pfetsch et al., 2015). Substantively, Germany is the seventh-largest carbon dioxide emitter worldwide and the largest economy in the European Union, making its climate policies decisive for global mitigation efforts (Crippa et al., 2020; Szulecki et al., 2016). At the same time, the impact of climate change is increasingly felt in Germany, raising the pressure on political and societal actors to respond (Eckstein et al., 2019). Since I focus on the discursive construction of a specific issue, I cannot study actors' ability to build the first level of the media agenda. Moreover, the focus on the German case limits the generalizability of the findings across media systems.

To test my hypotheses, I draw on a corpus of newspaper articles addressing climate change published in five German quality dailies between 1976 and 2020, and a second corpus of actors' press materials released between 2017 and 2020, both collected for this dissertation. To explain the visibility of individual actors and the reception of their press materials in climate change coverage, I combine quantitative text analysis techniques such as frequency analysis and machine learning with regression analysis. In the first part of the analysis, I focus on the visibility of actors with incentives to shape public perceptions of climate change in the full newspaper corpus, using an extensive dictionary of 960 political, business, civil society, and scientific actors compiled to supply the search terms for an automated frequency analysis. From the frequency of actor mentions in each newspaper article, I calculate four variables that capture

different aspects of actors' visibility in newspaper coverage for each observed legislative period. These measures constitute the first set of dependent variables for the subsequent regression analyses explaining actors' visibility as a function of the identified agenda-building factors. To account for the distribution of the visibility metrics as well as dependencies over time, I use negative binomial regressions with up to two lags of the dependent variable and fixed effects for the legislative periods to estimate the effects of individual agenda-building factors on actors' visibility in climate change coverage.

In the second part of the analysis, I consider the similarity between actors' press materials and newspaper articles, the exclusivity of the received coverage, and the tonality of journalistic evaluations in the period between 2017 and 2020. To determine the closeness in meaning while accounting for variations in text length and language use, I calculate the soft cosine similarity between press materials and newspaper articles. Unlike other similarity metrics, soft cosine similarity is based on word embeddings, which store information about the similarity between words and thus enable comparisons between the meaning rather than the words of two texts. To account for the specific focus on climate change, I train my own word embedding models on the pre-processed collection of newspaper articles and press materials. While this corpus is comparatively small for unsupervised machine learning approaches ( $N = 51,023$ ), the issue-specific word embedding models perform considerably better than pre-trained alternatives for the soft cosine similarity metrics. In addition, I implement an automated sentiment analysis to capture journalistic evaluations of actors' perspectives. The three reception variables constitute the second set of dependent variables, explained as a function of individual agenda-building factors in a series of linear and negative binomial multi-level regression models.

The findings show that actors from different societal domains dominated newspaper coverage on climate change at different points in time. Beyond confirming the previous finding that scientific actors shaped public perceptions of climate change before the issue was politicized in the 1980s, the results indicate that business and civil society actors played an active role in the discursive construction of climate change in Germany. All tested agenda-building factors influence the ability of individual actors to gain media attention for their climate change perspectives, confirming the utility of an integrated theoretical framework. Nonetheless, there are important differences in the relevance of individual factors across domains, newspapers, and especially newspaper sections. The relative importance of specific factors also varies over time, substantiating the notion that context conditions moderate the relevance of individual factors for actors' ability to build the media agenda, although my

analysis can only provide limited evidence for the impact of the examined context conditions. Lastly, the influence of the considered agenda-building factors differs for actors' visibility and the reception of their press materials in climate change coverage.

### 1.3 Contribution

The central contribution of this dissertation is the development of a comprehensive theoretical framework enabling us to explain the ability of different actors to build the media agenda under different context conditions. I integrate arguments from several related fields to identify ten individual-level factors expected to affect actors' influence over the media agenda. While some of these factors are bound to political offices, many others are applicable to different actor groups, allowing me to systematically compare the influence of political, business, civil society, and scientific actors in the discursive construction of political issues. By considering the impact of specific actor characteristics, this dissertation moves from the largely descriptive approach applied in previous research toward a generalized explanation of actors' ability to build the media agenda. Moreover, I explore the influence of context conditions on the relevance of the identified agenda-building factors, further advancing our understanding which actors can successfully shape public perceptions under which conditions. The proposed theoretical framework thus contributes to theory building in the largely undertheorized field of media agenda-building in an effort to consolidate the fragmented literature on this concept.

To empirically test the influence of the agenda-building factors on actors' ability to build the media agenda, I collect a corpus of 41,864 newspaper articles addressing the issue of climate change published in five German quality dailies between 1976 and 2020, and a second corpus of 9,159 press releases and statements from actors with incentives to shape public perceptions of climate change released between 2017 and 2020. In addition, I compile a dataset of 960 political, business, civil society, and scientific actors, which includes indicators for the agenda-building factors collected from a wide range of sources. This dataset offers a unique opportunity to explore which actors succeeded in building the media agenda on climate change over more than four decades and to examine which factors determined their success.

The results of my analysis extend the existing literature on the discursive construction of climate change in Germany (e.g., Weingart et al., 2000, 2002, 2008; see Schäfer, 2016 for an overview) by considering a broader range of actors, whose influence over public perceptions may have increased over the last 15 years, and including the crucial period from 2018 onward

(cf. Eckstein et al., 2019; Wozniak et al., 2021). Furthermore, they add to the broader literature on media agenda-building (e.g., Gilardi et al., 2022b; Kroon & van der Meer, 2021; Lan et al., 2020; T. Meyer et al., 2017; Nygaard, 2020) by testing the impact of the identified agenda-building factors in one comprehensive analysis, enabling conclusions about the influence of individual factors, and revealing the extent to which actors' perspectives are reproduced in the media. My findings also have implications for the related literature on policy agenda-building (Fawzi, 2018; Van Aelst & Walgrave, 2016), especially for scholars interested in windows of opportunity for policy change (e.g., Brunner, 2008; Carter & Jacobs, 2014; Mintrom & Norman, 2009). Finally, my findings speak to the diversity and accuracy of media coverage across the ideological spectrum and thus contribute to our understanding of the role of the media (Langer & Gruber, 2021; Masini et al., 2018; Pfetsch et al., 2015).

To facilitate the analysis of the large newspaper corpus, I draw on several automated text analysis techniques. Previous research relies mainly on supervised dictionary approaches and unsupervised topic modeling to analyze the content of large collections of newspaper articles (e.g., Barkemeyer et al., 2017; Bohr, 2020; Chinn et al., 2020; Hase et al., 2021; T. R. Keller et al., 2020; Liu et al., 2009; Schäfer et al., 2013). While these tools can offer important insights about the volume of coverage for different topics or, in this dissertation, the visibility of specific actors, they are not well suited to detect different angles or frames in the coverage, and topic models in particular can be difficult to interpret. Studies interested in the portrayal of issues in the media thus often resort to resource-intensive manual coding, drawing random samples from the coverage or focusing on short periods or events to enable human interpretation within constrained timeframes and budgets (e.g., Duan & Miller, 2019; Eide & Ytterstad, 2011; Kukkonen et al., 2018; Painter et al., 2018; Stoddart et al., 2016; Wagner & Payne, 2017; Wessler et al., 2016; Wozniak et al., 2017). Supervised machine learning offers promising possibilities to extend the scale of such manually coded analyses but requires large samples of annotated text to achieve adequate accuracy, which makes the initial costs prohibitive for many use cases (Collingwood & Wilkerson, 2012; but see Gilardi et al., 2022a; Merkley, 2020; Wozniak et al., 2021).

In this dissertation, I combine supervised and unsupervised approaches in an innovative way to analyze to which extent actors' issue interpretations are reproduced in the media without extensive manual coding. Specifically, I calculate the soft cosine similarity between press materials and newspaper articles based on word embedding models trained on the full corpus of newspaper articles and press materials. The authors of the press materials are known,

providing the categories for the supervised comparison with the newspaper articles. The word embedding models automatically learn how similar words are from their usage in large text collections and represent the distance to each other word in the model as a vector. Drawing on these vectors, the soft cosine similarity measure calculates the distance between the words used in two texts rather than the number of co-occurring words and is thus suited to detect similarities in meaning despite different linguistic uses. By reducing the required manual input to the category labels, this approach allows the comparison of large corpora at relatively low costs. Since context-sensitive word embedding models can be trained on the labeled corpus, this method can also be easily adapted to different use cases. In consequence, this approach is useful for scholars from different disciplines, who are interested in the portrayal of issues and perspectives in the media or generally seek to compare the content of large corpora.

While this dissertation extends the existing literature in important ways, it has obvious limitations. I test the proposed theoretical framework with newspaper coverage of a single issue published by quality dailies in one country. The focus on climate change allows me to explore the extent to which actors' perspectives are reproduced in newspaper articles in depth, but precludes the application of the theoretical framework to the first level of the media agenda. Moreover, the analysis does not include tabloid, television, or social media coverage of climate change. While I assume that all prevalent perspectives will eventually be covered in legacy newspapers and allow sufficient time for intermedia agenda-setting in the analysis, I cannot rule out that the influence of individual agenda-building factors varies across media genres. The analysis also neglects features such as visual representations and the positioning of articles (cf. Wozniak et al., 2015, 2017). The relative neutrality of the German media system suits the study of different actor groups but may limit the generalizability of the findings to more partisan and less consensus-oriented media systems. Finally, this dissertation can only offer preliminary empirical evidence for the theorized impact of contextual variations.

### 1.4 Dissertation Outline

In Chapter 2, I introduce the central concepts and develop a comprehensive theoretical framework to explain the ability of individual actors to build the media agenda under different context conditions. After discussing the role of the media in the news production process, I introduce the concept of media agenda-building, which captures internal and external influences on the topics and perspectives covered in the media. To account for different degrees



of influence over the media agenda, I consider the closeness of the match between actors' perspectives and media coverage, as well as the exclusivity and tonality of the coverage. Subsequently, I contemplate different motivations for actors to invest resources to shape media coverage and identify four types of actors who routinely have incentives to influence the perception of political issues. Based on these conceptualizations, I develop a theoretical model which integrates approaches from several related literatures to explain the ability of political and non-political actors to build the media agenda. From my theoretical framework, I derive two sets of hypotheses. The first set of hypotheses refers to the influence of domain-specific agenda-building factors, the second set concerns the expected effects of universal agenda-building factors. Lastly, I consider the impact of context conditions on the relevance of individual agenda-building factors and formulate expectations how the transformation from traditional to hybrid media systems, the salience of issues, crises, and shifts in the societal consensus on an issue affect the relative importance of the different factors.

In Chapter 3, I present the case for the empirical analysis and elaborate why climate change, in general, and the German climate change debate, in particular, are well suited to study actors' ability to build the media agenda. With regard to the former, I consider both the substantive relevance of the issue and the properties which make climate change an interesting case to study actors' ability to build the media agenda in different contexts. Subsequently, I outline the German climate change debate and discuss how characteristics including the non-partisan and consensus-oriented media system, the longstanding nature of the debate, and the presence of a strong issue owner facilitate the examination of the influence of individual agenda-building factors for different actor groups and in different contexts. In addition, I address the substantive importance of the German climate change debate for the development of global climate policies. Finally, I discuss the limitations that my case selection imposes on the analysis and the generalizability of the findings.

Chapters 4 and 5 outline my research design. In Chapter 4, I describe the data collection process and explain how actors' ability to build the media agenda as well as the factors expected to affect this ability are operationalized. To study actors' ability to build the media agenda, four types of data are required. First, I collect 41,864 newspaper articles addressing the issue of climate change published in five German quality dailies between 1976 and 2020. The resulting newspaper corpus covers the German climate change debate from its inception to its preliminary climax and incorporates climate change coverage from the newspapers with the highest circulation across the ideological spectrum. Second, I identify 960 political, business,

civil society, and scientific actors with incentives to shape public perceptions of climate change from a range of sources. The initial list is validated with the results of an automated identification of named entities in the newspaper corpus and the final dictionary is specific to the respective legislative period to reflect over-time changes in the pool of relevant actors. Third, I collect 9,159 press releases and statements addressing the issue of climate change from the 64 most frequently named actors. For reasons of availability and feasibility, press materials are only collected for the period between 2017 and 2020. Lastly, I gather data on the relevant agenda-building factors for each actor in the dictionary.

To measure actors' ability to build the media agenda, I consider their visibility in newspaper articles on climate change between 1976 and 2020, as well as the reception of their press materials between 2017 and 2020. For the first part of the analysis, actors' visibility in climate change coverage is calculated based on the frequency of mentions in the newspaper corpus. For the second part of the analysis, I use soft cosine similarity scores with word embeddings to determine the similarity between actors' press materials and newspaper articles on climate change. Furthermore, I use sentiment analysis to capture journalistic evaluations in relevant news items. Both parts additionally consider the exclusivity of the coverage to further differentiate actors' influence over the media agenda. The last subchapter elaborates the operationalization of the agenda-building factors since indicators for most of the considered factors are not readily available across domains.

Chapter 5 details the modeling strategy for the regression analyses. Regarding the first part of the analysis, actors' visibility is captured with count variables and is therefore best modeled with negative binomial regressions, which accommodate the non-normality of the residuals, as well as the observed heteroskedasticity and overdispersion. To account for the longitudinal structure of the data and path dependencies in the news production process, I include fixed effects for individual legislative periods as well as up to two lags of the dependent variable in the visibility models. For the second part of the analysis, the indicators for similarity and journalistic sentiment are continuous and approximately normally distributed, and therefore best modeled with linear regressions. In contrast, the exclusivity variable is primarily a count best modeled with negative binomial regressions. Since the dependent variables capture variation at the level of individual press materials, whereas the independent variables were measured at the actor level, I estimate multi-level models with random effects at the actor level. Given that actors' press materials could only be collected for the most recent observed

legislative period, neither fixed effects for the legislative period nor lagged dependent variables are required.

Chapters 6 and 7 present the results of the empirical analysis. Chapter 6 explores patterns of actors' visibility in newspaper coverage, describing differences across actor groups with diverse issue positions before discussing the results of the corresponding regression models, which explain actors' visibility as a function of the agenda-building factors introduced in Chapter 2. For both the descriptive and the regression analyses, I consider changes over time as well as across newspapers and newspaper sections to account for the potential influence of context conditions and capture ideological and thematic differences. In Chapter 7, I analyze how actors' perspectives were portrayed in newspaper articles and how the agenda-building factors influenced the reception of actors' press materials in the media, considering the similarity between press materials from visible actors and newspaper articles as well as the exclusivity and tonality of the received coverage. Actors' press materials are only available for the period between 2017 and 2020, but I examine ideological and thematic differences across newspapers and newspaper sections. I discuss implications for my hypotheses and open questions regarding the prevalence of specific interpretations of climate change and the accuracy and diversity of climate change coverage in German newspapers throughout both results chapters.

In Chapter 8, I summarize the implications of my findings for actors' ability to shape public perceptions and, ultimately, political and societal responses. I discuss my conclusions regarding the four questions raised at the outset of this dissertation and explain how the results add to our understanding of agenda-building, in general, and climate change communication and the role of the media, in particular. In addition, I outline how the automated text analysis performed in this dissertation can complement existing approaches to study agenda-building and related phenomena. In conclusion, I detail the theoretical, methodological, and empirical limitations of this dissertation and suggest avenues for future research.



## **Chapter 2: Actors' Influence over the Media Agenda**

To understand which actors can shape the media agenda and to which extent their perspectives are reflected in the media coverage, it is important to first consider the role of the media in the news production process and how external actors are able to influence it in their favor. The following subchapter discusses two apparently conflicting conceptions of the media and outlines the understanding adopted in this dissertation. The subsequent subchapter introduces the concept of media agenda-building, which describes how actors push their topics and perspectives onto the media agenda, and distinguishes different degrees of influence over the media agenda. In addition to the opportunity to influence the media agenda, actors need the motivation to invest resources to shape media coverage. The third subchapter introduces different groups of actors and discusses their incentives to promote issues and their perspectives under different context conditions. Drawing on these premises, the fourth subchapter presents my theoretical model, which combines ten individual-level factors to explain which political and non-political actors are more or less likely to successfully build the media agenda, and derives ten corresponding hypotheses. The final subchapter considers the relevance of the individual factors over time and presents hypotheses regarding the moderating impact of contextual variations.

### **2.1 The Media as Intermediaries**

News media are among the most widely studied influences that shape public opinion. The extensive literature on agenda-setting has shown time and again that the selection of issues and perspectives covered in the media influences which issues people think about and how they think about them (e.g., Iyengar & Kinder, 1989; McCombs, 2004, 2005; McCombs et al., 2014; McCombs & Shaw, 1972). When it comes to actors' ability to influence public perceptions, it thus seems only logical to ask which actors are best equipped to push their issues and angles onto the media agenda. However, the notion that external actors are able to influence the media agenda calls the role of the media as a source of objective, or at least independent, information into question. Normatively, the media are often conceived as a corrective power that bridges the information asymmetry between elites and citizens and acts as an additional check for the three other powers in the system of checks and balances (e.g., Janowitz, 1975; Sparrow, 1999;

Stewart, 1975). This understanding of the media as watchdogs alerting the public to elite misconduct is not easily compatible with the assumption that the media partly, or even largely, reproduce the selection of topics and perspectives advocated by elite actors, yet the latter view has received extensive theoretical and empirical support (Bennett, 1994; Entman, 1989; Herman & Chomsky, 1988; Kioussis et al., 2006, 2015, also see Ban et al., 2019).

Many influential theories of mass communication – from Herman and Chomsky's (1988) hegemonic model over Bennett's (1990, 2007, 2016; Bennett et al., 2006, 2007) indexing theory to Zaller's (1992) mainstream and polarization effects – portray media coverage as a more or less distorted reflection of elite opinions. Yet, only some of these theories deny any corrective power of the media (Herman & Chomsky, 1988; see Mullen & Klaehn, 2010 for an overview), while others conceive them as intermediaries between elite and public opinion that are neither completely independent from, nor entirely controlled by elite actors (e.g., Berkowitz, 1992; Callaghan & Schnell, 2001; Entman, 2003b). This more nuanced understanding of the media as intermediaries seems appropriate given that, on the one hand, the actions and positions of many influential actors are of public interest and journalists often depend on their information subsidies to provide audiences with relevant and timely information (e.g., Nisbet & Lewenstein, 2002; Tanner, 2004) and, on the other hand, actors need the media to publicize their perspectives and generate public support. For this dissertation, I assume that the relationship between the media and external actors with incentives to shape public perceptions is mutually beneficial, as external actors provide much of the raw material that fuels the news production process and journalists relay these perspectives to the wider public.

In addition to their collaboration in the production of news, elite actors are often an important audience, in particular for (quality) legacy media. Despite changing patterns of information gathering among news audiences and the concomitant decrease in their gatekeeping power, legacy media are still influential agenda-setters for other media outlets and the public alike (Guo & Vargo, 2015; Langer & Gruber, 2021; Pfetsch et al., 2015). Elite actors are aware of this influence and attempt to harness it by pushing their issues and perspectives onto the agendas of legacy outlets, but they tend to use the same outlets to inform themselves about public sentiments on an issue (Davis, 2007; Stoddart et al., 2016). Hence, the content of legacy media does not only guide public opinion, it also shapes what elite actors perceive as public opinion and thus affects their strategies and agendas (Langer & Gruber, 2021). In short, the intermediary function of the media works both ways: public opinion is communicated to elite actors at the same time that elite perspectives are communicated to the public.

If media outlets depend on the input of external actors to produce news, what remains of the corrective power of the fourth estate? Previous research suggests that journalists seldom offer issue interpretations that are completely detached from actors' perspectives (e.g., Entman, 2003a; Gandy, 1982; but see Callaghan & Schnell, 2001). Instead, their power more often lies in the selection of topics and interpretations from the spectrum provided by the numerous actors seeking public attention (Weaver & Elliott, 1985). In addition, they decide how many different perspectives to include in their news items and may offer evaluative cues for the audience, affording them considerable influence over the interpretation of an issue. In light of the diversity of elite perspectives on many issues, journalists may well be able to fulfill their normative function and provide an objective and diverse picture of issues despite their dependence on materials from external actors.<sup>1</sup> However, existing research on the news production process suggests that journalists often attach more weight to other criteria such as the news value of an item (Galtung & Ruge, 1965; Harcup & O'Neill, 2001, 2017), which are discussed in more detail in Chapter 2.4. The relevance of these criteria likely differs at the level of individual journalists, but may also vary systematically between different news outlets as perspectives may be selected in line with their ideological stance (Carvalho, 2007; Gentzkow & Shapiro, 2010; Hackett, 1984; Shoemaker & Reese, 1996, 2014). In learning about the extent of actors' influence over the media agenda, we thus also improve our understanding of journalists' ability to shape the reported content and their adherence to the normative demands of their profession.

## 2.2 Agenda-Building

Previous research on the influence of external actors over the media agenda coined the term (media) agenda-building to refer to the transfer of topics and angles from source materials to the media agenda (Lang & Lang, 1991; Gandy, 1982; not to be confused with policy agenda-building as in Cobb & Elder, 1971). Analogous to the literature on agenda-setting, researchers distinguish at least two levels of agenda-building. First-level agenda-building describes the transfer of topics from source materials to the media agenda (Kioussis et al., 2006, 2015; Wu &

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<sup>1</sup> Here, objectivity refers to the contextualization of presented angles in terms of their support base and (un-) certainty (see the discussion on the potentially adverse effects of balanced reporting for a differentiation between balance and objectivity; e.g., Boykoff & Boykoff, 2004), whereas diversity relates to the range of perspectives portrayed by the media (e.g., Masini et al., 2018; Porto, 2007).

Coleman, 2009). In these cases, influential actors provide materials on specific topics and the media cover these topics but do not necessarily adopt the supplied interpretation. While actors may benefit from increased issue attention irrespective of the adopted perspective, how issues are covered will often be crucial in determining whether media coverage increases or decreases audience support for actors' agendas (cf. Wu & Coleman, 2009). To account for the different implications of influencing which topics are covered and how they are covered, the literature refers to the inclusion of specific issue attributes in the coverage as second-level agenda-building (Kim et al., 2015; Kioussis et al., 2006; Kioussis & Wu, 2008; Wu & Coleman, 2009). When actors succeed in building the second level of the media agenda, the coverage not only addresses the promoted topic, but also includes some or even all of the attributes that the supplied materials associated with this topic. As the selection of an angle, and even individual issue attributes, can fundamentally change the interpretation of an issue, the resulting media coverage will be more likely to reflect the source's preferred issue interpretation if the attributes are adopted alongside the topic. Hence, second-level agenda-building can be considered the more pervasive form of influence over the media agenda. The distinction between the levels is relevant to understand which actors are best equipped to influence the media agenda as different factors may be decisive for actors' ability to build different levels of the media agenda.

While first-level agenda-building is continuous only with regard to the volume of the coverage for an issue, second-level agenda-building also captures different levels of closeness between actors' materials and the resulting media coverage. Actors will benefit more from media coverage that closely matches the supplied issue interpretation and less from coverage that mentions only some of the provided attributes. Therefore, the degree to which media coverage reproduces actors' issue interpretations needs to be considered alongside the visibility of (partial) perspectives to meaningfully assess which actors are most successful at building the second level of the media agenda. On the lower side of the spectrum, actors may be named in news items on an issue with a brief summary of their perspective, for instance in the form of a direct quotation or a short statement. On the upper side, news items may reproduce entire interpretations, departing from the source material only in terms of formulation. In addition, news items that reproduce single perspectives can be expected to benefit actors more than items covering several contrasting angles. In short, exclusive, in-depth coverage of their angles offers the greatest advantage for actors seeking to influence public perceptions, who should push for their perspectives to be covered as closely as possible.



For many actors, merely being linked to an issue in the media can benefit their agenda because audiences are made aware that their perspective are worth considering in the context of that issue. The positive impact of being acknowledged as a (legitimate) source of information on an issue will likely be stronger if the news item names one (collective) actor rather than several actors with dissenting positions (Chong & Druckman, 2007; Druckman et al., 2010; Sniderman & Theriault, 2004; Wells & Chinsky, 1965). Yet, even if the content of the coverage does not support an actor's position, they may still profit from the increased salience of their stance in the public discussion (cf. Berger et al., 2010). The same cannot be assumed for actors whose names are already saliently associated with an issue. For these actors, additional mentions will not be detrimental but they cannot expect to shape public perceptions in their favor unless the coverage also promotes their perspective. Hence, being named in association with an issue can advance actors' agendas but is unlikely to offer a comparative edge in contexts where proficient agenda-builders compete to define an issue.

Media coverage that conveys how actors think about an issue seems more suited to persuade audiences of their perspectives. In their information subsidies, actors will strive to offer convincing interpretative packages that present their agenda as a logical consequence of the facts rather than one of several possible courses of action. Such interpretative packages will be most persuasive when presented in their entirety, suggesting that the closer the reproduction in the news item, the higher the chance that audiences will follow the presented reasoning (cf. the idea of interpretative media packages introduced by Gamson & Modigliani, 1989).<sup>2</sup> Actors can also expect to benefit more from news items that closely resemble their perspectives because issue interpretations can only provide readily available information shortcuts for decisions about anything from voting to buying a new product if people are able to associate actor and angle (Kahneman, 2011).

In parallel to the expectation that actors benefit more from exclusive mentions of their name in news items than from being listed alongside other actors, audiences are likely more easily persuaded by news items that offer a single, coherent interpretation instead of contrasting several perspectives (Chong & Druckman, 2007; Hansen, 2007; Sniderman & Theriault, 2004;

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<sup>2</sup> In agenda-setting theory, the adoption of complex perspectives including several connected elements could even be considered third-level agenda-setting, which describes the transfer of relationships between elements from the media agenda to public opinion (Guo et al., 2012; McCombs et al., 2014). While this definition is easily transferred to agenda-building (e.g., Kioussis et al., 2015; Schultz et al., 2012), the further differentiation would unnecessarily complicate the theoretical argument in the context of this dissertation.

Wells & Chinsky, 1965). The most persuasive form of media coverage may be the reproduction of an angle without an overt attribution to one or more actors. In the absence of an attribution, audiences may be more likely to perceive the presented perspective as a societal consensus rather than one of many potential interpretations (Reese & Lewis, 2009). Yet, following the reasoning above, such naturalizations may be less beneficial for actors attempting to generate public support for themselves as well as their positions, as the former requires people to mentally link angles to specific actors.

A third aspect that can affect the persuasiveness of adopted perspectives in addition to the closeness and exclusivity of the media coverage are journalistic evaluations. While any press may be good press for some, most actors will benefit more from coverage that evaluates their issue interpretation positively than from news items that criticize their perspective. Journalists' valence judgments supply audiences with direct cues how to assess the presented perspective and offer an important heuristic that allows people to readily integrate an angle into their existing belief systems. Positive evaluations embedded in news items may thus additionally enhance the persuasiveness of presented perspectives, whereas negative evaluations can be expected to decrease persuasiveness. Actors who are more successful at building the agenda should therefore receive more exclusive, positive coverage that resembles their materials more closely than those of less influential actors.

### **2.3 Actors and their Incentives for Media Agenda-Building**

To understand the extent of actors' influence over the media agenda, we first need to consider their incentives to seek media attention for their issues and perspectives. Where studies interested in the probability that specific source materials are selected for publication can point to the range of available materials to define the population of possible contenders, actor-centric approaches cannot take for granted that all actors equipped to push their topics and angles onto the media agenda are also willing to expend the necessary resources. Because the influence of actors who refrain from even attempting to build the media agenda cannot be observed, the population of possible contenders must be defined based on actors' incentives to seek media attention. Although these incentives will likely be specific to both actors and issues – that is the same actor will have different incentives for different issues and different actors will have different incentives for the same issue – the population of actors whose incentives on an issue

need to be considered to understand the discursive construction of political issues should remain largely unchanged.

Previous research has identified four broad groups of actors with incentives to shape public perceptions of political issues. Political elites with opposing positions have been shown to compete for interpretative sovereignty both internally (e.g., Kioussis et al., 2006, 2009, 2015; T. Meyer et al., 2017; Seethaler & Melischek, 2019; Van der Brug & Berkhout, 2015) and externally with non-political actors such as economic and societal interest groups and the scientific community (e.g., Berkowitz & Adams, 1990; Carmichael & Brulle, 2017; Colistra, 2012; Kroon & van der Meer, 2021; Pfetsch et al., 2013; Shehata & Hopmann, 2012). Assuming that public perceptions are in large part constructed through the portrayal of an issue in the media (e.g., Iyengar et al., 1982; McCombs & Shaw, 1972; Weaver et al., 2004), these actors constitute the population whose incentives for specific issues must be considered to understand who is best equipped to build the media agenda.

### ***Political Actors***

Looking at relevant actors, political elites seem to be the most obvious candidates. Numerous studies have documented that political elites expend considerable effort and resources to influence the public salience of political issues and shape public perceptions in their favor (see Davis, 2003 for an overview), oftentimes using the media to broadcast their positions (e.g., Kioussis et al., 2006, 2009, 2015; T. Meyer et al., 2017). Yet, there is no consistent definition which actors beyond the head of government and the cabinet should be considered part of the political elite, not least because the set of relevant actors seems to be highly contingent on the studied case. Because the focus on actors' elite status stems mainly from researchers' expectations about actors' ability to influence public perceptions but seems largely irrelevant to their motivation to shape said perceptions, this subchapter considers the incentives for all political actors, relegating the discussion which actors should be most successful at building the media agenda to the following subchapter.

All political actors have incentives to seek media attention to increase public support for their issue positions (cf. Strömbäck & Kioussis, 2011), but attention for different issues will benefit actors to different degrees (Green-Pedersen, 2007; Otjes & Green-Pedersen, 2021). Hence, the question which political actors have incentives to build the media agenda cannot be answered without considering the issue at hand. Theories of issue ownership provide some

guidance which issues should benefit which actors, contending that parties can expect electoral advantages if they 'own' an issue that is salient at the time of the election (e.g., Budge & Farlie, 1983; J. Green & Hobolt, 2008; Petrocik, 1996; Van der Brug, 2004). Scholars differentiate competence ownership and associative ownership (Stubager, 2018; Walgrave et al., 2012). The former describing the prevalent perception among voters that a party is more competent at handling an issue than its competitors, whereas the latter implies that thinking about an issue prompts voters to reflexively think about a specific party. Political actors should strive to increase the public salience of issues that voters positively associate with their party and to continuously reinforce this association between their perspective and the issue to maintain issue ownership. Their incentives are positive insofar as actors expect to benefit from media coverage of owned issues, in general, and their perspectives on the issue, in particular.

Conversely, political actors have negative incentives to seek media attention on salient issues when the prevalent perspective threatens to damage their public support. Based on the notion that party competition is often more about selective emphasis than about direct confrontation on political issues, theories of issue competition suggest that political actors will usually ignore issues they perceive as detrimental to increasing their public support (Abou-Chadi, 2016; Green-Pedersen & Mortensen, 2010). However, the success of this strategy depends on the salience of the issue as well as the position of the actor, both of which can motivate actors to attempt to reinterpret rather than ignore issues. If an issue is already high on the public agenda, ignoring it could lead to the public perception that an actor does not care about problems that the people deem relevant, potentially damaging their public support more than the unfavorable issue association (Damore, 2004; Green-Pedersen, 2007; Green-Pedersen & Mortensen, 2010). To minimize the expected negative impact of such issues, actors need to promote a more advantageous interpretation of the issue that may allow them to change public perceptions, even if this alternative interpretation is only moderately persuasive and adds to the salience of the issue (Green-Pedersen & Mortensen, 2010).

In addition to the salience of issues, the position of actors inside or outside the political mainstream influences the strength of their negative incentives. Issue competition theory argues that mainstream parties have stronger negative incentives to counter other parties' interpretations of political issues with their own perspectives than niche parties because voters expect mainstream parties to offer policy solutions for all issues on the public agenda, whereas niche parties are somewhat less constrained by public demands (Green-Pedersen & Mortensen, 2010; Meguid, 2005). The same rationale applies to (aspiring) government and opposition

parties (Green-Pedersen & Mortensen, 2010). This literature further suggests that political actors have greater negative incentives to promote their perspectives on issues owned by actors from the same party family compared to issues owned by actors from different party families, as parties from the same family often compete for the same voters and therefore pay closer attention to issues on which their direct competitors can gain a relative advantage (Green-Pedersen & Mortensen, 2014).

### ***Non-Political Actors***

In addition to political actors, previous research has identified interest groups as stakeholders with strong incentives to influence the public salience and perception of political issues, irrespective of their position (Andsager & Smiley, 1998; Berkowitz & Adams, 1990; Kroon & van der Meer, 2021; Wetts, 2020). Some interest groups strive to raise public awareness for an issue (Andsager, 2000; Huckins, 1999), whereas others are more interested in minimizing public attention or reinterpreting the issue (Buchmeier, 2020, 2022; Colistra, 2012, 2018; Davis, 2003), but all can be expected to seek control over public perceptions. Most non-political actors invested in the discursive construction of political issues can be categorized as representing either business or civil society interests. Here, companies, trade associations, and other interest groups lobbying for financial gains are counted as business actors, whereas non-profit organizations and issue activists are considered civil society actors. Numerous studies have also explored the visibility of scientific actors and their perspectives in the media (e.g., Antilla, 2005; Boykoff & Boykoff, 2007; Carmichael & Brulle, 2017; Eide & Ytterstad, 2011; Granado, 2011; Grundmann, 2007; Merkley, 2020; Shehata & Hopmann, 2012; Wetts, 2020). These studies implicitly and sometimes explicitly assume that scientific perspectives are (more) objective compared to other actors' issue interpretations and seldom consider the diverse motivations that may prompt scientific actors to seek media attention on issues linked to their work. The exception are scientific actors who promote perspectives that diverge from the scientific consensus in their discipline and whose motives are often assumed to be ideological or monetary (Boykoff & Farrell, 2020; McCright & Dunlap, 2000, 2003).

Like political actors and despite their vastly different motivations, business and civil society actors depend on public support in one form or another and need the media to convey their positions to larger audiences (e.g., Cottle & Nolan, 2007; Davis, 2002; Koopmans, 2004). In other words, these actors have positive incentives to seek media attention for their

perspectives. The expected benefits vary but will frequently entail an increase in income for business actors and an increase in membership, donations, or simply public support for their cause for non-profit organizations. The situation is different for scientific actors, who are generally less dependent on public support and for whom media coverage may equal, for instance, more people learning about and from their work or improved funding opportunities (Entradas & Santos, 2021; Palmer & Schibeci, 2014). Although the driving force for researchers to promote specific issue interpretations may often be the desire to educate the public as well as political actors, scientific actors can also benefit from media attention in terms of more available funding and career advancement. Hence, scientific actors are treated as another group of actors with diverse positive incentives to publicize their issue interpretations in the media, though researchers and scientific institutions with known financial interests relating to their work may be more accurately described as a special kind of business actor.

Negative incentives should be comparatively less relevant for non-political actors as most business, civil society, and scientific actors are specialized in one field and their incentives can therefore be expected to resemble the motivations of niche parties. In other words, people do not expect non-political actors to attend to issues beyond their field of operation, minimizing their negative incentives. The exception are salient issue interpretations that cast specific actors as responsible for negative ramifications, for instance when business actors are accused of promoting child labor to keep purchasing prices low. In these cases, non-political actors have strong negative incentives to reinterpret the issue at hand if it is too salient to be ignored (cf. Green-Pedersen & Mortensen, 2010). In theory, some actors may also have neutral incentives in the sense that these actors do not expect to benefit from increased media attention for their issue interpretation, nor to suffer reputational damages if the prevalent issue interpretation remains uncontested, but act on selfless motives. For instance, scientific actors may feel obligated by their profession to refute public misconceptions concerning their discipline.

### 2.4 Actors' Ability to Build the Agenda

While many different actors have incentives to seek media attention for their perspectives, this attention is necessarily limited, bringing us back to the question who can build the media agenda. To date, the majority of agenda-building studies focuses on procedural and contentual factors to explain which materials are incorporated into the media coverage. An extensive literature studies how the news production process, in general, and journalistic norms, in

particular, shape the selection of topics and angles from source materials (e.g., Boesman et al., 2017; Boykoff & Boykoff, 2007; Brüggemann, 2014; Gitlin, 2003; Schudson, 2001; Shoemaker & Reese, 2014; Tuchman, 1978). Much scholarly attention is also paid to the influence of contentual factors such as the news value of materials and their congruence with the ideological orientation of media outlets (e.g., Galtung & Ruge, 1965; Harcup & O'Neill, 2001, 2017; Staab, 1990). Fewer studies adopted the actor-centric approach pursued in this dissertation and explore the impact of source characteristics on the probability that topics and angles will be covered in the media (e.g., Berkowitz, 1992; T. Meyer et al., 2017). For non-political actors, in particular, prior research on media agenda-building is largely explorative and empirical analyses tend to focus on substantiating the existence of agenda-building effects, merely noting differences in actors' abilities to build the agenda in their description of the results (Kroon & van der Meer, 2021; for an exception see Wetts, 2020). Moreover, existing literature largely neglects the possibility that actors' abilities to build the media agenda vary with context conditions below the system level (but see Jungherr et al., 2019; Pfetsch et al., 2013, 2015). Agenda-building research thus lacks a comprehensive theoretical framework that enables us to explain which political and non-political actors can push their topics and perspectives onto the media agenda under which conditions.

This is somewhat surprising as several related literatures offer valuable reference points which actors may be better equipped to build the media agenda. For political actors, a closely related argument that centers around the individual-level determinants of their ability to present their perspectives in the media comes from the literature on framing effects. In his seminal work, Entman (1991, 2003a) identifies four factors that explain whether frames promoted by the government are transferred to the media agenda: motivations, cultural congruence, power, and strategy. The first two factors are pull factors largely determined by the content of the frame and thus not actor-specific, the latter two are push factors and directly linked to the individual-level characteristics of the source promoting the frame (Entman, 2003b). Despite their distinct conceptual origins, framing is functionally equivalent to second-level agenda-building in important ways. Entman (2003a, 2003b) defines framing as “*selecting and highlighting some facets of events or issues, and making connections among them so as to promote a particular interpretation, evaluation, and/or solution*” (2003b, p. 417; emphasis in the original) to exert political influence over (other) political elites, journalists, and the public. To reiterate, second-level agenda-building is defined as the transfer of substantive and affective attributes from source materials onto the media agenda (Kim et al., 2015; Kioussis & Wu, 2008; cf. McCombs,

2004).<sup>3</sup> Like framing, second-level agenda-building thus allows actors to increase the salience of attributes that underpin their interpretation of an issue while suppressing attributes that suggest diverging interpretations. Therefore, power and strategy should be similarly relevant to explain actors' (second-level) agenda-building ability (cf. McCombs et al., 1997).

Valuable insights may also be gleaned from theories aiming to explain the dynamics and outcomes of party competition. Based on the theories of issue ownership introduced in the previous subchapter, parties who own an issue are reflexively associated with this issue and perceived as being more competent at handling it (Stubager, 2018; Walgrave et al., 2012). The link between such competence perceptions and, to a lesser degree, between reflexive associations and electoral choice is that voters perceive issue owners as more credible than their competitors (Bélanger & Meguid, 2008; Damore, 2004; Sides, 2006). Given that issue ownership usually reflects a history of consistent attention and commitment to an issue (Stubager, 2018; Tresch & Feddersen, 2019; Walgrave et al., 2012), it is not surprising that journalists also perceive issue owners as more credible sources (Van Camp, 2018; Van der Brug & Berkhout, 2015; but see Gilardi et al., 2022b). Hence, issue ownership can be expected to increase actors' influence over the media agenda with regard to the owned issue. Although issue ownership theory is intended to explain party competition, the assumed mechanism that longstanding attention and commitment to an issue increase the perceived credibility of an actor should apply analogously to non-political actors.

A third set of relevant arguments originates from journalism studies, where scholars have identified a range of factors often referred to as news values, which increase the probability that source materials will be used in news items (e.g., Galtung & Ruge, 1965; Harcup & O'Neill, 2001, 2017). While many news values relate exclusively to the content of source materials and are thus irrelevant to explain whose rather than which topics and angles are selected for publication, others are directly or at least indirectly linked to the actor who supplies the material. An obvious example of an actor-specific factor from the classical news values identified by Galtung & Ruge (1965) are references to elites, whom audiences are assumed to be more interested in because their actions tend to be consequential and their prominence facilitates personalization and identification. In consequence, elite sources likely have a comparative

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<sup>3</sup> The differentiation between substantive and affective attributes has been more prominent with regard to candidates (Balmas & Sheaffer, 2010; Kioussis et al., 1999, 2006; McCombs et al., 1997), but both classes of attributes can be readily applied to issues (Kioussis et al., 2015).



advantage over other sources irrespective of the topic or angle of their statement because their prominence is newsworthy. Although the original argument needs to be elaborated to account for different types of elite actors, this example demonstrates the value of news production theories in informing theoretical arguments about actors' influence over the media agenda.

Fundamentally related to agenda-building theory, the recently introduced concept of discursive power, which describes actors' ability to "introduce, amplify, and maintain topics, frames, and speakers that come to dominate political discourse [in hybrid media systems]" (Jungherr et al., 2019, p. 406), considers factors at the system level, the organizational level, and the individual level to explain actors' ability to build the media agenda alongside other spaces of political discourse. Importantly, the concept is not domain-specific and therefore enables comparisons between political and non-political actors, whose ability to build the media agenda may stem from different characteristics. Although the presented theoretical argument focuses largely on different media systems and organizational characteristics that (dis-)advantage broader groups of actors and considers individual-level factors only in passing, the concept of discursive power marks an important step toward a comprehensive theoretical framework of actors' influence over the media agenda.

Drawing on these and related literatures, I propose a theoretical model that integrates approaches from several fields to explain which political and non-political actors are more or less likely to succeed in pushing their topics and angles onto the media agenda in different contexts. To keep the following discussion concise, the term *agenda-building ability* will be used to denote actors' overall chance that promoted issues and perspectives will be covered in the media. Unlike broader concepts such as discursive power, the model focuses on the characteristics of actors and combines ten individual-level factors expected to influence actors' ability to build the agenda. These factors are *executive authority*, *issue-specific relevance*, *economic weight*, *scientific* and *personal expertise*, *issue ownership*, *prominence*, *surprise*, *controversy*, and *consonance*. While political actors have inherent advantages with regard to the discursive construction of political issues, many of the factors expected to shape actors' ability to influence the media agenda are also relevant for non-political actors and some even favor non-political actors.

In the following, I discuss domain-specific factors for political, business, and scientific actors, as well as universal factors applicable across domains. Most of these factors are directly related to actors' characteristics, like their prominence or expertise. In contrast, surprise, controversy, and consonance are contentual factors that need to be linked to specific actors to

add to our understanding of actors' agenda-building ability. The individual factors also differ with regard to the level of the media agenda that they can be expected to influence. For instance, actors' executive authority may allow them to influence the selection of both topics and perspectives for publication, but the issue-specific relevance of their political office cannot be determined independent of the issue and should therefore only be relevant for second-level agenda-building. Although the ten factors are interlinked at various levels, each captures a distinct dimension of actors' ability to build the agenda and is expected to have an independent and additive effect.

### *Domain-Specific Factors*

The factor that is most frequently cited to explain the often-observed agenda-building advantage of political actors is their executive authority or decision-making power (e.g., Berkowitz, 1992; Boykoff & Boykoff, 2007; Entman, 2003a, 2003b). Depending on their position in the political hierarchy, political actors' decisions can influence outcomes that guide or restrain people's actions, most commonly in terms of legislation. In consequence, political actors' issue interpretations are relevant to large audience shares, making their materials valuable – if not indispensable – for most news outlets, whether they strive to fulfill journalistic norms or pursue economic interests. The higher an actor ranks in the political hierarchy, the larger their potential influence over audiences' lives and the greater the likelihood that the media will cover their perspective (Entman, 2003a, 2003b; Gans, 1979; Hill, 1998). Boykoff & Boykoff (2007) term this tendency to rely on political decision-makers as sources the authority-order bias, finding it most relevant in the context of threats and crises, when people long for reassurances that order and safety will be restored (2007, p. 4). Entman (2003a, 2003b) attributes the same tendency to actors' power and strategy, both of which are closely linked to executive authority and the associated access to resources that Berkowitz (1992) also invokes to explain who succeeds at building the media agenda (cf. Tuchman, 1978). In short, political actors likely have an agenda-building advantage over other actors but this advantage depends on their position in the political hierarchy.

**Hypothesis 1.1:** Actors' agenda-building ability increases with their executive authority.

In addition to their executive authority, which is expected to be pertinent beyond individual issues, the issue-specific relevance of political actors' positions may enhance their influence over the media agenda in their area of expertise. Both executive authority and issue-specific relevance are grounded in the expectation that the perspective of an actor will be decisive for policy outcomes. However, the latter is issue-specific and thus only becomes relevant when an issue is already on the media agenda, increasing actors' ability to build the second but not the first level of the media agenda. Accordingly, ministers should be better equipped to push their issues and angles onto the media agenda than members of parliament, who should in turn have an advantage over non-political actors because the issues and perspectives advanced by ministers are most likely to result in policies that affect audiences' lives. Yet, the minister of education can be expected to have a relative agenda-building advantage over the minister of transport on issues related to schooling due to the greater issue-specific relevance of their portfolio.

**Hypothesis 1.2:** Actors' second-level agenda-building ability increases with the issue-specific relevance of their office.

Although non-political actors lack the executive authority to regulate people's actions, the decisions of business actors who add significant value to the national economy or have large workforces may be similarly consequential for people's lives (cf. Berkowitz, 1992). In this vein, Wetts (2020) argues that large companies are more successful at building the agenda than other actors because their decisions have the potential to constrain people in their actions via their pocketbooks, even without legal force. While not many companies can be expected to have the economic weight required to perceptibly influence either the value of the national economy or unemployment, collective business actors such as industry associations likely cross this threshold more often. As the national economy and (un)employment rates are important to almost all audiences (e.g., Heffington et al., 2019; Kellermann & Rattinger, 2006; Singer, 2011), actors' economic weight may engender similar incentives for media outlets as executive authority. The probability that business actors succeed in pushing their issues and angles onto the media agenda should thus rise with their economic weight.

**Hypothesis 1.3:** Actors' agenda-building ability increases with their economic weight.

Another factor expected to increase the likelihood that actors' perspectives are covered in the media is their perceived competence on an issue. According to the norms of their profession, journalists should aspire to supply their audiences with accurate information (Porlezza, 2019). Yet, journalists lack the time and expertise to evaluate the accuracy of provided materials for most issues (Davies, 2009; Graves & Amazeen, 2019). Therefore, they often rely on the perceived competence of sources to deduce the accuracy of their materials (Albæk, 2011; Merkley, 2020), resulting in an agenda-building advantage for actors whom journalists expect to supply relevant information on an issue. Although actors from different domains may be perceived as similarly competent on an issue, only scientific actors possess the most frequently studied and perhaps most obvious form of competence, namely scientific expertise. Numerous studies theoretically link actors' scientific knowledge about an issue to their ability to build the media agenda, with mixed empirical results (e.g., Carmichael & Brulle, 2017; Eide & Ytterstad, 2011; Granado, 2011; Merkley, 2020; Shehata & Hopmann, 2012; Wetts, 2020). In general, scientific expertise seems to be less decisive for actors' ability to push their perspectives onto the media agenda than other factors such as executive authority. Nevertheless, expertise can be expected to give actors a relative advantage in the absence of other factors, and to offer a competitive edge in contexts where influential actors compete to build the agenda. Like issue-specific relevance, scientific expertise is issue-specific and can thus only increase actors' influence over the second level of the media agenda.

**Hypothesis 1.4:** Actors with scientific expertise have a relative advantage over other actors in building the second level of the media agenda.

### *Universal Factors*

The six remaining factors are expected to benefit actors from all domains and include actor characteristics as well as contentual features that need to be linked to actor characteristics to understand which actors are best equipped to build the media agenda. Based on the argument about actors' perceived competence introduced above, there are at least two characteristics besides scientific expertise that offer similar competence cues and should thus increase actors' second-level agenda-building ability. The first is actors' personal expertise on an issue, which stems from personal experience and has received significantly less scholarly attention than scientific expertise (Bonds, 2009; Ihlen et al., 2015). While personal experience is pervasive

and thus irrelevant for many issues such as schooling, personal expertise on other issues is considerably rarer. In consequence, journalists may perceive the perspectives of actors with such rare personal expertise as more authentic and relevant than other actors' issue interpretations. Personal expertise has been considered mainly in the literature on human interest framing (Valkenburg et al., 1999) and seems especially relevant with regard to experiences of catastrophes and deprivation (Carpenter, 2007; Figenschou & Thorbjørnsrud, 2015; Li, 2007; Olausson, 2009). Accordingly, an actor with migration experience should be perceived as the more competent source on integration policies compared to an actor without this personal expertise. In addition to increasing actors' perceived competence, personal expertise tends to facilitate personalization and thus caters to an important news value (Boesman et al., 2017; Boukes et al., 2015). Depending on the issue at hand, personal expertise may therefore offer a larger relative advantage than scientific expertise.

**Hypothesis 2.1:** Actors with personal expertise have a relative advantage over other actors in building the second level of the media agenda.

The second factor that can be expected to affect actors' perceived competence is issue ownership. To reiterate, issue ownership was originally conceived to explain the link between the salience of policy issues and ensuing electoral gains and captures competence attributions as well as mental associations between issues and actors (Stubager, 2018; Walgrave et al., 2012). Beyond its electoral impact, issue ownership has been shown to increase parties' ability to push their perspectives on owned issues onto the media agenda (Van der Brug & Berkhout, 2015). The assumed mechanism that actors who have proven their commitment to an issue are perceived as more competent than actors who have not devoted the same amount of attention to this issue thus seems to work for journalists much like it does for voters. Like expertise, the greater competence attributed to issue owners can therefore be expected to enhance actors' ability to build the second level of the media agenda.

To date, issue ownership has been applied primarily to the political domain. Yet, if issue ownership is understood as actors' sustained attention and commitment to an issue, or conversely citizens' competence attributions and associations between actors and issues, this mechanism is not limited to political actors. Instead, journalists (and citizens) may assess actors' issue competence relative to other actors from the same domain, suggesting that several actors can be perceived as similarly competent on the same issue. In addition, citizens'

competence attributions are unlikely to conform to the strict dichotomy implied in many conceptions of issue ownership, where actors either own or do not own an issue (e.g., Bélanger & Meguid, 2008; Damore, 2004; Spoon et al., 2014; Stubager, 2018; Tresch & Feddersen, 2019). Rather than perceiving one actor as competent on an issue and all others from the same domain as incompetent, it seems more plausible that citizens evaluate actors as more or less competent than other actors (cf. Tresch et al., 2013; Van der Brug & Berkhout, 2015). In this dissertation, issue ownership is therefore understood as domain-specific and continuous, which implies that actors can own an issue more or less than other actors and that actors from different domains can own an issue to the same degree.

**Hypothesis 2.2:** Issue owners have a relative advantage over other actors in building the second level of the media agenda.

Returning to the classical news values, elite actors should be better equipped to build the agenda than other actors because their perspectives are more consequential for people's lives and their prominence arouses audiences' curiosity (Galtung & Ruge, 1965). While the first mechanism is captured by actors' executive authority and economic weight, the second mechanism reflects actors' ability to attract the interest of large audience shares independent of both their official authority and the issue at hand. Hence, prominence constitutes an independent universal factor requiring people to recognize an actor's name rather than their function. Existing research shows that celebrity continues to intrigue audiences (e.g., Blumell & Hellmueller, 2019; Dubied & Hanitzsch, 2014) and prominence, like personal expertise, facilitates the personalization of news items (e.g., Galtung & Ruge, 1965). The mechanism linking prominence to increased influence over the media agenda, namely that actors who can be expected to draw the interest of larger audience shares will receive more media attention, applies to collective as well as individual actors. The more followers, members, or supporters an actor has, the larger the share of the audience interested in their perspectives (Blumell & Hellmueller, 2019; Iyengar et al., 2004; Turner, 2010). In consequence, their issue interpretations should receive more media attention than the angles of less prominent actors. Although conceptually distinct, executive authority, economic weight, and prominence sometimes promote each other, for instance when heads of states become celebrities.

**Hypothesis 2.3:** Actors' ability to build the agenda increases with their prominence.

Developed to capture the probability that individual news items will be covered in the media, most of the classical news values are contentual and must be linked to characteristics of the item source to speak to actors' ability to build the agenda. Three features that routinely increase the likelihood that specific issues or angles will be covered are surprise, controversy, and consonance. The first value favors news content that describes novel and unexpected events or developments (e.g., Jungherr et al., 2019; Wilkins & Patterson, 1991), whereas the second value leads to the preferred selection of items that focus on (societal) conflicts with clearly named opponents encouraging audience identification (e.g., Bennett, 2007; Boykoff & Boykoff, 2004; Galtung & Ruge, 1965). In contrast, the third value promotes news items that align well with prevalent mental images and that audiences can easily assimilate into existing thought patterns (cf. Entman, 2003a).

Surprise, controversy, and consonance all relate to the content of news items, but specific actors' perspectives can nonetheless be expected to feature surprise or controversy more often, whereas other actors' angles should be more likely to match audiences' mental schemes. Specifically, the angles and actions of relatively new actors should surprise audiences more often than the perspectives of established actors, whose positions – even on new issues – will be relatively more predictable. Considering that stability and continuity are valued assets in politics as well as business and tend to enhance the credibility of civil society actors (Janda et al., 1995; T. M. Meyer & Wagner, 2013), established actors have incentives to be predictable rather than surprising. Moreover, most established actors have to conform to external as well as self-imposed rules and regulations, limiting their ability to act in unexpected ways (cf. Dalton & McAllister, 2015). In contrast, new actors are less constrained by previous commitments and their positions will hence be less predictable.

**Hypothesis 2.4:** New actors have an advantage over established actors in building the media agenda.

Despite the relative predictability of their perspectives, established actors outside the political or societal mainstream can capture audiences' attention with surprising actions that would damage mainstream actors' reputations. For instance, an established activist organization that (illegally) disrupts traffic may still succeed in raising public support for their cause, whereas the same action would most likely be deemed unacceptable if carried out by an international company or governing party. Hence, in addition to new actors whose perspectives are

unfamiliar to the audience, the news value of surprise should favor actors outside the political and societal mainstream, who can generate public attention with unexpected actions.

Actors outside the political or societal mainstream can also be expected to benefit from the news value of controversy, as their issue interpretations are more likely to deviate from the current consensus. On the other hand, mainstream actors often have incentives to preserve the status quo, favoring a consensual interpretation of issues (cf. Meguid, 2005). Even when mainstream actors portray an issue as contested, challengers may profit from the news value of controversy because their positions offer an obvious contrast to those of mainstream actors. Similar to the journalistic norm of balance, which tends to foster the disproportional representation of challengers (e.g., Boykoff & Boykoff, 2007; Merkley, 2020), controversy can thus be expected to increase media attention for actors who challenge the status quo or oppose an existing consensus.

**Hypothesis 2.5:** Challenger actors have an advantage over mainstream actors in building the media agenda.

In contrast, the journalistic preference for consonant news items should favor the perspectives of mainstream actors, which should be more likely to match patterns of thought that are prevalent in audiences' minds. The news value of consonance closely resembles Entman's conception of cultural congruence, which describes the closeness of fit between frames and culturally dominant schemes. The latter are thought patterns that are "habitually used by most members of society" (2003b, p. 422). By definition, mainstream actors will tend to promote perspectives that are shared by large audience segments, making them likely sources of consonant issue interpretations.

**Hypothesis 2.6:** Mainstream actors have an advantage over challenger actors in building the media agenda.

The last two hypotheses are antithetic, raising the question which value takes precedence in the news production process. While surprise, controversy, and consonance need not be mutually exclusive – a news item may include consonant and dissonant perspectives to offer controversy, or use consonant perspectives in a surprising issue context – news items that cater to several news values will seldom fulfill all of them to the same degree. Pitting two consonant



perspectives against each other usually offers less controversy than contrasting the positions of mainstream actors and challengers, and nothing is as surprising as an angle that challenges existing mental schemes. Hence, journalists have to balance these values in accordance with their perceived impact on audience interest (e.g., Iyengar et al., 2004; Patterson, 1993), which can be expected to vary across different audience groups as well as across context conditions. In consequence, the weight attached to the news values of surprise, controversy, and consonance likely depends on the preferences of individual journalists and the directives of media outlets targeting different audience segments, but may also vary more systematically across the context conditions discussed in Chapter 2.5.

### *Summary*

Drawing on several related literatures, I identify ten factors that can be expected to enhance actors' abilities to build the agenda (see Table 2.1 for an overview of the hypotheses). These factors are all directly or indirectly linked to actors' characteristics and their combination for individual actors offers an indication, albeit imperfect, which actors are best equipped to push their topics and perspectives onto the media agenda. Extending previous research, the proposed model includes factors that should add to the agenda-building ability of political as well as non-political actors. The considered factors differ on three dimensions. First, factors can be domain-specific or universal. Domain-specific factors stem from characteristics that are closely linked to the domain an actor inhabits and therefore unattainable for actors from other domains. For instance, only political actors can hold public offices and thus possess executive authority. In contrast, universal factors are attainable for actors from all domains. Second, factors may enhance actors' ability to build all levels of the media agenda or become effective only after an issue has emerged on the media agenda. Consequently, the factors that can only be determined in reference to specific issues (issue-specific relevance, scientific and personal expertise, and issue ownership) can only increase actors' ability to build the second level of the media agenda. Third, factors can be directly or indirectly related to actors' characteristics. In the latter case, contentual factors like surprise, controversy, and consonance need to be linked to specific actor characteristics to add to our understanding of actors' agenda-building ability.

**Table 2.1: Hypotheses for the agenda-building factors**

No.	Hypothesis
1.1	Actors' agenda-building ability increases with their executive authority.
1.2	Actors' second-level agenda-building ability increases with the issue-specific relevance of their office.
1.3	Actors' agenda-building ability increases with their economic weight.
1.4	Actors with scientific expertise have a relative advantage over other actors in building the second level of the media agenda.
2.1	Actors with personal expertise have a relative advantage over other actors in building the second level of the media agenda.
2.2	Issue owners have a relative advantage over other actors in building the second level of the media agenda.
2.3	Actors' ability to build the agenda increases with their prominence.
2.4	New actors have an advantage over established actors in building the media agenda.
2.5	Challenger actors have an advantage over mainstream actors in building the media agenda.
2.6	Mainstream actors have an advantage over challenger actors in building the media agenda.

Actors from three different domains can expect to benefit from domain-specific factors in their attempts to build the media agenda. Depending on their office, political actors' executive authority and issue-specific relevance allow them to shape legally binding policies, increasing the relevance of their issue interpretations for audiences and, hence, their agenda-building ability. Similarly, business actors' economic weight can enable them to affect the national economy with tangible consequences for people's lives, enhancing audience interest in their perspectives and adding to their ability to build the media agenda. From another perspective, actors' scientific expertise offers an easily available cue for the accuracy of their materials, increasing the chance that their perspectives will be selected for coverage. While executive authority and economic weight should enhance actors' ability to build all levels of the media agenda, issue-specific relevance and scientific expertise are issue-specific and therefore only relevant for actors' ability to build the second level of the media agenda.

Looking at the universal factors, personal expertise and issue ownership can be expected to increase the perceived competence, and thus the second-level agenda-building ability, of actors from all domains based on the same mechanism as scientific expertise. Likewise, prominence is universally attainable and should enhance actors' ability to push both their issues and their interpretations onto the media agenda because it offers an easily available cue for audience interest. Other universal factors are contentual in nature, but they should be more prevalent in the issue interpretations of specific actor groups. Accordingly, the perspectives of new actors can be expected to feature surprise more often than those of established actors, and challengers' angles should be more likely to feature both surprise and controversy. In contrast,

the perspectives of mainstream actors should more frequently include consonant messages. Whether this constellation favors challenger or mainstream actors depends on the weight that journalists attach to the individual news values.

The relative importance of individual factors can be expected to vary both across outlets and with the contextual features discussed in Chapter 2.5, but remains largely an empirical question. Generally, their independence of specific issues may make executive authority, economic weight, prominence, and the contentual news values more decisive for actors' ability to build the media agenda than issue-specific relevance, scientific and personal expertise, and issue ownership. Despite the different levels of influence that individual factors may afford, each factor is expected to have an independent, positive effect on actors' ability to push their issues and angles onto the media agenda. Individual actors may possess several factors, increasing their advantage over actors who fulfill fewer criteria.

Although the proposed theoretical framework includes ten factors that can be expected to influence actors' ability to build the media agenda and is thus considerably more comprehensive than models used in previous literature, it cannot capture all factors that may affect the probability that actors' issues and interpretations will be covered. For instance, non-political actors may sometimes be able to shape, delay, or prevent policies through legal action, affording them considerable power over the range of legitimate behaviors (cf. BVerfG, 2021). Because this form of influence depends on the alignment of various context conditions, it is not easily attributed to specific actors, impeding its inclusion in the model. Moreover, the proposed framework focuses on actors and is not intended to capture the influence of purely contentual features.

## **2.5 The Impact of Context Conditions**

The relative importance of the ten factors, and thus the influence of individual actors over the media agenda, cannot be expected to be static. Instead, it likely varies across individual journalists and media outlets with different resources, audiences, and ideological standpoints (e.g., Carvalho, 2007; Gentzkow & Shapiro, 2010), as well as across different context conditions. Four broader conditions that can differ between systems or evolve over time are the configuration of the media system, the salience of specific issues, the perception of issues as crises, and the societal consensus on issues. In addition to the relevance of the agenda-building factors, shifts in the salience of and consensus about issues likely affect actors' motivations to

seek media attention in the first place. In the following, the impact of the four context conditions on the relative importance of each agenda-building factor is considered alongside their influence on actors' incentives.

### *The Transformation of the Media System*

Over the last decades, the media systems of most Western democracies have been transformed through increasing commercialization, rising competition, the emergence of digital and social media, and shifting audience preferences (Arbaoui et al., 2020; McMagnus, 1994; Otto et al., 2017; Pfetsch, 1996; Thussu, 2022; Wieten et al., 2022), with implications for the ability of individual actors to build the media agenda. The decrease in the gatekeeping power of legacy media linked to the emergence of digital and social media suggests that actors require considerably fewer resources to push their issues and perspectives onto the media agenda in hybrid media systems (e.g., Jungherr et al., 2019; Pfetsch et al., 2013, 2015). As the influence of both actors' positions in the political hierarchy and their economic weight is partly based on the substantial resources associated with these factors, their relative importance may be attenuated in systems where institutionalized press channels lost importance. Yet, none of the transformations in the media system could have altered the impact that the issue interpretations of actors with executive authority, issue-specific relevance, or economic weight have on audiences' lives, indicating a continued but perhaps slightly attenuated relevance of these factors for actors' ability to build the agenda across different media systems.

**Hypothesis 3.1:** The relative importance of executive authority, issue-specific relevance, and economic weight is slightly lower in hybrid than in traditional media systems.

Opposing developments may have contributed to changes in the importance of factors increasing the perceived competence of actors. With regard to scientific expertise, the abundance of publicly available information on almost every issue may have reduced the reliance on experts to understand complex issues (Flanagin & Metzger, 2013). At the same time, the available information frequently elicits competing interpretations, which could prompt journalists to rely more strongly on recognized authorities to inform their coverage. In addition, scientific actors now have greater incentives to present their findings in an easily understood manner that appeals to news audiences, as the communication of findings to broader audiences

is increasingly considered in the allocation of research grants (Entradas & Santos, 2021; Palmer & Schibeci, 2014). Generally, the abundance of available information on many issues may add weight to expertise and issue ownership as easily implemented selection criteria to distinguish well-founded issue interpretations from less accurate alternatives (cf. Sundar, 2008). In consequence, the relative importance of expertise and issue ownership in hybrid compared to traditional media systems remains an open empirical question.

With regard to prominence, the emergence of digital and especially social media fueled rather than weakened audience interest in the lives of celebrities (e.g., Blumell & Hellmueller, 2019; Dubied & Hanitzsch, 2014), suggesting an unabated and possibly increasing importance of this attribute for actors' ability to push their issues and angles onto hybrid media agendas. Active online communities and large numbers of followers offer media outlets easily available indicators for audience interest, which is essential to ensure the financial survival of outlets. To withstand the economic pressure from digital-born competitors and appeal to different target groups, many legacy media in hybrid systems have diversified their services, adding digital formats and increasingly tailoring their content to audience interests (e.g., Bennett, 2007; Jungherr et al., 2019). Therefore, prominence can be expected to play an increasingly important role in the selection of news items, even among legacy media that traditionally focus on hard news (Dubied & Hanitzsch, 2014; Turner, 2010).

**Hypothesis 3.2:** The relative importance of prominence is slightly higher in hybrid than in traditional media systems.

Rising competition and increasing profit orientation have also fostered a reporting style geared toward sensational headlines rather than deep content and episodic rather than thematic coverage (Iyengar, 1991; Otto et al., 2017). Considering that controversy and surprise can be easily conveyed in headlines and are well suited for episodic coverage, this development may have increased the relative importance of these news values compared to consonance in many media systems starting in the mid-1980s (McMagnus, 1994; Pfetsch, 1996; Wieten et al., 2022). However, even legacy media utilize metrics of user behavior collected from their digital services to match their coverage to the preferences of their audiences in hybrid media systems (Jungherr et al., 2019; Schroeder, 2018), following the trend on social media sites to tailor the displayed content to the preferences of individual users (Bennett, 2007). In a world of customized news streams, news items matching the preferences of large audience shares will

therefore be displayed, viewed, and shared more often than dissonant news items, strengthening existing incentives to select consonant perspectives. Considering that controversy and consonance are expected to benefit challenger and mainstream actors, respectively, the resulting hypotheses are antithetic rather than complementary.

**Hypothesis 3.3:** The relative importance of surprise and controversy is higher in hybrid than in traditional media systems.

**Hypothesis 3.4:** The relative importance of consonance is higher in hybrid than in traditional media systems.

### *Changes in Issue Salience*

The salience of issues can alter both actors' incentives to seek media attention and the relative importance of many of the agenda-building factors introduced in the preceding subchapter. The more salient an issue, the more actors generally have incentives to push their interpretations of the issue onto the media agenda (see Chapter 2.3). Whereas positive incentives should motivate actors to seek increased media attention for non-salient issues and to promote their perspectives on salient issues, negative incentives only become effective when issues are already salient. Hence, actors who lack positive incentives will commonly ignore, or at least downplay, issues that are not at the top of the public agenda. With regard to the importance of the individual factors, prominence, surprise, and controversy arouse audience interest largely irrespective of the conveyed issue. Therefore, their effects should not be affected by issue salience.

**Hypothesis 4.1:** The relative importance of prominence, controversy, and surprise is not affected by the salience of an issue.

In contrast, actors' issue-specific relevance as well as their expertise and issue ownership only increase their ability to build the second level of the media agenda. Accordingly, salience on the media agenda, if not the public agenda, is a necessary condition for these factors to take effect, although the threshold that allows actors to capitalize on these factors must be defined empirically rather than theoretically. Since increases in salience can be expected to coincide with increases in the volume of available information, issue-specific relevance, expertise, and

issue ownership may also become more important as information shortcuts indicating the relevance and accuracy of materials when issues are salient.

**Hypothesis 4.2:** Issue-specific relevance, expertise, and issue ownership only take effect when an issue is sufficiently salient in the media and their relative importance increases with the salience of the issue.

Although expected to add to actors' ability to build the agenda even on non-salient issues, the impact of executive authority, economic weight, and consonance may be more pronounced when actors promote their perspectives on salient issues. Both executive authority and economic weight are assumed to increase audience interest because the issue interpretations of actors possessing these factors can impact people's lives. However, unless outcomes have immediate and detrimental effects, audiences can be expected to care more about potential impacts related to issues that are high on the public agenda, compared to issues that are not currently on people's minds (T. Meyer et al., 2017). Similarly, consonant perspectives reassure audiences in their preconceptions, but the demand for reassurance is likely higher for issues that people already worry about. Anticipating audience interest, journalists should thus attach more weight to executive authority, economic weight, and consonance when news items cover salient issues.

**Hypothesis 4.3:** The relative importance of executive authority, economic weight, and consonance increases with the salience of an issue.

While events are not expected to affect the assumed mechanisms directly, events with issue-specific relevance may raise the salience of an issue and thus increase the agenda-building ability of actors whose influence is limited to the second level of the media agenda (cf. Van der Brug & Berkhout, 2015).

### ***(Issue-specific) Crises***

Issues that are publicly perceived to be at the core of impending or current crises are considered an escalation of salience, as crises add concern and personal importance to attention. Since people seek reassurance in times of crisis (Bennett, 2007), factors such as executive authority

and consonance can be expected to become more relevant in crisis contexts. Boykoff & Boykoff (2007) have demonstrated that journalists give actors with executive authority even more attention in times of crisis, anticipating audiences' need for reassurance. In addition, crises often have immediate and pervasive consequences for people's everyday lives, making the impact of executive decisions more tangible and, therefore, more relevant for audiences. The same argument can be applied to issue-specific relevance, whose relative importance should reach its maximum in crises that evolve around the issue for which actors' positions are relevant. Since almost every national crisis has an economic component, actors' economic weight may be similarly decisive for audiences' everyday lives as executive authority (Berkowitz, 1992; Wetts, 2020), and should thus also become more important in crisis contexts. Lastly, the (psychological) reassurance inherent in consonant perspectives should be in greater demand during crises. In short, crises can be expected to bias the news selection process in favor of actors who represent the status quo.

**Hypothesis 5.1:** The relative importance of executive authority, issue-specific relevance, economic weight, and consonance increases during (issue-specific) crises.

In contrast, surprise and controversy should be less popular during crises, which tend to assuage audiences' desire for drama (Bennett, 2007). The case for prominence is less clear. Especially people who are directly affected may redirect their attention to more existential information in crisis contexts. Yet, audiences cannot be expected to avoid information on celebrities as they might avoid conflict during crises. Hence, the decline in relative importance should be smaller for prominence than for controversy and surprise.

**Hypothesis 5.2:** The relative importance of surprise, controversy, and prominence decreases during crises.

With regard to expertise and issue ownership, actors' perceived competence on an issue offers audiences greater certainty regarding the accuracy of issue interpretations. However, the perspectives of competent actors are not necessarily reassuring and, in the context of many



crises, even rather disconcerting.<sup>4</sup> The rise of populist parties in many Western democracies has demonstrated that considerable shares of the population prefer reassuring half-truths over realistic assessments when faced with complex problems (Mudde, 2007). In consequence, the relative importance of expertise and issue ownership during crises remains an open question, as the relevance of competence-enhancing factors may rise for some media outlets but fall for others depending on the targeted audience.

### *Shifts in Societal Consensus*

Like its salience, the existence or lack of societal consensus on an issue may affect actors' incentives to seek media attention as well as audiences' preferences and, thus, the importance that journalists attach to the individual agenda-building factors. With regard to their motivations, political mainstream and economic actors are unlikely to seek media attention when their perspectives do not conform to an existing consensus and risk losing supporters unless they have strong negative incentives (see Chapter 2.3). However, political challengers and other non-political actors may deliberately question or reject the societal consensus to emphasize the controversy of their issue interpretations in hopes of increasing media and ultimately public attention. For this group, departures from the societal consensus may work similarly as the violations of societal norms implied in celebrity scandal and raise audience interest (Allern & Pollack, 2012).

Concerning the relevance of the individual factors for actors' ability to build the agenda, the absence of societal consensus on an issue should have a similar impact on audience preferences as crises. However, the differences in relative importance should be less marked when people feel unsure about the appropriate interpretation of an issue compared to when the very tangible consequence of a crisis make the future seem uncertain. Hence, audiences likely prefer consonant issue interpretations underpinned by executive authority or issue-specific relevance when issues are contested, but favor the diversion offered by controversy and surprise when there is broad societal consensus. Since the consonance of issue interpretations is difficult to determine in the absence of societal consensus, different media outlets may attribute consonance to different perspectives depending on the prevalent mental schemes of their

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<sup>4</sup> Consider, for instance, expert warnings about the severe impacts of climate change (e.g., IPCC, 2022), or predictions of collapsing healthcare systems during the Covid-19 pandemic (Reuters, 2021).

audiences. In consequence, it is difficult to predict which actors will benefit from the absence of consensus.

**Hypothesis 6.1:** The relative importance of executive authority, issue-specific relevance, and consonance decreases when there is societal consensus on an issue.

**Hypothesis 6.2:** The relative importance of surprise and controversy increases when there is societal consensus on an issue.

Normatively, accuracy should be valued more when issues are contested, as audiences cannot meaningfully weigh different considerations when the available information is incomplete or incorrect (Jandura & Friedrich, 2014). Yet, in reality, people base their understanding on many cues besides competence (e.g., Case et al., 2022; Dalton et al., 1998; Lin et al., 2016; Sundar, 2008) and journalists can therefore not be expected to favor materials from competent sources to meet anticipated audience preferences. Hence, the impact of expertise and issue ownership, like the influence of prominence and economic weight, should be largely independent of the presence or absence of societal consensus on an issue.

**Hypothesis 6.3:** The relative importance of prominence, economic weight, expertise, and issue ownership is not affected by the societal consensus on an issue.

### *Summary*

The relative importance of individual agenda-building factors likely differs across media outlets and varies both horizontally between systems and vertically over time, as media systems evolve, the salience of issues changes, crises emerge and dissolve, and the consensus about them shifts (see Table 2.2 for an overview of the moderation hypotheses). Rising competition has altered the style of news reporting, foregrounding catchy headlines and episodic coverage and likely increasing the relative importance of surprise and controversy. Later, the emergence of digital and social media drastically transformed many Western media systems, decreasing the relevance of institutionalized press channels, intensifying the interest in celebrities, and fostering the customization of news streams. In consequence, executive authority, issue-

specific relevance, and economic weight could have lost importance, while prominence and consonance gained relevance.

**Table 2.2: Hypotheses for the moderating impact of context conditions**

No.	Hypothesis
3.1	The relative importance of executive authority, issue-specific relevance, and economic weight is slightly lower in hybrid than in traditional media systems.
3.2	The relative importance of prominence is slightly higher in hybrid than in traditional media systems.
3.3	The relative importance of surprise and controversy is higher in hybrid than in traditional media systems.
3.4	The relative importance of consonance is higher in hybrid than in traditional media systems.
4.1	The relative importance of prominence, controversy, and surprise is not affected by the salience of an issue.
4.2	Issue-specific relevance, expertise, and issue ownership only take effect when an issue is sufficiently salient in the media and their relative importance increases with the salience of the issue.
4.3	The relative importance of executive authority, economic weight, and consonance increases with the salience of an issue.
5.1	The relative importance of executive authority, issue-specific relevance, economic weight, and consonance increases during (issue-specific) crises.
5.2	The relative importance of surprise, controversy, and prominence decreases during crises.
6.1	The relative importance of executive authority, issue-specific relevance, and consonance decreases when there is societal consensus on an issue.
6.2	The relative importance of surprise and controversy increases when there is societal consensus on an issue.
6.3	The relative importance of prominence, economic weight, expertise, and issue ownership is not affected by the societal consensus on an issue.

In addition, changes in issue salience may affect both actors' motivations and the relevance of individual factors for actors' ability to build the media agenda. More actors have incentives to seek media attention on salient issues, and while the weight attached to prominence, surprise, and controversy in the news production process is not expected to vary with issue salience, increases in salience should add to the importance of executive authority, economic weight, and consonance. Once an issue is on the media agenda, increases in salience should also enhance the weight of issue-specific relevance, expertise, and issue ownership. Issues are probably most salient during crises, prompting people to seek reassurances and thus increasing the weight attached to executive authority, issue-specific relevance, and economic weight, as well as consonance. On the other hand, surprise, controversy, and prominence should be less relevant in times of crisis. Lastly, the existence of societal consensus on an issue may influence the relative importance of individual factors. In the absence of consensus, people may favor more reassuring coverage, while broad societal consensus may increase audience interest in thrilling

news. In consequence, journalists should attach more weight to surprise and controversy and less weight to executive authority, issue-specific relevance, and consonance when there is broad societal consensus on an issue.

## **Chapter 3: Constructing Climate Change in Germany**

The German climate change debate is well suited to explore the agenda-building abilities of actors from different domains and test the hypotheses introduced in the previous chapter. The first subchapter introduces climate change as a longstanding and domain-crossing political issue and discusses how these features may enhance our understanding which actors can shape the media agenda. The second subchapter delineates the theoretical and substantive interest of the German case, noting analytical advantages as well as limitations. Based on this case description, the last subchapter outlines contextual variations in the German climate change debate and discusses the implications of the corresponding hypotheses against the backdrop of the case.

### **3.1 Climate Change: The Perpetual Catastrophe**

Over the past years, climate change has moved to the top of public and political agendas around the world, sparking an unprecedented amount of media attention for the issue and considerably widening the circle of actors with incentives to shape public perceptions of climate change. The ongoing competition for interpretative sovereignty over an issue that affects people around the world and is often named as one of the most important, if not the most important, political and societal challenge of the century is substantively interesting in itself (Europäische Kommission, 2021; United Nations, n.d.). However, the case of climate change also offers some distinctive features that make it particularly suitable to investigate the ability of actors from different domains to build the media agenda under varying context conditions. First, despite its recent rise in salience, climate change is not a new issue. Scientists publicly expressed their concern about global climate change as early as the late 1970s, identifying climate change as a political issue from the start (World Meteorological Organization, 1979). Over the following decades, the salience of climate change varied considerably, with several peaks interrupting its crawling ascent to the top of the public agenda (e.g., Bohr, 2020; Carvalho & Burgess, 2005; Gkiouzepas & Botetzagias, 2017; Liu et al., 2009; Wagner & Payne, 2017).

More recently, consensus positions on the existence of climate change, and even more so on the seriousness of the threat to human lives and health, have shifted toward greater concern in many developed countries (Flynn et al., 2021). In the late 2010s, the salience of climate change reached an all-time high with its designation as a global crisis rather than just another

issue among the plethora of issues on the political agenda (Carrington, 2019; R. Meyer, 2018; Simpkins, 2021; Sobczyk, 2019; Zhou, 2019). In addition to the variations in salience and societal consensus, the issue of climate change has become increasingly urgent over time, as many of its consequences are already irreversible and have started to impact human lifestyles (Pörtner et al., 2022). Due to its long history, climate change allows me to study actors' ability to build the media agenda on the same issue across diverse context conditions, eliminating the potentially confounding influence of using different issues. The longitudinal perspective also enables me to investigate changes in the relevance of the ten factors over time.

Second, many different actors have incentives to shape public perceptions of climate change, as the issue is linked to numerous policy fields, has severe implications for almost every economic sector, and is already affecting human lifestyles around the globe. Initially located firmly in the scientific domain, climate change soon spread to the international political arena (Carvalho & Burgess, 2005; Chinn et al., 2020; Trumbo, 1996; Weingart et al., 2000). Given the immense economic interests at stake, business actors were eager to negate or at least re-interpret the somber accounts from scientific actors whenever climate change received public attention (e.g., Levy & Egan, 1998; McCright & Dunlap, 2003; Oreskes & Conway, 2012; Van den Hove et al., 2002). In turn, civil society actors rallied to denounce the inaction of political and business actors and to raise public awareness for climate change (e.g., Hadden, 2017; Nulman, 2015; Rome, 2013). Thus, the case of climate change is well suited to study most of the factors that are expected to explain the differential agenda-building abilities of actors from different domains.

In combination with the longitudinal perspective, the large set of actors with incentives to shape public perceptions on this issue also offers an opportunity to investigate which actors could have initiated the recent surge in public as well as political attention. While political actors tend to be the most influential agenda-builders (e.g., Bennett, 1990; Bennett et al., 2006, 2007; Carmichael & Brulle, 2017; Dekavalla, 2016; Pfetsch et al., 2013; Sigal, 1973; but see Berkowitz & Adams, 1990), this does not preclude the possibility that actors from other domains provided the stimulus that accelerated the issue to the point where government and mainstream actors could no longer ignore or downplay it. In the case of climate change, civil society actors gained considerable media attention for the issue around the same time that it climbed to the top of many government agendas (e.g., Bergmann & Ossewaarde, 2020; Wozniak et al., 2021; cf. Schäfer et al., 2013). This raises the question whether the increased

media attention was an outcome of the looming political change or the campaign launched by civil society actors successfully altered the incentives of political actors.

### **3.2 Germany: Role Model and Top Emitter**

The discursive construction of climate change in Germany is an interesting case to study the ability of actors from different domains to build the media agenda. From a theoretical perspective, it offers a relatively level playing field for actors from different domains, as the German media system is generally considered non-partisan and consensus-oriented (Schäfer, 2016). Although media outlets, and particularly newspapers, tend to lean toward one side of the ideological spectrum, they are not associated with political parties and journalists pride themselves on their objectivity (Lünenborg & Berghofer, 2010; Schmitt-Beck & Staudt, 2022). Newspaper readership remains comparatively high despite the diffusion of social media and many legacy media now offer their content digitally in addition to the traditional print format (BDZV, 2021; D. Keller & Stavenshagen, 2020). With the Green party *Bündnis 90/Die Grünen* (GRUENE), Germany has a longstanding issue-owner from the political domain, who has continually pushed climate change onto the public and political agenda since 1980, with varying success (Abou-Chadi, 2016; Watanabe & Mez, 2004).

In substantive terms, public perceptions of climate change in Germany are decisive for the success of global climate action, as Germany currently has the seventh largest carbon footprint worldwide and its positions on climate change heavily influence European climate policies (Crippa et al., 2020; Szulecki et al., 2016). For several decades, Germany acted as a role model pushing more ambitious climate protection on a global scale (Jännicke, 2010; Weidner & Mez, 2008). Although Germany failed to maintain its leading role in international climate politics over the last decade, recent developments such as the increasing vote share for the Green party at all levels of the political system and their return to government power in the current legislative period suggest that Germany may soon resume its pioneering role (cf. Watanabe & Mez, 2004). At the same time, Germany has started to experience early consequences of climate change such as prolonged heat waves, severe storms, and floods, which have made the costs of climate change more tangible, both in terms of the financial burden and the human suffering caused by climate change impacts (Eckstein et al., 2019).

In light of its theoretical and substantive relevance, it is not surprising that the German case has received considerable attention from scholars interested in climate change politics on

the domestic, transnational, and global scale (e.g., Bailey, 2007; Kelemen & Vogel, 2010; Schreurs, 2008; Szulecki et al., 2016), the evolution of (international) climate policies (e.g., Hustedt, 2013; Schaffrin et al., 2014), and the dynamics of climate change communication (for a comprehensive overview of research on climate change communication in Germany, see Schäfer, 2016). In the early 2000s, Weingart et al. (2000, 2002, 2008) first analyzed the German discourse on climate change (then commonly called global warming) focusing on the distinct but interrelated representations of climate change in the statements of scientific and political actors, as well as in the media. Their findings show that, like in other countries (cf. Trumbo, 1996), scientific actors dominated both the general discourse and the media coverage of climate change in Germany when the issue first emerged in the 1970s. Their dominance ended when the issue reached the political agenda in the mid-1980s and political actors started to comment on it. The Green party, in particular, was instrumental to the evolution of climate policies in Germany and often provided the stimulus for change (Watanabe & Mez, 2004). Despite the neutral and consensus-oriented character of the media system, climate change coverage tends to be dramatized and alarming in tone (Heinrichs & Grunenberg, 2009; Peters & Heinrichs, 2005, 2008), tentatively supporting the hypothesis that audiences prefer excitement in times of general consensus, which increases the relevance of controversy and surprise (Hypothesis 6.2).

While the early stages of the discursive construction of climate change are well-researched with regard to the influence of scientific and political actors on the media agenda, later stages and especially the role of civil society and business actors have received less scholarly attention (Schäfer, 2016; but see e.g., Huckins, 1999; Wozniak et al., 2017 for civil society actors; and Lan et al., 2020; Wetts, 2020 for business actors). This dissertation closes this gap by analyzing the agenda-building ability of civil society and business actors alongside the influence of scientific and political actors, and considering all stages of media agenda-building on climate change. The German media system, like many others, tends to favor institutionalized actors over less organized collective and individual actors (Schäfer, 2016). Yet, institutionalized media channels have lost importance with the emergence of the hybrid media system (Pfetsch et al., 2015). Moreover, media attention for climate change has significantly increased over the last two decades, suggesting that it has become easier to successfully place an interpretation of this issue on the media agenda. In consequence, civil society actors, who tend to have fewer resources for media agenda-building, could have come to play an important role in the agenda-building process even if their influence over the media agenda was negligible in the past.



In contrast, business actors always had the resources to compete for interpretative sovereignty over climate change but lacked incentives to do so in the past. Unlike business actors from other countries, German industries with high carbon dioxide emissions accepted the existence of climate change early on, embracing the ecological modernization approach and becoming forerunners in the development of technological solutions in the fields of emission control, efficient production, and renewable energies (Mol, 1999; Schäfer, 2016). Thus, German business actors profited from climate change at the same time that business actors from other countries extended considerable resources to deny the existence of climate change or downplay its consequences (McCright & Dunlap, 2003; Oreskes & Conway, 2012; Van den Hove et al., 2002). Although increases in efficiency and the partial transition to renewable energies enabled Germany to sharply decrease its carbon dioxide emissions in the 1990s and early 2000s (Perrow & Pulver, 2015; Watanabe & Mez, 2004; Weidner & Mez, 2008), further decreases have proven difficult to achieve without significant costs, especially for energy-intensive industries (BMWK, 2022). In combination with the high public and political salience of climate change that makes ignoring the issue difficult, these costs provide business actors who previously refrained from attempting to shape public perceptions with incentives to promote technical solutions over more costly reduction measures.

To understand the potential strategies of different actor groups, it is important to consider how climate change is discussed in Germany. Until recently, the German climate change debate revolved around the widely shared consensus that climate change exists and that immediate political action is required to cope with its consequences (Engels et al., 2013; Schneider & Ollmann, 2013). While actors' positions on how to best cope with climate change impacts differed significantly and concrete measures were discussed controversially and even heatedly, no actor group challenged this fundamental consensus (Tschötschel et al., 2020). Unlike in the United States or the United Kingdom, climate change denial networks never gained traction in Germany and their perspectives were hardly ever covered in the media (Schäfer, 2016). However, this may have changed with the entrance of the far-right *Alternative für Deutschland* (AfD) into parliament in 2017. Although the AfD does not deny the existence of climate change outright, the party questions whether human activities are responsible for the observed rise in temperatures and whether its consequences pose a threat (AfD, 2017). Hence, climate change skeptics are represented in the political domain for the first time, increasing the probability that their perspectives will receive media attention (Bennett, 1990, 2016; Schäfer, 2016).

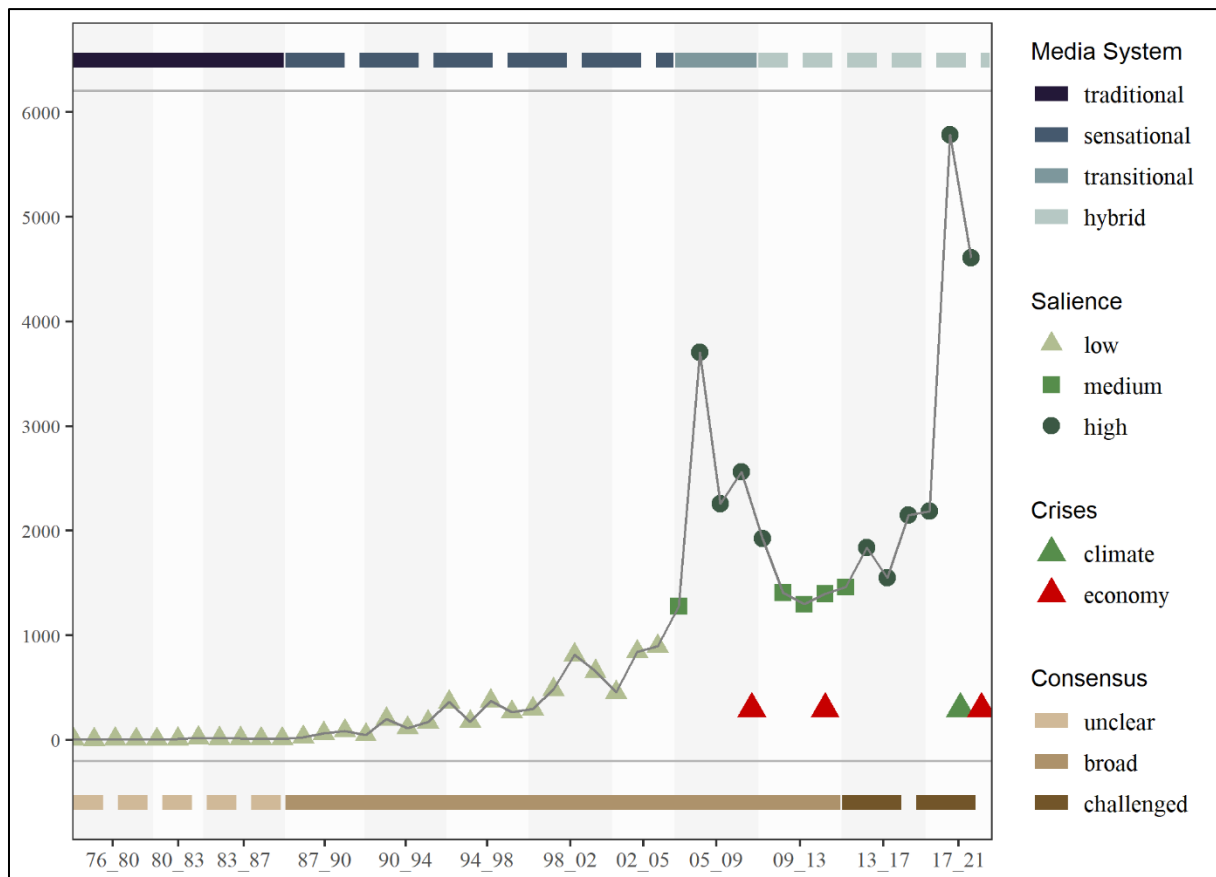
While the German climate change debate offers many interesting features, the case selection limits the analysis in two important ways. First, putting the focus on a single issue over time largely prevents the examination of first-level agenda-building effects, which could be studied by comparing the issues that actors push in their materials to the issues that are covered in the media. Analyzing just one issue, I can still identify periods when actors with incentives to push climate change onto the media agenda failed to generate media attention, but I cannot study the relative ability of different actors to build the first level of the media agenda. I study a single issue and thus focus on the second level of agenda-building because the first level of agenda-building has been researched more extensively in previous literature (e.g., Brandenburg, 2002; Hopmann et al., 2012; Lang & Lang, 1991; Seethaler & Melischek, 2019; Weaver & Elliott, 1985) and, more importantly, because the full range of agenda-building factors only comes into play when an issue is already established on the media agenda. Since it is not feasible to analyze the relative importance of all ten factors over time for a range of issues and, hence, to adequately study both levels of agenda-building, I focus on the longitudinal analysis of a single issue instead of analyzing multiple issues in a cross-sectional design.

Secondly, the German climate change debate differs from other cases with regard to the almost universal adherence to the consensus of the Intergovernmental Panel on Climate Change (IPCC) in the media coverage, irrespective of ideological leanings (Weingart et al., 2000). This divergence implies that the German case is not well suited to generalize findings to countries that have starkly different media systems and experience partisan polarization rather than consensus like the United States or the United Kingdom (Dunlap & McCright, 2008, 2015; McCright & Dunlap, 2011). However, much of the previous research on agenda-building in general (e.g., Berkowitz & Adams, 1990; Callaghan & Schnell, 2001; Kioussis et al., 2006, 2015; Parmelee, 2013; Weaver & Elliott, 1985), and climate change agenda-building in particular (e.g., Neil et al., 2018; Robbins, 2020; Wagner & Payne, 2017), focuses on these cases, with a much smaller number of studies examining different contexts (Gilardi et al., 2022b; Kroon & van der Meer, 2021; T. Meyer et al., 2017; Schäfer et al., 2013; Seethaler & Melischek, 2019; Shehata & Hopmann, 2012). Hence, the German case offers new insights about the ability of actors from different domains to build the media agenda in relatively neutral media systems, which are prevalent in Northern and Central European democracies (Hallin & Mancini, 2004). Given that the AfD challenges the longstanding consensus that climate change is anthropogenic and threatens human lives and lifestyles (AfD, 2017), this case also allows me to analyze consensus and dissensus situations for the same issue in the same media system.

### 3.3 Contextual Variations in the German Climate Change Debate

The contextual factors discussed in Chapter 2.5 all varied over time in Germany, leading to different constellations in the observed period. While most factors changed continuously rather than abruptly from one legislative period to the next, some changes were considerably more marked than others and can therefore be expected to perceptibly affect the relative importance of the ten agenda-building factors. This contextual variation allows me to detect over-time changes in the explanatory power of each factor, though the relative importance of individual factors compared to other factors remains an empirical question. In other words, the German climate change debate offers considerable leverage to learn about the conditions in which individual actors wield more or less influence over the media agenda. Figure 3.1 provides a schematic overview of the contextual variation in Germany over time.

**Figure 3.1: Contextual variation in Germany over time**



**Notes:** Depicted is the schematic development of the four contextual factors discussed in Chapter 2.5 in Germany across legislative periods.

Like most other media markets around the world, the German media system changed considerably over the investigated period (Figure 3.1, blue-hued lines in the top panel). Newspaper readership rose steadily from the end of World War II to the mid-1980s (BDZV, 2008), when private television channels entered the market (R. Müller, 1990). Although the emergence of private television initiated the gradual decline in newspapers circulation observed over the following decades (BDZV, 2008) and fostered a more dramatic and often episodic reporting style, it did not fundamentally change the power structures ingrained in news production processes. In consequence, the media remained gatekeepers of public information flows until the internet drastically broadened the access to means of mass communication in the early 2000s (ARD/ZDF, 2022). This development foreshadowed the transformation from traditional to hybrid media systems that was cemented with the diffusion of digital and social media in the late 2000s and early 2010s (Chadwick, 2017; Jungherr et al., 2019).

With regard to actors' ability to build the media agenda, the hypotheses for traditional and hybrid media systems indicate that the relative importance of executive authority, issue-specific relevance, and economic weight should slightly decrease in hybrid media systems (Hypothesis 3.1), whereas the relative importance of prominence, surprise, controversy, and consonance should increase (Hypotheses 3.2-4). Following the timeline above, surprise and controversy likely gained importance around the mid-1980s, when the competition from private television started to influence newspapers' reporting styles. In contrast, executive authority, issue-specific relevance, and economic weight should have become less relevant as the gatekeeping power of traditional media outlets decreased with the emergence of the hybrid media system in the 2000s. At the same time, the success of digital and social media could have further increased the weight of prominence, and the associated trend to tailor displayed content to user preferences may have added to the relative importance of consonance.

To assess the salience of climate change, I consider how the number of newspaper articles on the issue changed relative to the total number of articles published over the investigated period (Figure 3.1, green-hued markers in the center panel). Although the percentage of articles on climate change exhibits a clear upwards trend over time, it remained below the one-percent mark until it spiked at 2.7 percent in 2007. Subsequently, the rate slowly fell back down to just below one percent in 2012, before rising again to two percent in 2018, spiking at 5.5 percent in 2019, and edging down to 4.3 percent in 2020. For actors' ability to build the media agenda, this implies that issue-specific relevance, expertise, and issue ownership were more important in legislative periods with relatively high salience (2005-2009, 2013-2017, 2017-2021) than in

periods with moderate salience (2009-2013; Hypothesis 4.2).<sup>5</sup> Since increases in salience are also expected to add weight to executive authority, economic weight, and consonance (Hypothesis 4.3), these factors should likewise have been more important during periods with moderate and especially with high salience.

Several crises that may have affected actors' ability to build the media agenda occurred during the investigated period (Figure 3.1, green and red triangles at the bottom of the center panel). The Global Financial Crisis (GFC) reached Germany in the fall of 2008 and led to the worst recession since World War II (Statistisches Bundesamt, 2010), extending into the European sovereign debt crisis (Euro crisis) that severely stunted the growth of the German economy in 2012 and 2013 (Statistisches Bundesamt, 2022). In consequence, actors' executive authority and economic weight, but not their climate-specific relevance, should have been relatively more important in the legislative period from 2009 to 2013 (Hypothesis 5.1). In addition, journalists could have anticipated that audiences prefer consonance over surprise and controversy in uncertain times and adapted their reporting accordingly (Hypotheses 5.1-2). Likewise, prominence should have lost relevance during the GFC and the Euro crisis (Hypothesis 5.2).

Since the late 2010s, climate change itself has increasingly been recognized as a crisis, and this perceptual change has been accentuated by the deliberate change in terminology from 'climate change' to 'climate crisis' initiated by politicians, news outlets, and activists in 2019 (Carrington, 2019; R. Meyer, 2018; Simpkins, 2021; Sobczyk, 2019; Zhou, 2019). The climate crisis should have added to the relative importance of executive authority, issue-specific relevance, and consonance (Hypothesis 5.1), while reducing the weight attached to surprise, controversy, and prominence (Hypothesis 5.2). The Covid-19 pandemic toward the end of the investigated period likely accentuated the impact of the climate crisis on the relative importance of the factors named above (Naumann et al., 2020; Nicola et al., 2020; Putinas-Neugebauer & Roland-Lévy, 2021). The exception is economic weight, which was likely unaffected by the economically impalpable climate crisis but should have gained importance during the severe economic downturn following the Covid-19 pandemic in 2020, making it difficult to predict its relative importance for the whole legislative term.

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<sup>5</sup> Climate change is considered highly salient if more than 1.5 percent of all newspaper articles published during a period cover the issue and moderately salient if this rate is above one percent. While these cut-off points are quite arbitrary, this should not impair the argument, which expects relative rather than absolute changes. The labels are thus illustrative rather than substantive.

At the beginning of the investigated period, there was neither a societal consensus about climate change, nor was the issue conflicted, as few actors outside the scientific domain had sufficient knowledge to form an opinion (Figure 3.1, brown-hued lines in the bottom panel). This information asymmetry likely led to an agenda-building advantage for scientific actors, who were effectively the only sources prepared to offer materials on climate change at the time (Weingart et al., 2000; cf. Trumbo, 1996), although the salience of the issue and thus the volume of the coverage were extremely low during this period. However, scientific actors pushed hard for political attention, and in the mid-1980s, voices opposing the newly formed consensus that the global climate is changing due to human actions and that this change poses a threat to human lifestyles and perhaps even lives, were marginalized (Weingart et al., 2000). Recognizing the widespread societal acceptance of climate change, German business actors remained largely silent on the issue and soon adopted the ecological modernization approach, which allowed them to retain or even increase their profits without challenging the already established consensus (Schlichting, 2012). This broad societal consensus on the existence, the origins, and the threatening nature of climate change remained stable for almost three decades until the AfD first entered the political domain and challenged both the anthropogenic nature of climate change and the seriousness of the threat, at least for German citizens (AfD, 2017).

Accordingly, the German climate change debate revolved largely around different approaches to fight climate change and cope with its consequences during this time, rather than around the existence of climate change. Although the AfD has focused more on economic issues and migration since its inception in 2013 (Franzmann, 2019), the presence of climate change skeptics in the political domain and, since 2017, the national parliament has led to more controversial discussions (Berker & Pollex, 2021; Boecher et al., 2022; Tschötschel et al., 2020), which may be reflected in the media coverage of climate change. Hence, actors' executive authority, their issue-specific relevance, and the consonance of their perspectives may have been less relevant for the ability to build the media agenda in the legislative terms between 1987 and 2013, rising in importance after the AfD first entered the political domain (Hypothesis 6.1). In contrast, the relative importance of surprise and controversy should have been high when there was broad societal consensus on the issue, but declined when the AfD started to challenge this consensus, presumably weakening the demand for additional excitement (Hypothesis 6.2).

## **Chapter 4: Data and Measurement**

The analysis draws on data in several formats from different sources to examine which actors shaped the German climate change debate. Detecting successful agenda-building requires data on both the media's coverage of climate change over time and the range of actors with incentives to build the media agenda and their perspectives. The first subchapter describes the modalities of the media data collection and explains the selection of newspaper articles rather than other forms of media coverage. The second and third subchapters identify actors from the four domains with incentives to shape public perceptions of climate change and describe the collection of data on their perspectives in the form of press releases and public statements. Two dependent variables are used to capture the degrees of actors' influence over the media agenda discussed in Chapter 2.2. The first part of the analysis assesses actors' visibility in climate change coverage, that is how often they are named in relevant news items. The second part of the analysis focuses on the portrayal of actors' perspectives in the media, considering the content and tonality of the coverage. Both parts also examine the exclusivity of the coverage to further differentiate actors' ability to gain advantageous coverage for their perspectives. While the starting point of this analysis are the late 1970s, when scientists first publicly expressed their concern about climate change, data for the second part of the analysis is largely unavailable for ex-post collection. Therefore, the reception of actors' press materials in the media can only be examined for the most recent legislative period, during which climate change was more salient than ever before.

Understanding why some actors are more successful at building the media agenda than others requires additional information about actors' agenda-building factors. The third subchapter describes how the individual factors are measured and details the data collection process. Since most of the considered factors change slowly and the factors that are exclusive to the political domain routinely vary across but not within legislative periods, changes in actors' visibility are assessed across legislative periods. Using legislative periods as the unit of analysis offers the additional advantage that the results can be expected to reflect typical patterns of actors' influence over the media agenda rather than unsystematic and perhaps uncommon variations tied to fluctuating causes. Although such fluctuations can be of substantive interest, this dissertation aims to identify factors that routinely affect actors' ability to build the media agenda and are thus effective beyond unique sets of circumstances.

### 4.1 Climate Change Coverage in German Newspapers 1976-2020

To measure media coverage of climate change in Germany, I draw on newspaper articles addressing this issue published in German quality dailies between 1976 and 2020. Despite the popularity of social media, actors have substantive incentives to push their perspectives onto the agendas of mass media outlets. While social media sites offer actors an inexpensive means to communicate their perspectives directly to the people, online audiences are more selective in their news consumption than newspaper readers (e.g., Bakshy et al., 2015; Del Vicario et al., 2017; Dylko et al., 2017; Mukerjee & Yang, 2021; Parmelee & Roman, 2020). Therefore, social media campaigns will frequently reach audiences who already share actors' issue interpretations. In addition to their broader audience, news items in (quality) newspapers are generally perceived as more valid than unmediated communication from individual actors on social media platforms (Harder et al., 2017; infratest dimap, 2020). Hence, mass media coverage communicates not only actors' perspectives but also increases the perceived legitimacy of the covered angle. To broaden rather than reinforce public support for their issue interpretations, actors thus still depend on coverage in the mass media. This does not imply that actors will not promote their perspectives on social media sites, or that the mass media will not sometimes pick up issues and angles from social media posts. In fact, actors may attempt to build the mass media agenda through their social media presence. However, it means that actors will seek to build the mass media agenda largely irrespective of their ability to promote their issue interpretations on social media sites.

The often-observed agenda-setting function of quality newspapers for other media (e.g., Carvalho & Burgess, 2005; Langer & Gruber, 2021; McCombs, 2004) indicates that perspectives covered in quality newspapers are often adopted by other media outlets, suggesting that quality newspaper coverage is well suited to measure actors' overall ability to build the media agenda. Moreover, the temporal aggregation at the level of legislative periods allows for intermedia agenda-setting in different directions (e.g., Su & Borah, 2019; Vliegenthart & Walgrave, 2008; Vonbun et al., 2016). Where actors' issue interpretations are first mentioned therefore does not matter, as they will most likely be covered in quality newspapers at some point during the same legislative period if they received sufficient public attention to affect public perceptions. In combination with the comparatively high newspaper readership in Germany (BDZV, 2021), the agenda-setting function of quality newspapers, and the possibility of intermedia agenda-setting reassure me that quality newspaper coverage reflects actors'



success at building the media agenda. In practical terms, newspaper coverage is the only data available to analyze whose perspectives on climate change are covered in the media over the last five decades. Although television news were prominent news sources throughout the observed period (AGF, 2021), systematic data on the content of news broadcasts is unavailable. Based on the arguments outlined above that quality newspapers routinely set the news agenda and that perspectives with the potential to shape public perceptions will at some point be covered in quality newspapers, data on the content of television news would be an interesting addition to the corpus but is not required to obtain an accurate picture of the mass media's coverage of climate change.

The lack of available longitudinal data on tabloid news coverage of climate change is more problematic. Although previous research has shown that actors are similarly successful at building the agendas of quality and tabloid newspapers (Kroon & van der Meer, 2021), tabloid-style reporting can be expected to attach more weight to specific agenda-building factors such as surprise and controversy (Boykoff, 2008; Lengauer & Höller, 2013), which should favor challenger actors. For German climate change coverage, Kaiser (2017) found that climate change skeptic views were more visible in the quality newspaper *Die Welt* than in the largest German tabloid *BILD*. However, this does not alleviate the concern that tabloids preferentially publish the perspectives of challenger actors such as climate activists, pointing to systematic differences in the source selection of tabloid and quality newspapers. Because these differences are known and can be considered in the substantive interpretation of the effects, neglecting tabloid coverage of climate change should not impair the validity of the obtained results. Yet, it represents an important limitation for the generalizability of my findings.

To obtain the broadest possible range of climate change coverage in quality newspapers, I collected 41,864 articles on climate change published in the print and online editions of five national dailies with high circulation: *Frankfurter Allgemeine Zeitung* (FAZ), *Frankfurter Rundschau* (FR), *Süddeutsche Zeitung* (SZ), *die tageszeitung* (taz), and *Die Welt* (Welt). These dailies cover the ideological spectrum from left (taz) to center-right (Welt) and have coined the German newspaper market for decades (Eilders, 2002; see Table 4.1). With the exception of the taz, which was founded in 1978, all newspapers were already established at the beginning of the observed period in 1976. However, only the FAZ provides digitalized coverage for all relevant years, whereas digitalized coverage for the other outlets is available starting between 1988 (taz) and 1999 (Welt, see Table 4.1). Despite the relatively neutral character of the German media system, systematic differences between newspapers with distinct ideological leanings

cannot be ruled out (see Chapter 2.5). Therefore, the results for the early phases of the climate change debate may reflect biases that are specific to the source selection of the FAZ. The stable ideological placement of the newspapers over time suggests that differences between the newspapers in later phases of the climate change debate are indicative of persistent biases and can thus be used to estimate the probability and direction of potential biases in earlier phases. Still, additional data would be needed to conclusively eliminate the possibility that biases have changed over time.

**Table 4.1: Overview of newspaper sources**

Newspaper	Available from	Articles (N)	Sections	Retrieved from
Frankfurter Allgemeine Zeitung (FAZ)	1976	12,777	Economy, Feature, Politics, Science	F.A.Z.-Bibliotheksportal
Frankfurter Rundschau (FR)	1995	3,470	Economy, Feature, Politics, Science	F.A.Z.-Bibliotheksportal
Süddeutsche Zeitung (SZ)	1992	13,701	Economy, Feature, Politics, Science, Society	SZ Archiv
die tageszeitung (taz)	1988	7,294	Current, Economy, Feature, Opinion, Politics, Science, Society	WISO
Die Welt (Welt)	1999	4,622	Economy, Feature, Politics, Science	WISO

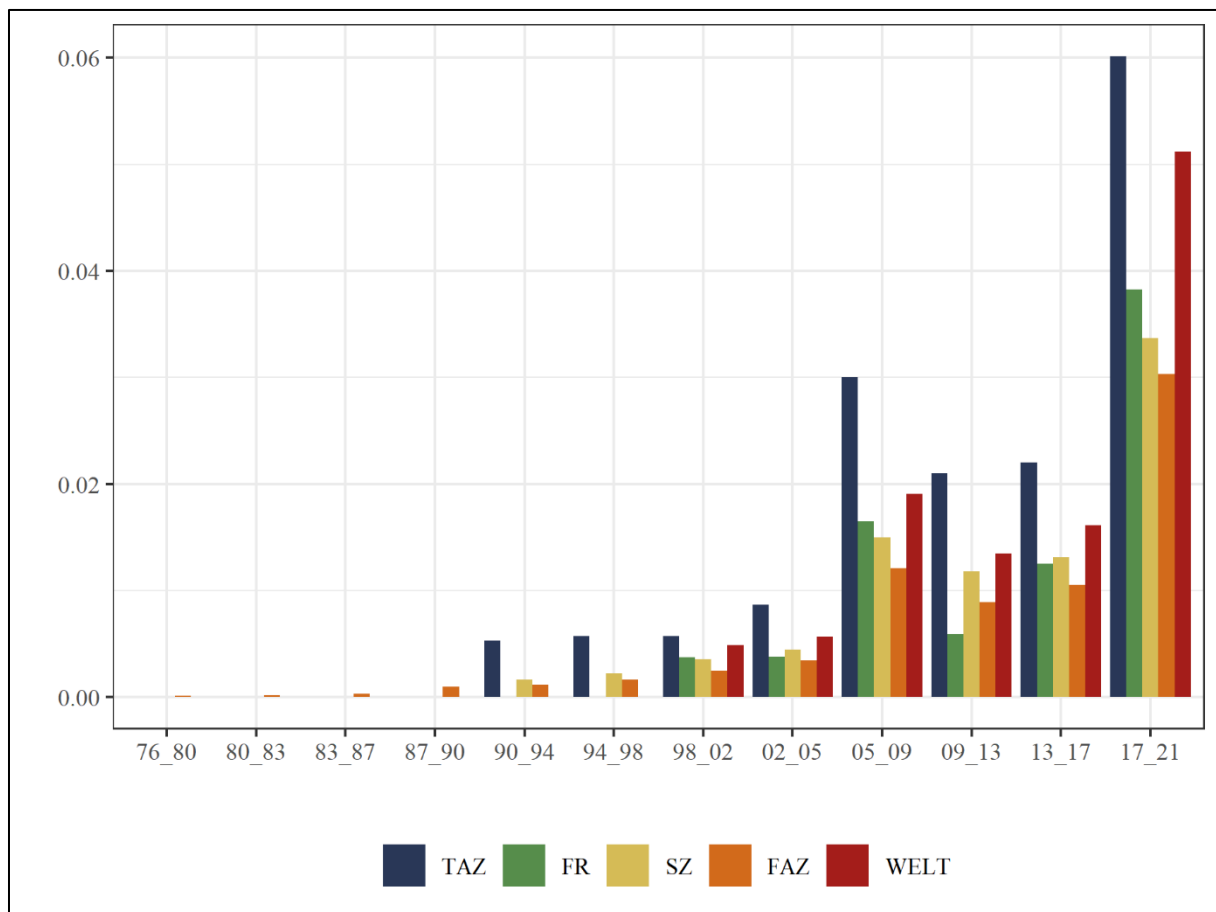
  

left ————— taz FR SZ FAZ Welt ————— right

**Notes:** The collected articles equal the population of newspaper articles on climate change in the indicated periods. Visualization of newspapers' ideological positions adapted from Figure 2 in Eilders (2002, p. 41).

The salience of climate change compared to other issues varies across outlets as well as over time.<sup>6</sup> Although salience generally follows the over-time pattern depicted in Figure 3.1, the percentage of the total coverage dedicated to climate change differs considerably across the five newspapers (see Figure 4.1). At the turn of the millennium, the leftist taz addressed climate change in around 0.6 percent of its articles, followed by the Welt with 0.5 percent, the FR and the SZ with 0.4 percent, and the FAZ with 0.3 percent. While only one out of 174 taz articles dealt with climate change at this time, this is still more than double the share of the FAZ. In the most recent legislative period, newspaper coverage of climate change increased roughly tenfold compared to the legislative periods from 1998 to 2002, rising to 6 percent in the taz, 5.1 percent in the Welt, 3.8 percent in the FR, 3.4 percent in the SZ, and 3 percent in the FAZ.

**Figure 4.1: Share of climate change articles in total coverage per newspaper**



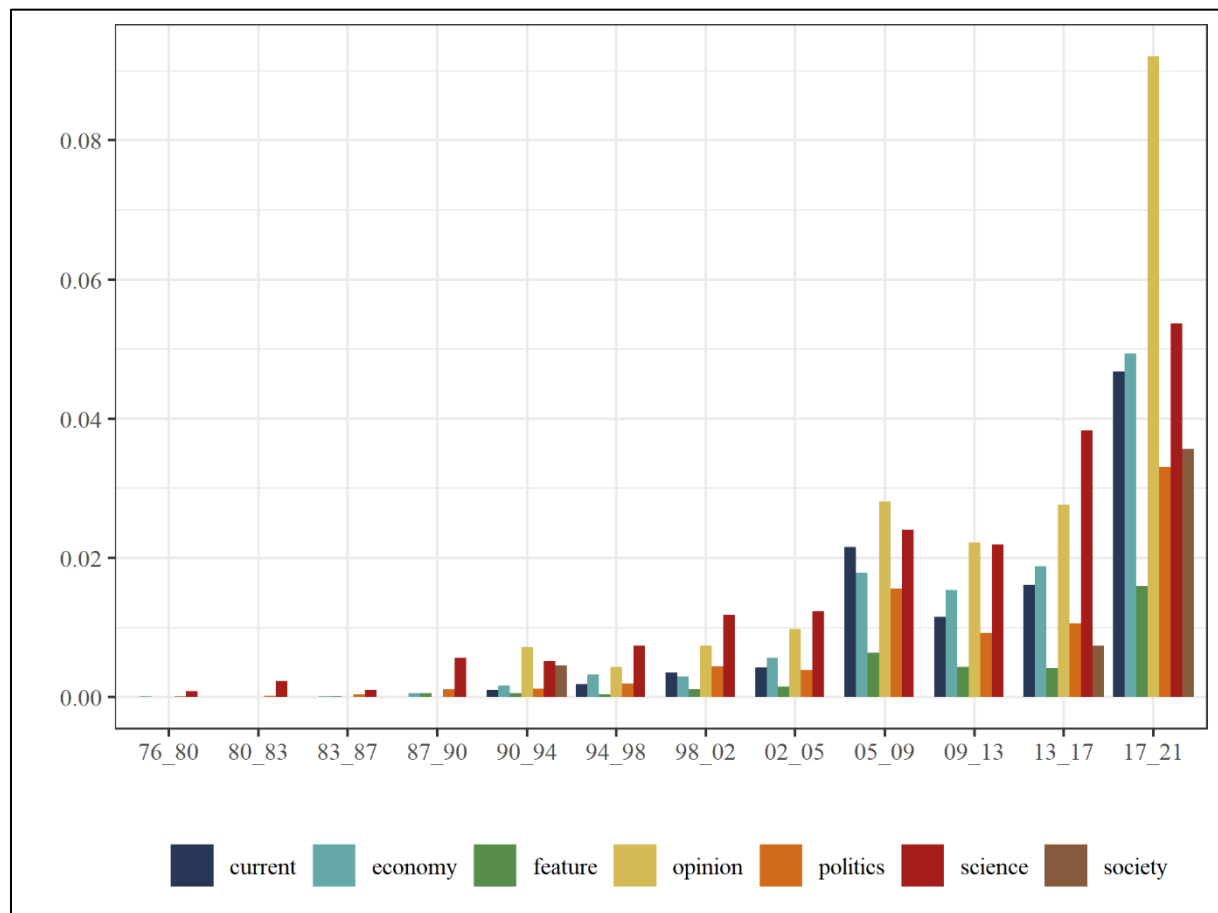
**Notes:** Depicted is the percentage of all published articles in the respective newspaper addressing the issue of climate change per legislative period.

<sup>6</sup> Issue salience was calculated by dividing the number of climate change articles by the total number of articles published in the collected newspapers or sections (see Chapter 3.3 ).

Both the order of the newspapers and the relative distance between them remain fairly stable over time, though the relation between the two left-liberal newspapers FR and SZ is reversed in half the legislative periods. Interestingly, the newspapers with the strongest ideological leanings dedicated the most coverage to climate change, tentatively supporting the notion that the issue has been politicized since the mid-1980s. Since newspapers' ideological leanings are reflected in their coverage, different actors may be more or less able to build the agendas of leftist and rightist newspapers. Hence, leftist newspapers may give more coverage to actors promoting greater climate protection and vice versa, but actors could also be covered at similar rates, with leftist and rightist newspapers evaluating their perspectives differently.

As actors from different domains are likely better equipped to build the agenda of different newspaper sections – the perspectives of political actors are likely featured more often in the politics section, whereas the angles of business actors are more prominent in the economy section, and the issue interpretations of scientific actors are favored in the science section – I collected articles published in the politics, economy, science, feature or culture, and society sections. While the taz uses these section headings, their content is organized differently than in the other newspapers. Therefore, articles published under the headings of current and opinion were collected in addition to articles from the common sections for the taz (see Table 4.1 for the list of sections collected for each newspaper).

Figure 4.2 shows how the share of climate change coverage varied across the different sections over time. In relative terms, climate change received the most coverage in the science section until the 1990s, when greater coverage shares in the opinion and society sections were dedicated to the issue. This is in line with the expectation that scientists were the most prevalent sources when the issue first emerged. However, it should be noted that most articles about climate change were published in newspapers' much larger politics sections during that time. In the following legislative periods, the share of climate change-related articles tendentially increased in all sections, with a temporary peak in the legislative period 2005-2009 that reflects the overall salience of climate change in the collected newspapers. Somewhat surprisingly, climate change remained relatively less salient in the politics section even as the issue was politicized, whereas coverage in the economy section increased more markedly. Mirroring the high visibility of climate change in the taz, the current and opinion sections feature comparatively high shares of climate change coverage. Overall, climate change was addressed in a variety of newspaper sections, suggesting that newspapers had room, though not necessarily the incentives, to cover the perspectives of various actors.

**Figure 4.2: Share of climate change articles in total coverage per section**

**Notes:** Depicted is the percentage of all published articles in the respective newspaper section addressing the issue of climate change per legislative period.

### Data Collection

To identify all articles addressing the issue of climate change, variations of the term climate change (e.g., climate crisis, climate emergency) and related phrases (e.g., climate protection, two-degrees target; see Appendix 1 for the full list) were used to search the respective newspaper archives indicated in Table 4.1. The search terms included previously popular styles for climate change such as ‘greenhouse effect’ and ‘global warming’ to account for changes in linguistic use, as well as broader terms often discussed in the context of climate change (e.g., carbon emissions, carbon offsetting). In the data collection stage, the search terms were selected to maximize sensitivity, i.e. the rate of correctly identified true positives, at the cost of lower specificity, i.e. more false positives. The resulting collection of 50,266 articles can therefore be expected to contain (almost) all available articles covering the issue of climate change in the

observed period, but also included 4,046 duplicate articles and 4,443 unrelated articles that were subsequently removed from the dataset (see the next section on data cleaning).

Access to the used newspaper archives is restricted to licensed users and non-commercial use,<sup>7</sup> prohibiting the application of an automated web crawler for the collection of raw data on the relevant articles in HTML format. Therefore, the article pages were downloaded and saved manually, before reading the raw data into RStudio<sup>8</sup> using the *rvest*-package (Wickham, 2022) and extracting the title, teaser, text, and publication date of each article. The individual elements were identified based on the corresponding HTML tags or XML paths in the source code of the article pages, which vary across archives (see `media_coverage.R` in the replication materials for the customized retrieval functions). The HTML tags were stripped from all elements to obtain the raw content in text form and encoded in UTF-8 format for the proper representation of special characters such as umlauts. Lastly, meta information about the newspaper and the section in which an article was published was added and the data was combined into a data frame with 50,266 observations of the six variables title, teaser, text, date, outlet, and section.

### *Data Cleaning*

Articles were frequently published in both print and online editions and sometimes in several sections of the newspaper, resulting in numerous duplicate articles in the initial dataset. These duplicates were identified using a three-step process based on article comparisons and removed from the dataset. In the first step, articles with identical content were identified and 2,511 repetitions were removed. To detect articles that are almost identical in content but differ with regard to spelling, syntax, or individual words, I further identified 3,141 potential duplicates whose first 30 characters were identical and calculated the Damerau-Levenshtein distance for all pairs of potential duplicates.<sup>9</sup> The Damerau-Levenshtein distance is an established measure

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<sup>7</sup> The SZ Archiv further prohibits the systematic downloading of content and limits the storage period of downloaded content to 180 days. Since my project clearly violates these terms of use, I obtained written permission from the SZ Archiv to download and store the required data for the purposes of this dissertation project before collecting the respective articles.

<sup>8</sup> All operations, including data collection, data cleaning, processing, analyses, and visualization, were implemented using R (R Core Team, 2022) in the RStudio IDE (RStudio Team, 2022).

<sup>9</sup> I refrain from calculating the Damerau-Levenshtein distance for all article pairs remaining after the first duplicate removal step because the calculation for 47,755 articles is prohibitively computationally expensive.

of the edit distance between two sequences, which counts the minimum number of operations needed to change one sequence into the other, where an operation can be the insertion, deletion, or substitution of a single character or the transposition of two adjacent characters (Damerau, 1964; Levenshtein, 1966). In other words, the Damerau-Levenshtein distance measures how many characters in an article need to be changed to make it identical to another article. The threshold above which sequences are classified as duplicates depends on the use case. Manual examination of a random sample of 500 potential duplicates indicated that a Damerau-Levenshtein distance of 20 is a suitable threshold to account for minor changes in the phrasing of articles and spelling mistakes. As a result, an additional 1,535 articles were classified as repetitions and removed from the dataset.

Due to the relatively low specificity of the data collection, the initial dataset also contained articles that used the search terms in contexts unrelated to climate change. Most of these false positives can be traced back to the ambiguous meaning of the term *Klimawandel*, which can refer to the meteorological phenomenon of climate change but can also describe changes in social climates, business climates, or working climates. In German, the different usages can usually be distinguished syntactically, as the meteorological phenomenon is always combined with a definite article (*der Klimawandel*), whereas other forms of climate change are typically preceded by indefinite articles (*ein Klimawandel*).<sup>10</sup> Moreover, because the term climate change is used as a figure of speech in the latter case, it is usually not repeated. Hence, frequency is another easily assessable criterion to differentiate references to the meteorological phenomenon from other usages. However, some articles continuously refer to the same figure of speech for stylistic reasons and elude both criteria, as climate change is mentioned more than once and the definite article can be used when referring to a previously mentioned instance of climate change. To verify that an article addresses the meteorological phenomenon, the combination of climate change with adjectives such as ‘global’ and the presence of other keywords like ‘climate crisis’ or ‘global warming’ were thus considered in combination with the use of definite articles and the frequency of occurrence.

Fewer false positives resulted from references to organizations other than the Intergovernmental Panel on Climate Change, which also abbreviate their names to ‘IPCC’ (e.g., the Independent Police Complaints Commission). These cases were easily distinguished using the keywords ‘climate’ and ‘science’. In addition, articles discussing carbon emissions and

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<sup>10</sup> Unlike in English, the term climate change cannot be used without an article in German.

carbon offsetting (also: emission trading, cap and trade) were classified as false positives if the terms were used in purely economic or technical contexts, without any reference to negative and positive effects on the climate (also: the environment) or climate-related emission reduction targets such as the ones agreed upon in the Kyoto Protocol or the Paris Agreement. The automated classification process resulted in a small number of ambiguous cases, which were manually reviewed and classified. The cleaned data set comprises 41,864 articles.

The first part of the analysis required no further cleaning of the data, as actors' visibility was assessed with a dictionary of full names encoded as regular expressions. Here, typical pre-processing steps for text analyses such as decapitalization, stripping numeric characters and punctuation, and lemmatization would have decreased the accuracy of the dictionary, as actors' names are commonly capitalized in texts, may contain numbers and punctuation, and can lose their meaning through lemmatization. Capitalization helps the dictionary to distinguish proper names from other uses of the word, for instance when discriminating between the company *MAN* and the pronoun *man*. Stripping numbers and punctuation would reduce the name of the environmental organization *350.org* to *org*, and lemmatization would turn *Robert Balling* into *Robert Ball*, making these names unrecognizable for the dictionary. Hence, properly encoded raw strings are the optimal input for the dictionary search.

For the second part of the analysis, remnants of the original HTML formatting such as tags and line breaks were removed from the newspaper articles alongside hashtags, @-mentions, hyperlinks, and digits. Punctuation was converted to spaces to prevent the contraction of hyphenated words and sequences of spaces were reduced to single spaces. To decrease the dimensionality of the newspaper corpus, I removed German stopwords adapted from the stopwords package (Benoit et al., 2021). Stopwords are common words such as articles, which do not convey meaning independent of associated words and are thus not helpful to determine or compare the topical content of documents. These pre-processing steps greatly reduce noisy features that hold no informational value for automated text analysis techniques. While the name of the environmental organization *350.org* will still be reduced to just *org*, this transformation is applied to all compared documents, mitigating the information loss.

In an additional version of the corpus, words were transformed to their lemmata using the German lemmatizer (gsd) from the udpipe package (Wijffels, 2022). Nouns, pronouns, and articles were reduced to nominative singular (e.g., *Landes*, *Länder*, and *Ländern* were all transformed to *Land*), verbs to their infinitive (e.g., *hilft* and *halfen* became *helfen*), adjectives and adverbs to their positive (e.g., *weniger* and *wenigsten* became *wenig*). Lemmatization can



facilitate the automated processing of texts because words with the same meaning are summarized in unique features. However, the reduced complexity comes at the cost of less nuanced content, which can make it more difficult to delineate the perspectives of individual actors. For instance, the comparative, superlative, or elative use of an adjective may be quite informative to distinguish the perspectives of actors with similar positions that vary mainly in their urgency. Moreover, lemmatization should be less relevant for analyses based on word embeddings, which already account for the synonymous meaning of words (see Chapter 4.3 for an explanation of word embeddings). Since the impact of lemmatization on the performance of subsequent analyses could not be predicted, all analyses and validity checks were performed for both versions of the corpus.

Most text analysis techniques aim at individual words rather than larger units of meaning within texts and therefore require documents to be split into so-called bags of words. This representation surrenders information about the context and the syntactic function of words to enable the automated processing of texts and can be refined through the use of word pairs (bigrams) or multiples (n-grams). Larger word windows come with drawbacks, however, as the required computational power increases exponentially and the matrix representation becomes sparser, resulting in overfitting when analyses are performed on smaller corpora. Since the corpus for the second part of the analysis is comparatively small with 22,152 documents (both newspaper articles and actors' press releases and statements) and 126,075 unique words, I relied on individual words as the unit of analysis but compounded meaningful bigrams. To this end, I used the `textstat` module from the `quanteda` package (Benoit et al., 2018) to find all bigrams that occurred at least 100 times in the corpus and manually cleaned the resulting list to exclude collocations without any substantive meaning. Subsequently, word combinations were replaced with compounded bigrams (e.g., “*Angela\_Merkel*” instead of “*Angela*” and “*Merkel*”). After tokenizing and lowercasing, the document collection included 127,172 non-lemmatized tokens and 106,192 lemmatized tokens (the unit of analysis used in automated text analysis) representing individual or compounded words.

### ***Summary***

To capture the media's coverage of climate change, newspaper articles referring to climate change published in five German national quality dailies between 1976 and 2020 were identified based on relevant keywords. After removing duplicates and items falsely identified

as addressing climate change, the sample consisted of 41,864 articles. This collection covers the ideological spectrum from left to right but excludes tabloid media, television, and social media platforms. Considering the high newspaper readership in Germany, the comparatively broad audiences of quality newspapers, their agenda-setting function, and the long timeframe of the analysis that allows for intermedia agenda-setting in all directions, coverage in quality newspapers can be expected to reflect actors' success at building the general media agenda. However, different types of media may weigh the explored agenda-building factors differently, limiting the generalizability of the results across media platforms.

The share of articles addressing climate change tendentially rose over time, with a peak in 2006 and a sharp increase since 2017. While the percentage of articles dedicated to climate change roughly follows this trend across outlets, newspapers with stronger ideological leanings covered climate change about twice as often as more centrist newspapers and this difference persisted over time. The salience of climate change also differed across newspaper sections, where the largest coverage shares could initially be observed in the science section. Compared to the general trend, the percentage of climate change articles in the economy section rose more markedly in the most recent legislative period. The first part of the analysis required no further processing of the articles. For the second part of the analysis, HTML formatting, hashtags, @-mentions, hyperlinks, digits, punctuation, redundant spaces, and stopwords were removed from the articles. In addition, one version of the newspaper corpus was lemmatized, meaningful bigrams were identified from frequent collocations and compounded, and all articles were transformed to lowercase and split into tokens consisting of (compounded) words.

### **4.2 The Visibility of Potential Sources in Climate Change Coverage**

Actors with incentives to shape public perceptions about climate change were identified from a range of sources, including previous research, official lobby and non-profit registries, participant lists for climate-related government commissions, and various online resources. As for the newspaper articles, the search for actors who can be expected to seek media attention for their interpretations of climate change was aimed at maximizing the probability to identify relevant actors. Here, false positives are not of concern, as only actors who had incentives to build the media agenda on climate change at some point during the observed period (see Chapter 2.3) were added to the list. However, because the universe of potentially relevant actors is unknown, there is a higher risk that relevant actors are overlooked. To validate the initial list

of actors and ensure the inclusion of all actors who were saliently featured in climate change coverage, I applied named entity recognition (NER) to the corpus of climate change articles (cf. Grundmann, 2022) using the *spacyr* package (Benoit & Matsuo, 2020). Although the comparison with the NER results is useful to verify that no group of actors was systematically disregarded in the initial search, NER results depend on actors' ability to build the media agenda on the issue of climate change and can therefore only supplement the initial manual search. After validation, the list of actors was reviewed to eliminate duplicates originating from spelling mistakes or abbreviations and ensure that identified actors were assigned to the most fitting domain, resulting in a list of 960 individual or collective actors and 17 broader terms such as *government*, *scientist*, or *climate activist* (see Appendix 2 for the full list).

### ***Political Actors***

For the political domain, the list includes all parties currently or previously represented in the national parliament, their youth organizations, and affiliated foundations as collective actors. In addition, the members of all national governments in office between 1976 and 2020, the respective party chairpersons, and state environment ministers were included as individual actors. For the last observed legislative period, during which climate change was highly salient in the media, the list also includes parliamentary group leaders and members of parliament who were official party spokespersons for related issues like the climate, the environment, energy, or mobility, or worked in parliamentary committees on such issues. Moreover, the respective frontrunners for national and state elections, including incumbent state prime ministers, were added to the list, as these actors likely had heightened incentives to seek public attention. To be able to link individual and collective actors, the party affiliation of each actor was recorded, with additional categories for independent political actors and broader terms such as *minister* or *deputy* that are helpful to explore patterns of media attention over time but cannot be linked to individual actors.

Each political actor on the list was included for all legislative periods during which they were active in national politics. Accordingly, all political actors were included from when they first held a seat in the national parliament or the federal council to when they officially retired from politics or deceased. Since most government members were members of the national parliament before their cabinet posts, the list includes regular MPs for all legislative periods, allowing for cross-sectional as well as longitudinal comparisons. In other words, I can compare

the ability of government members and regular MPs to build the media agenda in the same legislative period, but also compare the ability of the same actor to build the media agenda as a regular MP and as a cabinet member.

### ***Business Actors***

Business actors with incentives to shape public perceptions of climate change were identified based on their membership in the coalition for climate protection (BMU, 2020), an official government forum for stakeholders to discuss their positions on climate policies with political representatives. In this forum, business interests were primarily represented by industry associations, not by individual companies whose interests are affected by public sentiment on climate change, for instance through changing consumption patterns or indirectly through climate policies endorsed by the public. To capture relevant individual actors, companies included in the Top 100 Companies Panel (Buchwald et al., 2021, see *Economic Weight* in Chapter 4.4) from industries that contribute substantially to the national carbon dioxide emissions (energy, chemicals, automotive, shipping, aviation, metal construction, paper production) were added to the list. These companies are large enough to be relevant to the national economy and tend to be affected by climate action, providing them with incentives to shape public perceptions of climate change when the issue is salient.

Whereas the stakeholders in the coalition for climate protection included actors with both positive and negative incentives, companies such as renewable energy providers that can be expected to profit from more ambitious climate protection policies have no substantial impact on the national economy (yet). Hence, the list of business actors comprises associations and organizations, but not individual companies that should favor more rigorous climate protection to advance their business interests. To understand which types of business actors are best able to build the media agenda on climate change, information about their presumed position in favor or against more ambitious climate protection and their organizational form (association, organization, company) was coded for each actor. Companies with diversified interests, such as energy providers with investments in both fossil fuels and renewable energies, were categorized based on the division which provided more added value for the actor.

### *Civil Society Actors*

The identification of relevant civil society actors proved more difficult, as activist actors tend to lack the organizational status required to participate in official government fora and may shun such institutionalized opportunities for deliberation. In consequence, the actors who represent civil society interests in the coalition for climate protection mainly include officially registered non-profit organizations, which are also listed in the lobby registry of the national parliament.<sup>11</sup> While a number of relevant civil society actors could be identified from these sources, less institutionalized actors such as the student movement *Fridays for Future* (FFF) or the more radical alliances *Extinction Rebellion* (XR) and *Ende Gelände* cannot be found in official registers. To identify these more elusive civil society actors, I conducted an extensive online search using variations of the keywords “climate change” or “climate protection” and “activist” or “organization” in combination with individual years between 1976 and 2020. All individuals and organizations mentioned in the resources listed on the first ten results pages were added to the list unless their commitment focused on a region outside of Germany and was not aimed at an international public. The resulting list includes large national and international environmental organizations such as the *Bund für Umwelt und Naturschutz* (BUND) and the *World Wide Fund for Nature* (WWF), networks of organizations like the *Deutsche Naturschutzring* (DNR) or the *Climate Vulnerable Forum* (CVF), activist movements like FFF or *Earth First!* (EF!), and individual activists. The broader term *climate (protection) activist* was also included on the list to capture unspecific references to this actor group.

All civil society actors mentioned thus far advocate climate protection, however, there are also civil society actors who promote climate change skeptic positions. Previous research into the networks of climate change deniers identified organizations, think tanks, and individuals who doubt the scientific consensus on climate change and seek to shape public perceptions in line with their perspectives (Boykoff & Farrell, 2020; Merkley & Stecula, 2018). Most internationally active climate change skeptic organizations are based in the United States (e.g., *Heartland Institute*, *Cato Institute*, *Competitive Enterprise Institute*), but some German actors such as the *Europäisches Institut für Klima und Energie e.V.* and the *Deutsche Wildtierstiftung* exist despite the longstanding marginalization of climate change skeptic views

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<sup>11</sup> The joint register portal of the German states can be accessed here: [www.handelsregister.de](http://www.handelsregister.de); the lobby register of the national parliament here: [www.lobbyregister.bundestag.de](http://www.lobbyregister.bundestag.de).

in the national climate change debate (Adam et al., 2020; Kaiser, 2017). In addition to the actors named in the literature, the list includes prominent climate change deniers identified through an online search using the keywords “climate change deniers” and “climate change skeptics”. Because scientific actors are often labeled as climate change deniers when their interpretations diverge from the IPCC consensus, the qualifications of each actor were checked to ensure that scientific actors who deny the existence of (anthropogenic) climate change or considerable threats from climatic changes, presumably based on their work, are not confounded with civil society actors who promote similar positions but lack any scientific background.

### *Scientific Actors*

Relevant scientific actors were identified based on their membership in the coalition for climate protection or political advisory boards, their inclusion on the Reuters Hot List<sup>12</sup> for climate scientists, and their collaboration on IPCC reports. Proceeding from this initial list, scientific actors who collaborated with the identified actors and whose work was primarily focused on climate science were added to the list. Actors were classified as scientific if they were affiliated with an academic institution such as a university, college, research institute, or think tank, or a specialized international organization, and had the academic qualification to conduct their own research, usually documented through a doctorate. Actors were also considered scientific if they lacked ordinary academic qualifications but had many years of experience in their field and regularly published in peer-reviewed scientific journals, or if they had the academic qualifications and publications but no longer worked in an academic institution. Given the complex causes and implications of climate change, scientific expertise on the issue was attributed to actors from all areas of study, as long as their published work addressed an aspect of climate change.

Because scientific actors supporting the IPCC consensus and those opposing it are unlikely to collaborate, I additionally performed an online search for contrarian scientists, who tend to participate in the meetings of climate change skeptic organizations such as the Cato Institute (Dunlap & McCright, 2011). Actors referred to as climate scientists in online resources were added to the list if they fulfilled the criteria for scientific actors outlined above. The final list includes academic institutions, specialized international organizations like the *World*

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<sup>12</sup> <https://www.reuters.com/investigates/special-report/climate-change-scientists-list/>

*Meteorological Organization* (WMO), scientific networks like the *Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen* (WBGU), advisory boards like the *Expertenrat für Klimafragen*, and individual scientists. For each actor, (dis)agreement with the IPCC consensus was coded alongside their institutional affiliation. Moreover, broader terms such as *scientist* or *researcher* were included to learn about the overall salience of scientific actors in climate change coverage.

### ***The Actor Dictionary***

To create the dictionary for the analyses, the actor lists for the four domains were combined in a data frame including information on actors' names, their domain, their association with collective actors such as parties or institutions, their organizational form, and the respective legislative period. To enable the dictionary to capture all mentions of an actor despite variations in spelling or the use of abbreviations, all names were translated into regular expressions. In other words, characters that may or may not be used (e.g., hyphens), variable characters (e.g., umlauts, which can be written as *ä* or *ae*), and inflections (e.g., *Sozialdemokrat*, *Sozialdemokratin*, *Sozialdemokraten*) were replaced with regular expressions that capture all relevant forms of the name. For instance, hyphens were exchanged with the regular expression `[- ]`, which specifies that the character in the indicated position is either a hyphen or a blank space. In addition, regular expressions accept alternative notations, meaning that different identifiers referring to the same actor can be included in the same expression. As a result, the dictionary entry for the *Potsdam-Institut für Klimafolgenforschung*, abbreviated to PIK, is translated to `"Potsdam[- ]Institut f.{1,3}r Klimafolgenforschung|PIK"` and captures mentions of *Potsdam-Institut für Klimafolgenforschung*, as well as *Potsdam Institut fuer Klimafolgenforschung* (note the missing hyphen and the alternate spelling of the umlaut), and *PIK* (but not *Pik* or *pik*). Moreover, the dictionary expressions for all actors begin and end with either a blank space or punctuation to ensure that the expression does not match instances in which actors' abbreviated names are coincidentally part of another term.

Although regular expressions are useful to improve actor recognition, they cannot differentiate between various uses of the same name. Hence, the dictionary will count all mentions of *IPCC* as mentions of the *Intergovernmental Panel on Climate Change*, even if the abbreviation refers to the *Independent Police Complaints Commission* in some cases. Because the cleaned corpus only contains articles addressing the issue of climate change, the names of

most actors are unambiguous in this context. However, the possibility remains that common names (e.g., *Stefan Müller*) or abbreviations (e.g., *AWI*) may yield false positives. As natural language processing (NLP) techniques commonly applied to differentiate distinct uses of the same term are based on the context indicated by the surrounding words (e.g., if *IPCC* is used alongside *climate change* and *science*, it most likely refers to the *Intergovernmental Panel on Climate Change*; if it is used alongside *police* and *brutality*, it most likely refers to the *Independent Police Complaints Commission*), they are not well suited to detect different uses in issue-specific corpora using many of the same words. Therefore, the unambiguity of the dictionary expressions was checked manually for each actor to ensure that there was no other (prominent) actor who may plausibly be mistaken for the actor in the dictionary.

The range of actors in the dictionary is specific to the respective legislative periods, that is the sample of relevant actors changes with each legislative period, as political actors enter and leave national politics, collective business actors form and dissolve, individual business actors grow and shrink, civil society actors become (in)active, and scientific actors graduate and retire. In consequence, the same actor can be included in the dictionary for several legislative periods and the classification of actors may change from one legislative period to the next (e.g., when an MP switches her party affiliation). Although such changes do not necessarily follow the legislative cycle and can thus only be approximated,<sup>13</sup> changes in classification are uncommon and should not compromise the validity of the results.

### ***Measuring Actors' Visibility in Climate Change Coverage***

The dictionary allows me to compute several measures capturing different dimensions of actors' visibility in the newspaper coverage of climate change. The first indicator counts how many times an actor was mentioned in the corpus of newspaper articles and thus captures the overall visibility of actors, but does not distinguish actors who are named in the same article ten times from actors who are named once in ten different articles. Because the latter may imply greater visibility for audience segments interested in different articles, the second indicator counts the number of articles in which an actor was mentioned. To capture the exclusivity of articles, the third indicator counts the number of articles in which an actor was mentioned

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<sup>13</sup> The classification of actors whose status changed during the legislative period reflects the status they held longer during the respective legislative period.



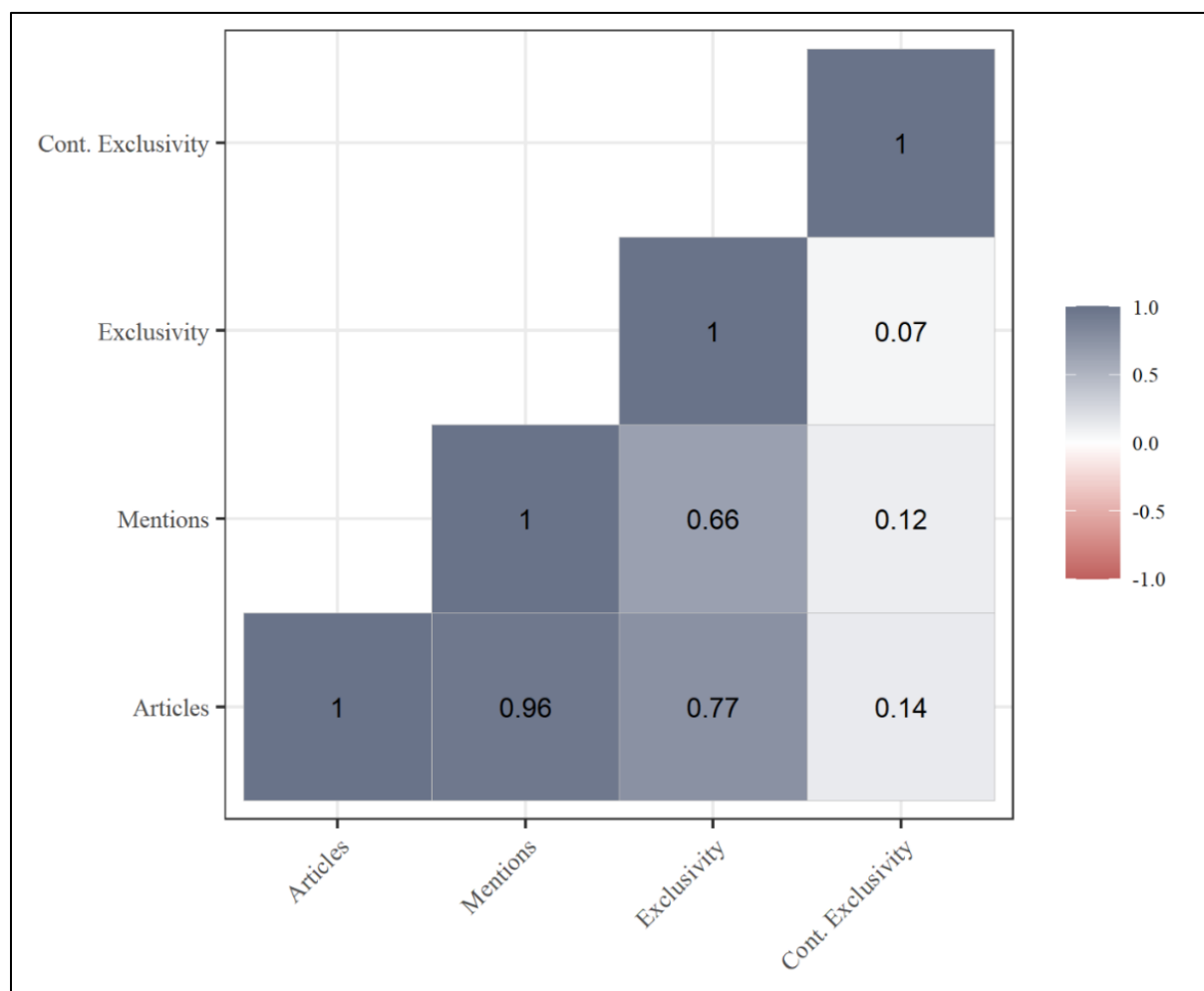
without any other actors being mentioned in the same article. While exclusive mentions should benefit actors most, exclusivity can be understood as continuous, suggesting that actors will profit more when fewer other actors are mentioned in the same article. The fourth indicator thus measures the mean number of other actors mentioned in the same article as an actor. The number of mentions and the number of articles in which actors were named are highly correlated (see Figure 4.3). Smaller but still substantial correlations exist between these two measures and the number of articles in which actors were mentioned exclusively. Surprisingly, continuous exclusivity is only weakly correlated with the other indicators, and the correlation is positive, although higher values indicate lower visibility for this metric. Hence, continuous exclusivity seems to capture a distinct dimension of actors' visibility, which may be determined by different agenda-building factors. The visibility indicators constitute the first set of dependent variables used in the regression analyses, where the aggregation at the level of legislative periods is used to match the operationalization of the independent variables.

All four indicators were measured for the entire corpus but can be broken down by legislative periods, newspapers, or newspaper sections. For the descriptive analysis, the visibility of actors across legislative periods allows me to observe trends over time, which could point to changes in the context conditions discussed in Chapter 2.5. For the regression analysis, the visibility metrics for the individual legislative periods were consolidated for periods of interest, which match contextual changes expected to influence the relative importance of individual agenda-building factors. Since these changes frequently coincided, even systematic patterns in the relative importance of individual agenda-building factors over time may not be attributable to specific context conditions, but patterns can support or contradict the expectations set out in Chapter 2.5. Furthermore, newspapers with different ideological leanings may dedicate more coverage to actors whose positions can be presumed to match the preferences of their readers, and newspapers covering climate change in larger article shares should attach more relative importance to agenda-building factors whose relevance is expected to increase with issue salience (see *Changes in Issue Salience* in Chapter 2.5).

Lastly, newspaper sections can be expected to give more coverage to actor groups that are particularly relevant to their substantial focus. Accordingly, political actors should receive more coverage in the politics section, business actors in the economy section, and scientific actors in the science section. In consequence, these sections may also value domain-specific agenda-building factors differently than the other sections. For instance, economic weight may be particularly important for coverage in the economy section, as weighty business actors are

highly relevant for the substantial focus of this section. On the other hand, economic weight may be more important for other sections, where business actors receive less coverage and economic weight can serve as an easily available selection criterion. In short, separate visibility metrics for different legislative periods, newspapers, and newspaper sections allow me to explore variations in the relative importance of individual agenda-building factors.

**Figure 4.3: Correlation of the visibility metrics**



**Notes:** Depicted are Pearson correlation coefficients for the number of articles in which an actor was mentioned (Articles), the number of mentions (Mentions), the number of articles in which an actor was mentioned exclusively (Exclusivity), and the average number of other actors mentioned in the same articles (Cont. Exclusivity). All correlations are statistically significant at the 95 percent confidence level.

### *Summary*

To measure the visibility of individual and collective actors in the newspaper coverage of climate change, actors who can be expected to have an interest in shaping public perceptions of this issue were identified from a range of sources, including previous research, official lobby

and non-profit registries, participant lists for climate-related government commissions, and various online resources. The initial search was supplemented through the automated identification of named entities in the newspaper corpus. The resulting list contains 960 actors and 17 broader terms from all four domains. For the political domain, the list includes parties and their youth organizations, affiliated foundations, and individual politicians representing different levels of the political hierarchy. For the business domain, I considered associations, economically oriented organizations, and individual companies large enough to have an impact on the national economy. Civil society actors on the list include NGOs, networks, think tanks, and individual activists. For the scientific domain, traditional actors such as universities and institutes were considered alongside scientific networks and think tanks, international organizations, advisory boards, and individual scientists working in these contexts.

To improve the recognition of actors' names in the media coverage, they were converted to regular expressions and the resulting dictionary was manually checked to ensure the unambiguity of the entries. To reflect over-time changes in the pool of actors with incentives to shape public perceptions of climate change, the dictionary is specific to the respective legislative period. Based on the dictionary search of the newspaper corpus, I calculated four variables capturing different aspects of actors' visibility. The first indicator measures the total number of mentions in the corpus, whereas the second one counts the total number of articles in which an actor was mentioned. The third and fourth indicators capture the exclusivity of actors' mentions by counting the number of articles in which an actor was mentioned without other actors being mentioned in the same article, and the average number of actors mentioned in the same articles as an actor. These indicators were calculated for the entire corpus, as well as individual legislative periods, newspapers, and newspaper sections.

### **4.3 The Portrayal of Actors' Perspectives in the Media**

Data on actors' perspectives on climate change is required to assess whose perspectives are more or less closely portrayed in the media coverage of the issue. Such data is available in the form of press releases and statements addressing climate change that actors publish with the explicit aim to influence the representation of climate change in the media. However, press releases and statements are seldom available for extended periods,<sup>14</sup> and not all actors publish

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<sup>14</sup> See [library.fes.de/pressemitteilungen](http://library.fes.de/pressemitteilungen) for a research project addressing this issue.

their own media materials. In consequence, meaningful data on actors' perspectives could only be collected for the legislative period 2017-2021. Moreover, collecting data on the perspectives of all 898 actors in the relevant dictionary is unfeasible in the context of this dissertation and the resulting data frame would likely be sparse for most actors. Therefore, the second part of the analysis focuses on the collective (e.g., parties, companies, civil society organizations, or research institutes) and unaffiliated individual actors who were most visible in the newspaper coverage of climate change. For the political domain, these actors include the parliamentary parties and their youth organizations. For the other domains, I collected data on the perspectives of the 15 most frequently named actors, as well as all actors who were named in at least two percent of the overall coverage. Even for this recent and comparatively short observation period, media materials were not available for all frequently named actors, resulting in a list of 13 political actors, 27 business actors, 15 civil society actors, and 13 scientific actors whose perspectives could be collected (see Appendix 3 for the full list of actors, their website(s), and the collection method).

### ***Data Collection***

Press releases and statements were collected from actors' official website(s) using the search terms *climate* and *environment* to filter the available materials. Unlike the newspaper archives, access to actors' websites does not require authentication, enabling the use of web crawlers to collect the materials from HTML-based websites (see `actor_materials.R` in the replication materials for the implementation of the customized web crawlers). Materials from interactive websites based on JavaScript were collected manually before they were read into RStudio with the `rvest` package (Wickham, 2022) or the `RSelenium` package (Harrison, 2022). As for the newspaper articles, the titles, teasers (if applicable), texts, and dates of press releases and statements were extracted based on the corresponding HTML tags or XML paths (see the actor files referenced in `actor_materials.R` in the replication materials for the customized retrieval functions). After removing press releases and statements with less than five characters, materials outside the relevant timeframe, duplicates, and materials referring to other topics (see *Data Cleaning* in Chapter 4.1 for a detailed description), a collection of 9,159 press releases and statements from 64 actors remained for the analysis (see Appendix 3).

Around ten percent of the collected actor materials were in languages other than German and required translation to be comparable to the newspaper articles. Almost all of these

materials were in English (921), though two statements were in Spanish, one in French, and one in Portuguese. I used the deepl package (Zumbach & Bauer, 2021) as a wrapper to access the DeepL API Pro to translate materials from other languages to German. DeepL provides an automated translation service based on neural networks developed through deep learning techniques, which currently outperforms similar tools (Lemire, 2017). Although DeepL translations capture the meaning of most texts with similar accuracy as non-professional human translators, automated translations remain inferior to professional human translations (Bernard, 2018; Lemire, 2017). However, since the analyses performed with the translations rely on similar deep learning techniques to estimate the distances between texts and can therefore be expected to be similarly inept at capturing the level of meaning potentially lost in automated translation, professional human translations are unlikely to significantly increase the accuracy of the subsequent estimations. To ensure the comparability of the resulting corpora, actors' press materials passed through the same pre-processing steps as the newspaper articles, i.e., removing HTML formatting, hashtags, @-mentions, hyperlinks, digits, punctuation, redundant spaces, and stopwords, optional lemmatization, compounding meaningful bigrams, lowercasing, and tokenization (see *Data Cleaning* in Chapter 4.1 for a detailed description).

### ***The Similarity Between Actors' Perspectives and Media Coverage***

To compare the content of the remaining 9,159 press releases and statements to the 12,993 newspaper articles on climate change published between the German federal election on September 24, 2017, and the end of the collection period on December 31, 2020, I drew on computational measures of document similarity. While human interpretation is almost always superior to computational text analysis, it is infeasible for large document collections. In addition to the prohibitive costs of manual coding, human interpreters would likely find it difficult to quantify their similarity judgments on the 119,002,887 pairwise comparisons between newspaper articles and actors' press materials in a comparable manner. Computational measures that assess the similarity of different documents necessarily ignore many of the nuances captured by human interpreters, but can be useful to compare semantic attributes that indicate similar meaning for specific use cases. To account for the different lengths and language use in newspaper articles and press materials, I calculated the soft cosine similarity of each article-material pair to capture their closeness (Charlet & Damnati, 2017; Novotny, 2018; Sidorov et al., 2014).

The calculation of document similarity measures generally requires texts to be represented as word vectors. The similarity between two documents is then estimated based on the distance between the respective word vectors in space. Cosine similarity measures are frequently used for this task because the angle between two word vectors is unaffected by the length of the vectors (unlike, e.g., their Euclidian distance). While cosine similarity measures work well when documents use similar language, they are unable to account for synonymous expressions. Even with lemmatization, the estimated cosine similarity between two statements with very similar meaning such as ‘*Frau Merkel hielt eine Rede im Bundestag*’ (Mrs. Merkel gave a speech in the Bundestag) and ‘*Die Bundeskanzlerin sprach im Parlament*’ (The chancellor spoke in parliament) will thus be zero. In other words, cosine similarity measures alone are unable to capture paraphrases of actors’ press materials in newspaper articles, even if perspectives are adopted in their entirety. Soft cosine similarity measures were developed to overcome this problem and account for the similarity between synonymous expressions in estimating the cosine distance between two word vectors (Charlet & Damnati, 2017; Novotny, 2018; Sidorov et al., 2014). To this end, soft cosine similarity measures rely on word embeddings rather than individual or compounded words.

The intuition behind word embeddings is that words used in the same context often have similar meanings, and the meaning of words may differ across contexts. Hence, words like *Bundestag* and *Parlament*, which are often used in similar contexts, should be closer to each other than *Bundestag* and *Fabrik* (factory), which are seldom used in similar contexts. In addition, the word *Klima* (climate) likely refers to the meteorological phenomenon when used alongside terms like heat, rain, or zone, but to the quality of the work environment when used in the context of work, collaboration, and happiness. Word embeddings represent these contextual features as vectors, assigning greater values to words that are often used in the same contexts, and capturing similarities in the distance between word pairs. The resulting embedding vector for any word will thus have higher values for synonyms (and lower values for antonyms), but also for inflections of the same word, limiting the utility of lemmatization. In consequence, word embedding models are able to find the most similar terms for any word represented in the vector space and can even perform mathematical operations based on word associations such as *France - Paris + Germany = Berlin* (cf. Mikolov et al., 2013).

Word embeddings can enhance the performance of cosine similarity measures by providing a continuous value for the distance between two words. For the two statements introduced above, this means that soft cosine similarity measures will no longer assign the value

zero when two (compounded) words are not exactly the same, but instead use the continuous values stored in the word embedding vectors. Since '*Frau Merkel*' and '*Die Bundeskanzlerin*', '*eine Rede halten*' and '*sprechen*', and '*Bundestag*' and '*Parlament*' are all synonyms in the considered timeframe, the soft cosine similarity score will be closer to one than the simple cosine similarity score, reflecting the closeness in meaning between the two statements.

Word embedding models rely on neural networks to accurately capture the connections between words, which are usually trained on large, comprehensive corpora like Google books or Wikipedia and tend to include 300+ dimensions in their vector representation. Because the computational costs of training large word embedding models are prohibitive for most users, many applications draw on pre-trained models, which are available for many different languages including German (A. Müller, 2015). While these models are appropriate for the analysis of corpora matching the jargon and timeframe on which the word embeddings were trained, they are less suitable for more specific corpora or diverging timeframes because they may not contain all relevant words and assume different connections between word pairs. Both issues are relevant for the corpus of newspaper articles and press materials collected for the period 2017-2020. First, all documents in the corpus are newspaper articles or press materials about climate change, meaning that the corpus is very specific and patterns of association found in broader contexts may be misleading. Second, the German word embedding model was trained in 2015 and relevant words are therefore not represented or their associations are misrepresented in the model. To give an example, the word *Fridays* is most closely associated with the terms *Tuesday*, *the\_dark*, *Indeed*, *The*, *beginning*, *goes\_on*, *afternoon*, *fantastic*, *Thursday*, and *Saturday* in the pre-trained model, which obviously fails to capture the very relevant association with the student movement *Fridays for Future* founded in 2018. Naturally, the compounded word *Fridays\_for\_Future* does not exist in the pre-trained model.

In light of the poor performance of the pre-trained model, I trained two smaller word embedding models on the complete collection of newspaper articles and press materials (51,023 documents). This corpus is small compared to the larger collections used for pre-trained models, limiting the number of estimable dimensions for the resulting vector space. However, word embeddings trained on all (compounded) words occurring at least five times in the (non-)lemmatized corpora (128 dimensions<sup>15</sup>, 50 epochs, for more parameters see `word_embeddings.Rmd` in the replication materials) with the `Word2Vec` module from the

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<sup>15</sup> See Patel & Bhattacharyya (2017) for considerations on the optimal number of dimensions based on corpus size.

python package gensim (Rehurek & Sojka, 2011; the python implementation was used to ensure compatibility for subsequent analyses) returned more intuitively meaningful associations than the pre-trained model (see performance checks in `word_embeddings.Rmd` in the replication materials).

Here, *fridays\_for\_future* was most closely related to *fridays\_for\_future\_bewegung*, *fff*, *klimastreik*, *luisa\_neubauer*, *klimabewegung*, *klimaschutzbewegung*, *schülerin(nen)*, *schulstreik(s)*, *demos*, and *aktivistin*, accurately reflecting its use in the relevant period. To ensure that the word embedding models trained on the collection of newspaper articles and press materials outperform the pre-trained model for the calculation of document similarity scores, the performance of all three models was tested on a random sample of 100 newspaper articles x 100 press materials before soft cosine similarity scores were calculated for all article-material pairs (see `soft_cosine_similarity.Rmd` in the replication materials). Manual comparison of article-material pairs ranked as more or less similar confirmed that the results from the specific word embedding models matched the human interpretation more closely than the results from the pre-trained model. The differences between the two specific word embedding models trained on the (non-)lemmatized versions of the corpus were comparatively small and their results seemed equally plausible. Therefore, the soft cosine similarity for all article-material pairs was calculated once for each model.

Calculating the soft cosine similarity between newspaper articles and press materials required some additional document processing. Since soft cosine similarity measures have not yet been implemented in R, the corpora were transferred to the python environment in R markdown and converted to bags of words using the `corpora` module of the gensim package (Rehurek & Sojka, 2011). These bags of words were subsequently transformed into tf-idf (term frequency-inversed document frequency) matrices. This representation adds weights to the tokens in a corpus to account for their diverging discriminatory power. The idea is that words that occur more frequently in a document are more important for its meaning than words that occur less frequently. However, even after stopword removal, the most frequent terms may be ubiquitous across documents (e.g., the majority of documents in my corpus can be expected to use the term *Klima*), restricting their usefulness for document comparison. Hence, the term frequency weights are multiplied by their inverse document frequency to lower the weights for ubiquitous terms and give greater weight to terms that appear frequently within documents but are rare across documents. Finally, I used the `similarities` module from the gensim package (Rehurek & Sojka, 2011) to calculate the soft cosine similarity for all article-material pairs



based on the tf-idf matrices and the specifically trained word embedding models. The resulting similarity scores for the article-material pairs span the whole range between 0 and 1.

To measure how closely actors' perspectives were reproduced in the media, I identified the highest similarity score for each press material. I focus on the highest score rather than the mean or median because press materials will only be covered in a small number of articles in the newspaper corpus and I want to measure how closely related articles reproduced actors' perspectives. Since press materials may be covered in several newspapers or newspaper sections, I additionally identified the highest similarity scores for these subsamples. Some press materials did not receive any coverage in the collected newspapers (e.g., the announcement of a new climate fitness course at the VHS developed in collaboration with the *WWF*; ID: mat\_8512), whereas others were quoted almost verbatim (e.g., an interview with the deputy chair of the *Freie Demokratische Partei* (FDP) about changes in his party's climate policy strategy; IDs: mat\_5232, art\_11648). The second example shows that the similarity scores work well when press materials are paraphrased, but more extensive validation is required to test whether the similarity scores can capture degrees of contentual closeness beyond synonymous accounts. Looking at similarity scores around 0.8, the match between press materials and newspaper articles was still obvious. For instance, *Greenpeace* released a statement about their new study examining the sustainability strategy of the *European Central Bank* (ECB) on October 20, 2020:

„Weit mehr als die Hälfte der von der Europäischen Zentralbank (EZB) erworbenen Unternehmensanleihen (63 Prozent) stammt aus wenigen Sektoren, die mit ihrem CO<sub>2</sub>-Ausstoß massiv zur Klimakrise beitragen. Zu diesem Ergebnis kommt eine gemeinsame Studie von Greenpeace, der New Economics Foundation (NEF), der SOAS University of London, der University of the West of England und der University of Greenwich. Ausgangspunkt für die Analyse sind die von der EZB im Rahmen ihres Ankaufprogramms CSPP erworbenen Bestände an Unternehmensanleihen mit einem Umfang von 242 Milliarden Euro Ende Juli. „Die EZB braucht eine klimafreundliche Neuausrichtung. Dafür muss sie ihre Geldpolitik schleunigst in Einklang mit den Pariser Klimazielen bringen und damit den Rahmen für ein grünes europäisches Finanzwesen setzen“, sagt Mauricio Vargas, Finanzexperte von Greenpeace. [...]“ (ID: mat\_5799).

On October 21, 2020, the FR published an article titled “Greenpeace fordert grüne EZB”, starting with general remarks about the sustainability strategy of the *ECB* before paraphrasing the press release:

„Die Präsidentin der Europäischen Zentralbank (EZB), Christine Lagarde, gibt sich grün. Alle EZB-Geschäfte – inklusive des Anleihekaufprogramms – sollten dahingehend geprüft werden, „ob sie den Klimawandel bekämpfen“, kündigte sie Anfang Juli in einem Interview an. „Denn am Ende des Tages entscheidet das Geld“, sagte sie. Damit wäre die EZB die erste große Zentralbank weltweit, die explizit Nachhaltigkeitsziele unterstützt. Wie stark die EZB ihre Kaufstrategie verändern müsste, zeigt nun eine Studie, die von Greenpeace initiiert wurde. Danach stammt mit 63 Prozent mehr als die Hälfte der von der Zentralbank erworbenen Unternehmensanleihen aus Branchen, die mit einem hohen CO<sub>2</sub>-Ausstoß massiv zur Klimakrise beitragen. „Die EZB braucht eine klimafreundliche Neuausrichtung. Dafür muss sie ihre Geldpolitik schleunigst in Einklang mit den Pariser Klimazielen bringen und damit den Rahmen für ein grünes europäisches Finanzwesen setzen“, kommentierte Greenpeace-Finanzexperte Mauricio Vargas. [...]“ (ID: art\_14163)

While the newspaper article added some information and omitted some technical details, the interpretation that *Greenpeace* conveyed in their statement was completely reproduced, including the direct quotes. For article-material pairs with similarity scores around 0.6, the contentual reference remained clear, though articles tended to add a narrative around the facts presented in the press materials. For example, the environmental organization *350.org* informed about joint protests of Pacific Islanders and anti-coal activists on November 5, 2017:

„Pazifische Inselbewohner und Massenblockaden von Tagebau fordern gemeinsam sofortigen Kohleausstieg – Heute haben Pazifische Inselbewohner und tausende Menschen aus der ganzen Welt im Rheinischen Braunkohlerevier protestiert, um den sofortigen Ausstieg aus fossilen Brennstoffen zu fordern. Während Tausende den Tagebau Hambach blockierten, zeigten sich die „Pacific Climate Warriors“ solidarisch mit den Menschen, die in Deutschland unter den Auswirkungen der Kohleförderung leiden und Widerstand leisten. „Deutschlands Braunkohletagebaue

gehören zu den größten Kohleminen der Welt. Wenn wir sie nicht dicht machen, bleibt uns Menschen von den südpazifischen Inseln keine Chance. Wir sind hier um unser Land, unsere Kultur und unsere Identität zu beschützen”, so Zane Sikulu, Climate Warrior aus Tonga.“ (ID: mat\_11)

On November 6, 2017, the FR published an article about the protests that included the information from the press materials but added more of a human interest angle:

„Wie weitläufig so ein Braunkohletagebau ist, kann sich Joseph-Zane Sikulu nicht vorstellen, denn er hat noch nie einen gesehen. Aber Sikulu weiß, dass die Braunkohle, die dort abgebaut wird, indirekt etwas mit seinem Leben zu tun hat. Der Klimaaktivist mit dem freundlichen Gesicht und dem Bart ist nach Deutschland gekommen, um für den Kohleausstieg zu demonstrieren. Sein Heimatland, der Inselstaat Tonga im Pazifik, liegt nur wenige Meter über dem Meeresspiegel und ist besonders vom Klimawandel bedroht. Auf der Demo am Samstag in Bonn gehört Aktivist Sikulu von der Gruppe "Pacific Climate Warriors" zu den Ehrengästen. An die 25 000 Menschen sind zusammengekommen, um für mehr Klimaschutz und den Kohleausstieg zu demonstrieren. [...]“ (ID: art\_15177)

Compared to article-material pairs with similarity scores around 0.8, actors' press materials were edited more heavily, indicating that the similarity scores indeed capture degrees of contentual closeness in this range of the measure. What the similarity scores cannot capture is the effect of these editions on the persuasiveness of the presented perspective, as some added narratives strengthened the interpretations promoted in actors' press materials, whereas other additions were more neutral. Articles with similarity scores around 0.6 did not usually contrast the perspective promoted in the press material with other views, suggesting that actors' issue interpretations remained largely intact in the newspaper coverage. For similarity scores around 0.4, press materials and newspaper articles still addressed the same topic or event, but press materials were no longer referenced directly. To illustrate, the environmental organization *BUND* reported on their campaign to accelerate the coal phase-out on March 13, 2020:

„Bundesrat eingenebelt – BUND-Aktion für schnellen Kohleausstieg. Nach der ersten Lesung im Bundestag berät der Bundesrat heute über das geplante

Kohleausstiegsgesetz. Der Bund für Umwelt und Naturschutz Deutschland (BUND) fordert einen deutlich schnelleren Ausstieg bis spätestens 2030. [...] Damit die Forderung, Datteln 4 nicht ans Netz zu lassen, auch bis nach Finnland dringt, nutzt der BUND alle Hebel: So hat der Verband einen Online Appell an die finnische Regierungschefin Sanna Marin gestartet, da der finnische Staat über den Konzern Fortum demnächst Mehrheitseigner an dem Kraftwerk wird. Fortum ist Großaktionär beim Düsseldorfer Energiekonzern Uniper, der Datteln 4 im Sommer in Betrieb nehmen will. Und der BUND-Landesverband in Nordrhein-Westfalen prozessiert seit Jahren gegen das Kraftwerk – bislang juristisch immer erfolgreich. „Wir tragen unseren Protest bis nach Helsinki. Die Bundesregierung versagt, doch die finnische Regierung kann das Kraftwerk noch stoppen“, sagt Bandt.“ (ID: mat\_2823)

The closest newspaper article, published in the taz on March 17, 2020, likewise addressed the conflicting message sent by activating Datteln 4 against the background of the planned coal phase-out. However, the article did not reference the *BUND* campaign, instead quoting several other critical actors from the scientific and civil society domains:

„Peter Lund, Physikprofessor und Experte für Energietechnik an der finnischen Aalto-Universität, kann die Proteste der Klimabewegung verstehen: „Jetzt mit einem neuen Kohlekraftwerk ans Netz zu gehen würde ein ganz schlechtes Signal an Länder wie Indien oder China schicken, von denen wir ja erwarten, dass sie ihre Emissionen senken und keine neue Kohlekraft bauen.“ Angesichts der Klimaziele, die man sich gesetzt habe, sei das, was Uniper vorhabe, „direkt kontraproduktiv“. Es geht um Datteln 4. Das Steinkohlekraftwerk, das der Energiekonzern Uniper im Frühsommer in Betrieb nehmen möchte, ist auch in Finnland zu einem heißen Thema geworden. Uniper gehört derzeit zu 49,99 Prozent dem finnischen Fortum-Konzern – demnächst werden es über 70 Prozent sein. Und Fortum wiederum gehört mehrheitlich dem finnischen Staat. [...] Den Unmut der Klimabewegung bekam Finnlands Ministerpräsidentin Sanna Marin schon bei ihrem Antrittsbesuch bei Bundeskanzlerin Angela Merkel Mitte Februar in Berlin zu spüren. DemonstrantInnen forderten die Sozialdemokratin auf, alles in ihrer Macht Stehende zu tun, um Datteln 4 zu stoppen.“ (ID: art\_34795)

While the position expressed in the article matches the general position of the *BUND* on the activation of Dattel 4, the content is clearly less similar than for article-material pairs with higher similarity scores. The coverage thus benefits the *BUND* insofar as it may increase public support for their interpretation, but the missing reference to their campaign makes it more difficult for audiences to link the presented positions to the *BUND* and their work. Hence, lower similarity scores are associated with less similar meanings of the compared press materials and newspaper articles. For article-material pairs with similarity scores around 0.2, the captured contentual overlap is still discernible, but markedly less relevant. To give an example, the AfD released a statement on December 18, 2019, that criticized the climate package implemented by the governing parties:

“Die CO2-Klimahysterie ist kein guter Ratgeber – die Zeche zahlt der Bürger – Alternative für Deutschland. Der stellvertretende Bundessprecher Stephan Brandner, Vertreter der AfD-Bundestagsfraktion im Vermittlungsausschuss, hat das Ergebnis der Sitzung vom 18. Dezember 2019 zum Klimapaket der Bundesregierung als ernüchternd bezeichnet und begründet die Ablehnung durch die AfD-Fraktion: „Wir von der AfD-Fraktion haben versucht, die durch Klimahysterie geprägte Gesetzgebungsmaschinerie anzuhalten; leider waren wir nur zwei von 32, so dass es nicht klappte. Es gab zwar gute Ansätze, wie die Senkung der Mehrwertsteuer auf Bahnfahrkarten und die Erhöhung der Pendlerpauschale. Insgesamt ist es aber ein schlechtes Gesetzespaket, das für das Weltklima nichts bringen wird. Es ist daher überflüssig, kompliziert, es wird sehr teuer für den Bürger und ist in Teilen verfassungswidrig. Die schlechte Krönung ist die neue und sehr hohe Steuer auf CO<sub>2</sub>, die wir ablehnen, genauso, wie das gesamte Gesetzesvorhaben und das Vermittlungsergebnis.“ (ID: mat\_697)

Almost a month later, on January 15, 2020, the FAZ published an article about ‘climate hysteria’ being named the ugliest word of the year:

„Das Unwort des Jahres 2019 lautet „Klimahysterie“. Die AfD-Politikerin Beatrix von Storch benutzt es trotzdem weiter. Oder gerade deswegen? Am Dienstag schrieb sie auf Twitter: „Klimahysteriker erklären Klimahysterie zum Unwort. Ok. Wir ersetzen es sowieso besser durch: Klimaphobie, Klimapsychose, (...)“

Klimaextremismus (...) Sucht es Euch aus, Ihr Klimahysteriker!“ Die sprachkritische Aktion "Unwort des Jahres" will sich mit der Wahl von "Klimahysterie" gegen die Diffamierung von Klimaaktivisten stellen. „Der Begriff pathologisiert pauschal das zunehmende Engagement als eine Art kollektive Psychose“, sagte Nina Janich, die Sprecherin der Jury, am Dienstagvormittag in Darmstadt. [...]” (ID: art\_11674)

Both the press statement and the newspaper article referred to the AfD and their use of the term ‘climate hysteria’, but the article only hinted at the AfD’s general position on climate change through the quoted tweet. In consequence, the coverage may increase audiences’ awareness of the AfD’s stance but does not offer much more information than being mentioned in association with an issue and is therefore less suited to shape public perceptions than coverage with higher similarity scores. While still addressing the same subject area, article-material pairs with even lower similarity scores around 0.05 are too dissimilar to benefit actors’ agendas. For instance, the *Energie Baden-Württemberg AG* (EnBW) announced a new syndicated credit line on February 14, 2019:

„Die EnBW Energie Baden-Württemberg AG hat gestern eine syndizierte Kreditlinie mit einem Volumen von 1,5 Milliarden Euro plus einer Erhöhungsoption um 500 Millionen Euro unterzeichnet. Die Kreditlinie, die als sogenannter syndizierter Kredit von mehreren Banken gewährt wird, wird für allgemeine Geschäftszwecke genutzt und ersetzt vorzeitig die bestehende im Juli 2021 fällige syndizierte Kreditlinie. Neu ist die Koppelung der Finanzierungskosten an die Nachhaltigkeits-Performance der EnBW. Das bedeutet abhängig vom Grad der Zielerreichung ausgewählter Nachhaltigkeitsindikatoren reduzieren oder erhöhen sich die Kreditkosten der EnBW. [...]“ (ID: mat\_4609)

The closest newspaper article was published in the SZ on February 25, 2019. It addressed the increasing tendency to consider the sustainability of investments observed in international financial markets, as well as political action to promote this development:

„Vorige Woche ist es der Schweizer Rohstoffkonzern Glencore, der die Bremse zieht. Das Unternehmen verpflichtete sich künftig auf die Ziele des Pariser

Klimaabkommens, ließ Glencore wissen. Daran wolle man Investitionen fortan messen. Für ein Bergbauunternehmen, das massiv in Kohleminen investierte, ein bemerkenswerter Schritt. Eine Investorengruppe hatte Glencore zu der Kehrtwende gebracht, die „Climate Action 100+“. Dahinter stehen 310 Investoren oder in US-Dollar: 32 Billionen. Das ist Macht. Finanzmärkte, die Firmen zu ökologischem oder sozialem Handeln bewegen – das Thema wird immer bedeutender, auch hierzulande. Diesen Montag tritt in Berlin der „Staatssekretärsausschuss für nachhaltige Entwicklung“ zusammen, das wichtigste ständige Regierungsgremium in Sachen Nachhaltigkeit. Diesmal geht es auch ihm um die Macht des Geldes. „Deutschland“, so heißt es in einer internen Vorlage für das Treffen, „soll zu einem führenden Sustainable Finance-Standort werden.“ [...]“ (ID: art\_21713)

The similarity scores thus seem well suited to capture degrees of closeness between press materials and articles, and broader tendencies in the automated classification conform to human interpretations. In contrast, more fine-grained differences in the closeness of article-material pairs, for instance with similarity scores of 0.51 and 0.52, is not immediately apparent to the human interpreter. Although manual coding would have resulted in much broader categories, there is no indication that the finer nuances captured by the similarity scores represent the closeness between press materials and articles inaccurately. The greater variation captured by the automated measure may thus offer an advantage over indicators based on manual classification for the subsequent analyses. The manual validity checks did not reveal any perceptible differences in the performance of the indicators based on the non-lemmatized and the lemmatized version of the corpus, which are highly correlated (Pearson's  $r$  0.96). However, the two indicators rank the closeness of the article-material pairs slightly differently and effects were thus estimated for both measures to ensure the robustness of the results. Both indicators are plausibly distributed, as the similarity between press materials and newspaper articles is generally low. Only 26 percent of the press materials received similarity scores above 0.2, ten percent received scores above 0.3, four percent received scores above 0.4, and less than 0.5 percent received scores above 0.6.

### *The Temporal Connection Between Press Materials and Articles*

For press materials that were closely reproduced in the newspaper coverage of climate change, the highest similarity score can be expected to represent an article based directly on the press material. While such articles will usually be published shortly after the press material has been released, the considered timeframe for the comparison between press materials and articles is largely irrelevant. However, when newspaper articles represent press materials less closely, the article with the highest similarity score may cover a similar perspective independent of the tested press material. Although any newspaper article that conveys actors' perspectives can benefit them, articles matching their perspectives only incidentally are less likely to be informative with regard to their agenda-building ability. Therefore, I calculated the highest similarity score for newspaper articles published in the 30 or 90 days following the release of press materials, as well as for the entire legislative period.

The similarity scores for the different timeframes are the same if the closest article was published within 30 days of the press material, but matches in the 30-day frame are more likely to be based on actors' press materials, and therefore to reflect their influence over the media agenda, than matches in the longer timeframes. Since the 30-day frame still allows for intermedia agenda-setting and coverage in several newspapers, it should be better suited to test the effect of the agenda-building factors on the similarity between actors' press materials and newspaper coverage of climate change than the longer timeframes. On the other hand, the similarity scores for the entire legislative period offer interesting insights about the general visibility of actors' issue interpretations in the media, as actors whose perspectives were more closely reproduced during this timeframe likely benefitted most from the media's influence over public perceptions. This timeframe is therefore particularly interesting for the descriptive analysis. The 90-day frame serves as an intermediate reference to test the sensitivity of any observed effects to the considered timeframe.

As explained above, the highest similarity scores for the three timeframes were calculated separately for each collected newspaper and newspaper section, as well as for the entire corpus. Newspapers with different ideological positions likely favor perspectives that match their readers' preferences and could thus cover press materials released by actors who promote different climate change interpretations at different rates. Moreover, newspapers that addressed climate change in fewer articles may have relied on different criteria to select the covered press materials than newspapers that dedicated larger coverage shares to the issue (cf. Figure 4.1), as



the salience of climate change in the coverage may have influenced the relative importance of individual agenda-building factors (see *Changes in Issue Salience* in Chapter 2.5). The salience of climate change varied even more across newspaper sections (see Figure 4.2), which can moreover be expected to favor actor groups relevant to their focus and to attach more or less weight to domain-specific agenda-building factors. Accordingly, executive authority and issue-specific relevance may be relatively more important for coverage in the politics section, economic weight in the economy section, and scientific expertise in the science section. On the other hand, domain-specific factors could be more relevant for coverage in sections that give less attention to the perspectives of actors from the respective domain, as journalists may rely on the domain-specific factors as readily available selection criteria.

### ***The Exclusivity of Media Coverage***

To measure how exclusively the newspaper article identified as the closest match covered actors' press materials, I first calculated the number of other press materials that were similarly close or even closer to the relevant article, i.e., that had similarity scores larger than or equal to the tested press material. Since each newspaper article was compared to 9,159 press materials, the resulting indicator ranges between 0 and 9,158, with higher values indicating less exclusive coverage. To further differentiate the exclusivity of coverage for press materials that were most similar to the closest newspaper article, I additionally calculated the distance between the similarity score for the tested press material and the next highest similarity score for the closest newspaper article (minimum = 0, maximum = 0.8). For this second indicator, larger distances indicate more exclusivity. To match the direction of the first indicator, it was therefore subtracted from one. For the final exclusivity measure, zero values in the first indicator were replaced with the value of the second indicator, resulting in a measure with continuous values between 0 and 1 that ranges from 0.2 to 9,158. Since the exclusivity indicator compares the similarity score for a specific article-material pair with the similarity scores for other article-material pairs, it was calculated for the same timeframes as the similarity scores, and separately for individual newspapers and newspaper sections.

### *Journalistic Evaluations of Actors' Perspectives*

Measuring the evaluation of the covered perspectives is not straightforward, especially when the similarity between press materials and newspaper articles is low. As a first step, I calculated sentiment scores for the newspaper articles as well as the press materials as the ratio of positive to negative words identified based on *Rauh's German Political Sentiment Dictionary* from the sentiment module of the *quanteda* package (Benoit et al., 2018). The dictionary was trained on manually coded parliamentary speeches, party manifestos, and media coverage, and should therefore be well suited to detect the sentiment of press materials and newspaper articles (Rauh, 2018). The dictionary can also process bigrams, allowing me to adapt the code to recognize negated expressions and classify them as the opposite of the detected sentiment (see `sentiment_analysis.R` in the replication materials for the adaptation). However, newspaper articles with positive (negative) sentiment scores cannot simply be assumed to evaluate the presented issue interpretation positively (negatively), since the issue interpretation itself influences the sentiment score. For instance, a short press release from the environmental organization *360.org* stating that the New York Attorney is filing a lawsuit against ExxonMobil for defrauding shareholders and downplaying the risks of climate change (ID: `mat_127`) received the lowest possible sentiment score (-1). If this statement was paraphrased in a newspaper article, the sentiment score for this article would be similarly low, yet the negative score would not indicate that the article evaluated the presented perspective negatively.

Hence, I calculated the difference between the sentiment score for each press material and the sentiment score of the closest newspaper article to measure journalistic evaluations. The resulting measure ranges from -2 to 2, with observed values between -1.57 and 1.36. Negative values indicate that newspaper articles used more negative language than the press material, whereas positive values suggest more positive language. This indicator adequately captures evaluative tendencies when newspaper articles largely reproduce the content of press materials, but is less informative when articles only present some elements of the press material or contrast several perspectives. To give an example, the environmental organization *Naturschutzbund Deutschland* (NABU) informed about the findings of a new study attesting that the carbon dioxide balance of liquefied natural gas (LNG) is worse than previously assumed on January 28, 2020:

„Laut einer neuen Studie des International Council on Clean Transportation (ICCT) führt Flüssigerdgas (LNG) als Schiffskraftstoff zu 70 bis 82 Prozent höheren Treibhausgasemissionen im Vergleich zu Marinediesel. Diese Zahlen sind alarmierend, da immer mehr Schiffsbetreiber auf LNG zurückgreifen. Der ICCT-Bericht untersucht die Treibhausgasemissionen aus Schiffskraftstoffen über den gesamten Lebenszyklus, einschließlich der unbeabsichtigten Freisetzung von extrem klimaschädlichem Methan aus Schiffsmotoren, der sogenannte Methanschupf. Die Autoren fanden heraus, dass die Verwendung von LNG die Klimawirkung der Schifffahrt im Vergleich zu Marinediesel tatsächlich verschlechtern kann, wenn man die Emissionen betrachtet, die über einen Zeitraum von 20 Jahren emittiert werden würden. [...]“ (ID: mat\_6990)

On February 7, 2020, the Welt published an article referring to the *NABU* statement with a similarity score of 0.65 and a sentiment score of 0.32, which added positive evaluative cues to the original statement by emphasizing the credibility of the cited report:

„Wenn es sich um irgendein Forschungsinstitut handeln würde, das diese Erkenntnisse zu Tage bringt, dann wäre die Aufmerksamkeit vermutlich nicht sonderlich groß. Doch in diesem Fall ist es das International Council on Clean Transportation (ICCT), deutsch etwa Internationaler Rat für sauberen Verkehr. Und genau diese Wissenschaftler aus Washington waren es, die im Herbst 2015 den VW-Abgasskandal maßgeblich mit aufgedeckt haben. Zusammen mit der West Virginia University hatten die Forscher damals herausgefunden, dass bei Abgasmessungen mehrerer VW-Dieselaufos auf der Straße statt wie üblich im Labor ein Stickoxidausstoß weit über den zulässigen Höchstwerten herauskam. Eben diese renommierten Forscher nehmen sich nun die Schifffahrt vor und untersuchen dabei den derzeit angesagtesten Treibstoff, das Liquefied Natural Gas (LNG), also verflüssigtes Erdgas. [...] Umweltverbände reagieren prompt auf die ICCT-Studie. "Der Wechsel von Schiffen zu LNG ist sogar klimaschädlicher als so weiter zu machen wie bisher", sagte Leif Miller, der Bundesgeschäftsführer des Naturschutzbundes Deutschland (Nabu). [...]“ (ID: art\_39286)

In comparison, on January 15, 2020, *Greenpeace* announced their support for a constitutional complaint against lax national climate policies filed by several young climate activists:

„Neun junge Menschen aus der gesamten Bundesrepublik werden im Januar Verfassungsbeschwerde in Karlsruhe einlegen, weil das schwache Klimaschutzgesetz ihre Grundrechte nicht ausreichend schützt. Mit dabei: Luisa Neubauer, Mitbegründerin der deutschen Fridays-for-Future-Bewegung, Lueke Recktenwald von der Nordseeinsel Langeoog sowie alle sieben Jugendliche und junge Erwachsene der drei Bauernfamilien, die 2019 gemeinsam mit Greenpeace die Bundesregierung auf Einhaltung des Klimaschutzziel 2020 verklagt hatten. [...] „Die junge Generation muss es in der Zukunft ausbaden, wenn die Politik heute im Klimaschutz versagt. Deshalb brauchen wir kein halbherziges Klimaschutzgesetz, sondern einen gesetzlichen Rahmen, der garantiert, dass Deutschland seinen Treibhausgasausstoß vor 2040 auf nahe Null reduziert“, sagt die Greenpeace-Klimaexpertin Anike Peters. [...]“ (ID: mat\_5690)

The corresponding article published in the FR on January 16, 2020, likewise has a similarity score of 0.65. However, the article uses more neutral and descriptive language than the *Greenpeace* statement, as well as negatively connotated words like ‘*erzwingen*’ (*to force*), resulting in a sentiment score of -0.45:

„Junge Klimaaktivisten und mehrere Umweltorganisationen wollen vor dem Bundesverfassungsgericht mehr Klimaschutz erzwingen. Insgesamt drei neue Verfassungsbeschwerden gegen den Bundestag und die Bundesregierung stellten Greenpeace, die Deutsche Umwelthilfe (DUH) und Germanwatch am Mittwoch in Berlin vor. Die jungen Klägerinnen und Kläger argumentieren, dass das 2019 beschlossene Klimaschutzgesetz ihre Grundrechte nicht ausreichend schützt. An Bord ist auch Luisa Neubauer von "Fridays for Future": "Das Besondere an unserer Zeit ist, dass wir gerade noch handeln können", sagte sie bei der Vorstellung. "Das Möglichkeitsfenster schließt sich in einem rapiden Tempo." Es sei unverständlich, dass die Bundesregierung ihrer Verantwortung nicht gerecht werde, sagte Neubauer. Die Verfassungsbeschwerden seien die logische Fortsetzung der Massenproteste 2019. [...]“ (ID: art\_13961)

Hence, differences in the sentiment scores capture variations in the journalistic evaluation of actors' press materials that correspond to human interpretations for article-materials pairs with relatively high similarity scores. On the other hand, the sentiment scores are less well suited to measure differences in journalistic evaluations for article-material pairs with lower similarity scores, which address the same topic or event without an overt reference to the tested press material. For instance, the steel manufacturer *thyssenkrupp* announced that the non-profit organization *Carbon Disclosure Project* named it an international leader in climate protection on January 20, 2020:

„Der Klimaschutz bei thyssenkrupp findet weltweite Anerkennung: Zum vierten Mal in Folge hat die non-profit Organisation CDP (ehemals Carbon Disclosure Project) den Konzern als international führendes Unternehmen im Klimaschutz ausgezeichnet. Der Essener Konzern ist eines von 179 internationalen Unternehmen auf der „Klimaschutz A-Liste“ von CDP. An der Bewertung haben insgesamt 8.400 Unternehmen teilgenommen. [...] Martina Merz, Vorsitzende des Vorstandes der thyssenkrupp AG: „Das Ranking bestätigt, dass wir auf dem richtigen Weg sind, unseren CO<sub>2</sub>-Fußabdruck in der Produktion und bei unseren Produkten konsequent zu verringern. Dabei betrachten wir Klimaschutz nicht nur als Verpflichtung, sondern auch als Chance für neue Geschäfte.“ Gemäß seiner Klimastrategie will thyssenkrupp bis 2050 klimaneutral sein, nicht nur bei den eigenen Prozessen und der eingekauften Energie, sondern auch bei den Emissionen seiner Produkte. [...]“ (ID: mat\_7713)

On February 1, 2020, the SZ published an article about the challenges facing *thyssenkrupp*'s new chief executive, which mentioned the company's ambitious climate change goals but focused mainly on the massive losses in the current financial year:

„Martina Merz spricht aus, was sich alle in der Kongresshalle wünschen. „Wir wollen ein Thyssenkrupp schaffen“, sagt die Konzernchefin, „das Geld verdient, Dividende zahlt, klimaneutral wirtschaftet und seinen Mitarbeitern damit eine langfristige Perspektive bietet.“ Das Problem ist nur: Deutschlands größter Stahlhersteller, der seine Aktionäre nun zur Hauptversammlung geladen hat, ist von all diesen Zielen meilenweit entfernt. Beispiel Geldverdienen: Im jüngsten

Geschäftsjahr hat Thyssenkrupp 260 Millionen Euro Verlust eingefahren. Für dieses Jahr erwartet der größte Industriekonzern des Ruhrgebiets noch schlechtere Zahlen, auch weil er 6000 Stellen abbauen will und Abfindungen zahlen muss. „Die Ausschüttung einer Dividende wäre in dieser Lage nicht vertretbar“, sagt Merz. In Sachen Klimaschutz hat Thyssenkrupp zwar hehre Ziele, doch noch sind die Hochöfen einer der größten CO<sub>2</sub>-Emittenten der Republik. [...]“ (ID: art\_22306)

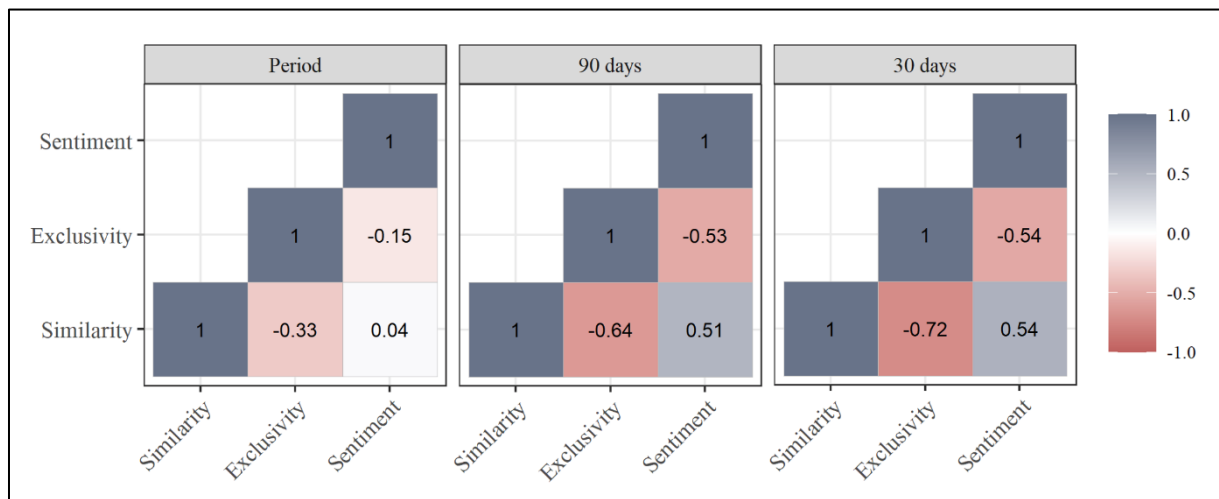
As indicated by the similarity score of 0.36, the press release and the article both refer to *thyssenkrupp* and its performance in climate protection. The sentiment score of -0.66 additionally suggests that the article includes negative evaluative cues, which is accurate insofar as the article expresses skepticism regarding the company's climate change goals and is thus more negative than the tested press material. However, the negative language in the article partly relates to the company's financial issues, biasing the sentiment score downward. Although the lower accuracy for article-material pairs with low similarity scores suggests that this measure includes considerable noise, the journalistic sentiment scores still capture broader evaluative tendencies in the manually inspected random sample of article-material pairs (see *material\_similarity.R* in the replication materials). In consequence, the results can provide a first intuition regarding the influence of actors' characteristics on journalists' evaluations, but cannot be expected to capture nuanced differences, limiting the explanatory power of the corresponding analyses. Like similarity and exclusivity, journalistic sentiment scores depend on the identified newspaper article and were therefore calculated separately for the three timeframes, individual newspapers, and newspaper sections.

### ***Connecting the Reception Metrics***

Although similarity, exclusivity, and journalistic sentiment capture different aspects of the reception of actors' press materials in newspaper articles, these indicators should be correlated on the actor level if they are at least partly determined by the same agenda-building factors. Figure 4.4 shows the correlation between the reception metrics for the three timeframes, confirming that similarity and journalistic sentiment are positively correlated and that both are negatively correlated with exclusivity. These correlations are in line with the expectation, as higher values for similarity and journalistic sentiment indicate that actors' perspectives are covered more closely and more positively, but higher values for exclusivity suggest less

exclusive coverage. The strength of the correlations varies across the three timeframes, with somewhat higher correlations in the 30-day frame than in the 90-day frame and considerably weaker correlations in the full legislative period. This pattern dovetails with the notion that matches in the 30-day frame are more likely to reflect actors' ability to build the media agenda than matches in the longer timeframes. In other words, the three reception metrics may plausibly be determined by the same set of agenda-building factors only in the shorter timeframes, and the strength of the correlations does not rule out that individual agenda-building factors affect similarity, exclusivity, and journalistic sentiment differently.

**Figure 4.4: Correlation of the reception metrics**



**Notes:** Depicted are Pearson correlation coefficients for the soft cosine similarity between actors' press materials and the closest newspaper article (Similarity), the exclusivity of the closest newspaper article (Exclusivity), and the difference between the sentiment scores of actors' press materials and the closest newspaper article (Sentiment) with reference to newspaper articles published in the entire legislative period (Period), 90 days after the press material was issued (90 days), or 30 days after the press material was issued (30 days). Observations are summarized at the actor level to account for the clustering of the data. All correlations are statistically significant at the 95 percent confidence level. The depicted correlations are based on the non-lemmatized corpus. For the substantively unchanged correlations of the reception metrics in the lemmatized corpus, see Appendix 4.

## Summary

To measure the similarity between actors' press materials and newspaper articles on climate change, press releases and statements referring to climate change or the environment issued during the most recent legislative period were collected from the websites of the most visible actors from each domain. After removing duplicates and materials using the keywords in irrelevant contexts, the sample consisted of 9,159 press materials released by 64 collective actors. Materials in languages other than German were automatically translated to German,

before HTML formatting, hashtags, @-mentions, hyperlinks, digits, punctuation, redundant spaces, and stopwords were removed from the materials. Moreover, meaningful bigrams were compounded and one version of the press material corpus was lemmatized to match the pre-processing of the 12,993 newspaper articles collected for the most recent legislative period. To account for different lengths and linguistic conventions, the closeness of each article-material pair was calculated as their soft cosine similarity drawing on word embedding models trained on the entire corpus of newspaper articles and press materials.

The resulting similarity matrix was used to determine the highest similarity score for each press material in reference to the entire legislative period, as well as 90-day and 30-day timeframes following the release of the press material. In addition, the highest similarity scores across the three timeframes were determined separately for each newspaper and newspaper section. The exclusivity indicator captures the number of press materials that are as or more similar to the closest newspaper article as the tested press material. In case the tested press material had the highest similarity score, the exclusivity indicator measures the distance to the next closest press material. To capture journalistic evaluations of the presented issue interpretations, I calculated the difference between the sentiment scores for the tested press material and the closest newspaper article. The correlations between similarity, exclusivity, and journalistic sentiment confirm that these metrics could be determined by the same set of agenda-building factors in the shorter timeframes.

### 4.4 Measuring the Agenda-Building Factors

To understand why some actors are better equipped to build the media agenda than others, the agenda-building factors introduced in Chapter 2.4 need to be operationalized for each actor in the dictionary. In the following sections, I describe the indicators used to measure each factor except personal expertise and their sources. Personal expertise on climate change is easily conceivable, for instance when actors are negatively affected by extreme weather events (cf. Howe et al., 2014; Konisky et al., 2016). However, the personal expertise of German actors on the issue will usually seem negligible compared to international actors, whose livelihoods and living spaces are acutely threatened, and personal expertise cannot be meaningfully measured for the many organizational actors in the dictionary. Therefore, actors' personal expertise will not be considered in the analysis. This leaves nine factors that can be expected to shape actors' ability to build the media agenda in the case at hand: *executive authority*, *issue-specific*



*relevance, economic weight, scientific expertise, issue ownership, prominence, surprise, controversy, and consonance.* The last three factors are contentual but can be linked to actors' novelty and their mainstream or challenger status. Since established measures for most of these factors are unavailable, I drew on various data sources and sometimes used alternative operationalizations to capture individual factors (see Appendix 5 for information on the coding and distribution of all independent variables).

### ***Executive Authority and Issue-Specific Relevance***

Executive authority and issue-specific relevance both relate to actors' political offices. Hence, I constructed two categorical variables based on the office an actor held during the relevant legislative period. The variable for executive authority distinguishes actors who held the chancellorship (3) from actors in ministerial offices (2), party chairpersons (1), and other actors (0). The variable for issue-specific relevance differentiates federal environment ministers (2), state environment ministers (1), and other actors (0). Both factors are specific to the political domain and thus unattainable for non-political actors, who were coded as 0. The information about actors' political offices was obtained from Wikipedia entries on the composition of the national and state parliaments and the cabinet in the respective legislative period and verified using official parliamentary websites and the résumés provided on actors' personal websites. Because press materials could only be collected for collective political actors, executive authority was measured with two dummy variables indicating whether an actor was affiliated with the political domain (1) or not (0) and whether an actor was affiliated with the current government parties (1) or not (0) for the second part of the analysis. These indicators are less suited to measure degrees of executive authority but still capture the concept. In contrast, issue-specific relevance could not be operationalized for collective actors.

### ***Economic Weight***

To measure economic weight, I drew on the Top 100 Companies Panel provided by the German Monopolies Commission, which provides information about the Top 100 companies according to the value added to the national economy and the size of their workforces alongside other economic indicators (Buchwald et al., 2021). To account for the numerous name changes that companies underwent over the studied period, in many cases due to mergers or acquisitions,

actors were manually matched to the Top 100 Companies Panel.<sup>16</sup> I constructed two different indicators that measure the share of the value added to the German economy and the share of the German workforce employed by the actor.<sup>17</sup> Although individual business actors were identified based on their inclusion in the panel, the indicators exhibit considerable variation because identified actors were included in the dictionary for all legislative periods. Since economic weight is specific to business actors, both indicators were coded as 0 for actors from other domains.

The first indicator measures actors' contribution to the national economy as a percentage of the total domestic value added for actors who were ranked among the Top 100 German companies. For collective actors, this indicator equals the sum of the value added by their listed members as a percentage of the total domestic value added.<sup>18</sup> Similarly, the second indicator measures the number of employees that a company or the members of an association ranked among the Top 100 German companies represented as a percentage of the total domestic workforce. I focus on the companies that contributed most to the German economy in the respective year because these companies were most likely to perceptibly influence the national economy and, thus, affect people's lives. Although this operationalization cannot account for the economic weight of associations that represent a multitude of smaller companies whose combined added value or workforce is large enough to impact the national economy, the kind of concerted action required to exert this influence seems unlikely. Hence, associations plausibly have more economic weight than their individual members, but this weight should be more easily perceived if at least some of their members are economic heavyweights.

Nonetheless, the indicators for actors' economic weight are biased toward larger companies, for whom reliable data on their value added and number of employees is available, and are thus less well suited to explain the agenda-building ability of associations representing

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<sup>16</sup> Previous names and ownership constellations were researched on actors' official websites and Wikipedia entries.

<sup>17</sup> Data on the value added to the German economy (in million euro) and the total domestic value was collected from the German Monopolies Commission's annual report and additional surveys. Data on the number of employees and the total number of employees in Germany refers to employees with mandatory social security contributions paid in Germany (Buchwald et al., 2021). For the second part of the analysis, data on the value added and the number of employees for *Porsche* was manually added from their annual report for the most recent legislative period, since this actor was not among the Top 100 German Companies in the relevant years.

<sup>18</sup> Member lists were retrieved manually from actors' official websites and members were matched to the companies ranked in the Top 100 Companies Panel in the same manner as individual business actors.

numerous smaller companies. Both indicators were coded as missing for collective actors whose member lists were not publicly available (see Appendix 6 for a list of collective business actors indicating the availability of member lists). The indicators were recoded so that one unit equals one percentage point of the total value of the German economy, respectively the total number of German employees in the analysis. The measures are highly correlated (Pearson's  $r$  0.99), indicating that business actors who add more value to the economy tend to also have larger workforces and confirming that both indicators measure the same concept.

### ***Scientific Expertise***

Scientific expertise was assumed for all actors from the scientific domain, that is all actors affiliated with an academic institution or specialized international organization who had the academic qualification to conduct their own research, as well as those not currently affiliated with an academic institution who had the academic qualification or relevant working experience and regularly published in peer-reviewed scientific journals (see *Scientific Actors* in Chapter 4.2). Scientific expertise on climate change was thus attributed to actors from a wide range of academic disciplines, including the natural sciences but also, for instance, economics, engineering, or the social sciences. Researchers from the former discipline are more qualified to comment on the causes of climate change and make predictions about future developments. Yet, scholars from the latter disciplines can advance our understanding of implications for economies and societies around the world or explore technical solutions to mitigate or adapt to climate change and thus crucially contribute to our understanding of the problem. Scientific expertise was coded as 0 for actors from other domains, who in some cases have academic qualifications from relevant fields and may even be affiliated with an academic institution, but do not study climate change.

### ***Issue Ownership***

Measuring actors' issue ownership is not straightforward, as there is no standardized indicator that could be applied across domains and the selection of actors for the dictionary is biased toward issue owners for non-political actors. For the political domain, prior research indicates that the Green party owns the issue of climate change in Germany (Berker & Pollex, 2021; Spoon et al., 2014). Therefore, all political actors affiliated with the Green party were coded as

issue owners (1), whereas other political actors were counted as non-owners (0). To my knowledge, continuous measures of German parties' issue ownership are not available for the observed period.<sup>19</sup> This binary classification fails to capture the different degrees of issue ownership proposed in my conceptualization, but is still useful to test the general influence of issue ownership on political actors' ability to build the media agenda.

Because non-political actors were included in the dictionary based on their incentives to shape public perceptions of climate change, all non-political actors in the dictionary are to some degree associated with the issue. In the absence of survey data querying the strength of these associations, all non-political actors would have to be coded as associative issue owners, resulting in an effectively useless indicator. However, actors' issue ownership can also reflect their perceived climate change competence. While survey data on competence attributions is equally unavailable, broad criteria which actors should be considered best equipped to handle climate change can be derived from three tenable assumptions. The first assumption is that actors who specialize in the handling of an issue will be perceived as more competent than actors whose primary focus lies on other issues. Accordingly, business actors who offer specialized solutions to deal with climate change, such as renewable energy providers, carbon collection companies, or green consulting services, should be perceived as more competent than actors whose main area of expertise lies elsewhere, although climate change threatens or advances their interests. Specialized business actors were thus counted as issue owners (1), whereas other actors were coded as non-owners (0). This coarse measure clearly neglects different degrees of issue ownership and cannot be empirically validated within the scope of this dissertation, but nonetheless offers some leverage to discern tendential effects of issue ownership for business actors' influence over the media agenda.

Although the specialization assumption can be expected to hold for the remaining two domains, almost all civil society actors and all scientific actors in the dictionary focus primarily on climate change, severely limiting the discriminatory power of the indicator for these actor groups. To differentiate civil society actors with various degrees of issue ownership, I collected additional information about the number of members and donations (including membership fees) to the most visible collective actors from this domain. Here, the assumption is that people

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<sup>19</sup> Attempts to measure German parties' issue ownership of climate change with continuous indicators have been made, but the resulting measure does not include the Green party (Seeberg, 2017).

will generally donate money to or become members of civil society organizations that they perceive as competent in their field of operation.

Given that the required data had to be manually compiled from the annual reports published on actors' websites, the information could not be collected for all civil society actors in the dictionary and was commonly unavailable for longer periods. To ensure that the effect of issue ownership could be tested in the second part of the analysis, the required information was collected for the same period and the same collective civil society actors as the press materials. Annual membership figures were aggregated using the maximum value, whereas donations were summed for the relevant legislative period. Since only registered organizations are legally obliged to publish annual reports, information about membership figures and donations was unavailable for less institutionalized actors such as activist movements. In short, membership figures and donations can be expected to reflect the relative issue ownership of collective civil society actors, but their availability is limited to the most recent legislative period and excludes activist movements. Like the other measures of issue ownership, these indicators thus need to be interpreted with caution.

The third assumption is that scientists and research institutions are perceived as more competent when their work impacts the academic community. Although their significance is contested among scientists, journalists likely rely on easily accessible cues such as the number of publications that an individual or collective actor has authored, how often other researchers have cited these publications, or composite indices of these metrics like the h-index (Hirsch, 2005) to gauge the scientific impact of potential sources (cf. Granado, 2011). Hence, these indicators may be useful to distinguish different degrees of issue ownership among scientific actors, though the relevant metrics needed to be manually coded from individual actors' Web of Science<sup>20</sup> and Dimensions<sup>21</sup> profiles or collective actors' publication pages. Their collection was thus subject to similar restrictions as the issue ownership indicators for civil society actors.

For collective actors who list their publications on their website, publications in the relevant period from 2017 to 2020 were counted and their respective citations summed. For other collective actors, especially expert committees that do not provide an overview of their publications, the total publication and citation numbers of their core research team were summed to approximate the collective actor's scientific impact. Since h-indices are not

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<sup>20</sup> Data derived from Clarivate Web of Science. © Copyright Clarivate 2022. All rights reserved.

<sup>21</sup> Data obtained from Digital Science's Dimensions platform, available at <https://app.dimensions.ai>.

available for collective actors, this metric similarly reflects the mean h-index of collective actors' core research teams. For the reasons indicated above, information was collected only for the most visible scientific actors and the most recent legislative period. Considering that continuous issue ownership captures degrees of perceived competence for scientific actors, it could also be interpreted as a more fine-grained measure of actors' scientific expertise, blurring the lines between these two factors for scientific actors.

The domain-specific operationalization of issue ownership raised the issue how to combine the indicators for actors from different domains to enable the analysis of broader effects. Although all measures were included separately in domain-specific regression models, the binary indicators for political and business actors are available for the same timeframe and easily consolidated. The resulting binary indicator counts political actors affiliated with the Green party and business actors who specialize in climate change as issue owners (1), and other political and business actors as non-owners (0). Since all civil society and scientific actors own the issue of climate change to some degree, they are coded as issue owners (1) for the binary indicator.

Continuous measures of issue ownership were only available for civil society and scientific actors and were measured on very different scales. Membership figures for collective civil society actors ranged between 838 (*Germanwatch*) and 803,737 (*WWF*), donations between €883,251 (*DNR*) and €277,050,000 (*Greenpeace*). The scientific actors in the dictionary authored between 0 (*Agora Energie- and Verkehrswende*) and 2,311 (*WMO*) peer-reviewed publications, which were cited up to 85,952 times (*IPCC*), resulting in an h-index ranging between 4 (*Kai Niebert*) and 73 (*Mojib Latif*). To obtain a continuous measure of issue ownership for both civil society and scientific actors, all indicators were first transformed to z-scores. For civil society actors, the score was then averaged across membership figures and donations. Scientific actors' h-index already incorporates their number of publications and citations; however, h-indices could not be approximated for all collective actors. Therefore, I calculated two continuous issue ownership measures based on either the mean z-score of actors' publications and citations or the z-score of their h-index. The resulting continuous indicator ranges from -1.36 (*Germanwatch*) to 2.61 (*IPCC*), or 2.01 (*Mojib Latif*) using the h-index. The continuous measures were coded as missing for political and business actors. Despite their obvious limitations, the continuous indicators enable me to explore tendencies in the ability of actors with different degrees of issue ownership to build the media agenda.

***Prominence***

To measure actors' prominence, I drew on Google Trends scores for each actor in the dictionary. The mechanism that links prominence to actors' ability to build the media agenda is that journalists expect more prominent actors to draw larger audience shares. Google Trends scores closely reflect audience interest in an actor by counting how many times users have searched for this actor in a specified region and timeframe. On the downside, Google Trends data cannot capture all online searches, the provided scores have no meaningful unit, and data is unavailable before 2004. Although Google search engine use can be expected to exhibit systematic biases because people concerned about their data privacy likely prefer other search engines, around 94 percent of all online searches in Germany are performed with the Google search engine (SEO United, 2018). Since the interests of the neglected six percent will generally be hard to learn, Google Trends scores can be expected to match the information available to media makers in the news selection process. To make Google Trends scores comparable across actors and legislative periods, actors' scores were divided by the score for the neutral search term 'benchmark' collected at the same time. While the unit of the scores remains obscure, this transformation allows me to compare the agenda-building ability of more and less prominent actors in the analysis (e.g., Boydston et al., 2014; Sisco et al., 2021).

Unlike other commonly used measures of prominence (e.g., Sinclair, 1990; Tresch, 2009), Google Trends scores measure interest in the actors in the dictionary independent of their visibility in the media. A similarly independent measure of prominence cannot be constructed for the time preceding the availability of Google Trends data because potential sources that reflect the prominence of actors independent of their visibility in the news media such as lifestyle magazines are not available for systematic review. Even if magazine data were available, an indicator of prominence would have to reflect actors' visibility across a range of different magazines to capture a similar variety of interests as online search metrics. In the absence of independent data, visibility in news media is the only available proxy for prominence. Since this indicator is already included as the dependent variable in the first part of the analysis, lags of the dependent variable included in the model to account for the temporal interdependence of the observations could be interpreted as controls for actors' prominence. However, this interpretation poorly matches the definition of prominence set out above and would confound two theoretically distinct concepts. Therefore, I refrain from using an alternative measure for actors' prominence for the period between 1976 and 2002.

To obtain Google Trends scores for all actors in the dictionary, I used the `gtrendsR`-package (Massicotte & Eddelbuettel, 2022) to consecutively pass the search terms for each actor to the Google Trends online interface, setting the search parameters to Google searches performed in Germany between January 1, 2004 (the earliest available date) and December 31, 2020 (see `actor_dictionary.R` in the replication materials for the query code). Because Google Trends cannot process regular expressions and the search was performed once for all legislative periods, I created a string vector of search terms containing unique values from the dictionary and manually encoded each name to match the query format. Like the actor dictionary, Google Trends accepts several search terms for the same actor (e.g., “Bündnis 90 + B’90 + Die Grünen”) and returns an overall Google Trends score for all search terms. Queries return monthly Google Trends scores, which were divided by the benchmark score before actors’ scores were averaged for each legislative period. To ease the interpretation of the results, the score was recoded so that one unit equals one percentage point relative to the benchmark. The resulting prominence measure ranges from 0 to 16, with higher scores indicating higher audience interest.

### *Novelty*

Since newer actors are expected to offer surprising content more frequently than established actors, novelty may grant actors from all domains an agenda-building advantage. To measure actors’ newness, I constructed an indicator counting the number of legislative periods from the respective period to the period in which an actor was first included in the dictionary. Political actors were thus coded as newly emerged if they became active in national politics, business and civil society actors if they were founded, and scientific actors if they were founded or graduated in the respective legislative period. Some collective actors were re-branded, changed hands, or transitioned into successor organizations over the observed period. In these cases, the successor actors were not coded as newly emerged unless they operated under a different name and inherited only some parts of the original actor. The resulting measure ranges between 1 when the actor first emerged during the respective legislative period, and 12 in the most recent legislative period when the actor was present for all twelve observed legislative periods. Hence, lower counts indicate greater novelty in all legislative periods except the baseline period from 1976 to 1980, in which all actors were counted as equally novel participants in the discursive construction of climate change.



### ***Mainstream and Challenger Actors***

Controversy and consonance are both expected to add to actors' ability to build the media agenda and can be linked to actors' mainstream or challenger status. Like issue ownership, actors' mainstream or challenger status was measured at the organizational rather than the individual level to reflect probable audience perceptions. To differentiate mainstream and challenger actors from the political domain, I drew on Farstad's (2018) definition of mainstream political actors as established and electorally successful parties. For the latter dimension, I constructed three indicators that measure whether an actor was represented in the national government (1) or not (0), whether an actor was represented in the national parliament (1) or not (0), and in how many state parliaments an actor was represented for each legislative period.<sup>22</sup>

While the binary indicators only vary across legislative periods, the election terms for the state parliaments are asynchronous to the national election terms. Therefore, the number of state parliaments in which an actor is represented can vary within legislative periods. To account for such changes, actors received scores between 0 and 1 for each state parliament and legislative period, with 0.25 points added for each year during the legislative period that actors were represented in the state parliament. An actor who entered the state parliament of Rhineland-Palatinate in 2011, but was not re-elected at the beginning of 2016, thus received a score of 0.5 for the legislative period 2013-2017, because they were represented in the state parliament for two of the four years. To obtain a continuous measure of actors' representation in state parliaments, the scores for all state parliaments were added for each legislative period. Between 1976 and 1990, this indicator refers only to Western German state parliaments and ranges from 0 to 11. Starting in 1990, the indicator also captures representation in Eastern German state parliaments, increasing the maximum value to 16. To make the measure comparable across legislative periods and match the scale of the dichotomous measures, the indicator was rescaled to range between 0 and 1 based on the respective maximum value for the legislative period.

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<sup>22</sup> Information about actors' participation in the national government or parliament was obtained from the "Datenhandbuch zur Geschichte des Deutschen Bundestages" (Feldkamp, 2011; Schindler, 1999) for the legislative periods between 1976 and 2010, and from the legislative period summaries in the text archive of the national parliament ([www.bundestag.de](http://www.bundestag.de)) for more recent legislative periods. Information about the composition of state parliaments was retrieved from the election archive provided by [tagesschau.de](http://tagesschau.de) (2022).

For business actors, the distinction between mainstream and challenger actors is not straightforward. While one could argue that small and emerging companies like start-ups are perceived as challengers by large and established companies and associations, this definition does not fit the theoretical mechanisms expected to favor mainstream and challenger actors. The advantage of challenger actors is based on their greater likelihood to provide conflict and surprise in their issue interpretations. However, the incentive structure of the economic sector ensures that business actors should generally avoid antagonizing societal majorities at the risk of losing customers. Hence, business actors have comparatively strong incentives to frame their perspectives on issues in consonant terms and to refrain from commenting on issues when their interpretation conflicts with mainstream views. In consequence, business actors were coded as mainstream actors (1) to preserve the comparability of the indicator across domains, though the resulting measure cannot explain differences in the ability of various business actors to build the media agenda.

Civil society actors were coded as mainstream actors (1) when their efforts to promote climate protection were primarily focused on institutionalized channels such as information campaigns, political lobbying, legal action, and the organization of climate protection projects. These actors depend on institutional cooperation and thus have incentives to adopt consonant rather than controversial perspectives. On the other hand, actors who relied mainly on public rallies, sensational protest action, the occupation of streets, forests, or worksites, or illegal acts to attract attention to an issue were counted as challenger actors (0). For this second actor group, conflict and surprise are central elements of their strategies to raise public awareness, which likely shows in their issue interpretations. The distinction between mainstream and challenger status is unambiguous and constant over time for almost all civil society actors in the dictionary except *Greenpeace*. This established activist actor arouses public attention with breakneck actions, but simultaneously uses institutionalized channels to advance climate protection and could therefore plausibly be counted as either mainstream or challenger. Considering that the legality of *Greenpeace* actions is still frequently determined in court, leading to recurring challenges concerning its non-profit status (e.g., Greenpeace, 2004; Jann, 2020; RND, 2021), *Greenpeace* was considered a challenger throughout the observed period.

For the scientific domain, traditional academic institutions such as universities and publicly funded research institutes, as well as governmental expert councils and intergovernmental panels and organizations were counted as mainstream actors (1). Conversely, think tanks and other privately funded research bodies were coded as challenger

actors (0). The classification of individual actors generally reflects the status that their primary affiliation (would have) received. However, especially for contrarian scientists, simultaneous affiliations with both mainstream and challenger institutions were not uncommon. In these cases, actors were counted as challengers because their controversial work for the challenger institution tended to be more salient than their ties to mainstream institutions. The status of individual actors differs across legislative periods if their affiliations change over time.

To capture the establishment dimension of Farstad's (2018) definition, I constructed an additional indicator that cumulates the number of legislative periods during which an actor was coded as mainstream while discounting each additional legislative period. The rationale behind this indicator is that actors will likely be perceived as more established the longer they have been visible in their respective domains. At the same time, the first couple of legislative periods after an actor emerged can be expected to be more significant for people's perceptions of actors' establishment than additional legislative periods. Borrowing from behavioral psychology, the higher value attached to more recent changes in the status quo can be modeled using a hyperbolic discounting function that assigns less weight to additional legislative periods (cf. Yi et al., 2006). Accordingly, I coded a hyperbolic discounting function using the formula  $\frac{1}{1+k*d}$ , where  $k$  denotes the discount rate<sup>23</sup> and  $d$  refers to the number of delays, to calculate the subjective discounting factor for the length of actors' mainstream status. The discounting factor takes the value 1 for unestablished actors and approaches 0 for long-established actors, allowing me to discount actors' mainstream status so that their tenth legislative period as a mainstream actor receives considerably less weight than their first or second legislative period.

To integrate the two dimensions, I first joined the indicators for actors from different domains, resulting in three mainstream status measures based on the three electoral success indicators used for political actors. The first two measures are binary, whereas the third can take values between 0 and 1 for political actors. In a second step, each mainstream status indicator was multiplied with the discounting factor to account for the expected recency bias in people's perceptions. Lastly, the discounted values were summarized in three cumulative indices ranging between 0 for actors always coded as challengers and 1 for actors always coded as mainstream, who were present in all legislative periods. To provide an intuition for these indicators, consider the values assigned to the *Sozialdemokratische Partei Deutschlands* (SPD; 1), the Greens (0.88), and the AfD (0.12) based on their representation in national parliament

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<sup>23</sup> Because  $k$  is unknown, the discount rate could only be estimated based on previous literature (Yi et al., 2006).

in the most recent legislative period. This ranking reflects the respective length of parties' representation in the national parliament, although the distances between the parties are smaller than their parliamentary tenures would suggest because additional legislative periods are discounted. For the period 1983-1987, when the Greens first entered the national parliament, the distance between the values for the SPD (0.36) and the Greens (0.12) is twice as large, matching the notion that the difference between one or three periods in parliament is perceived as more important than the difference between ten or twelve periods. The three indicators are highly correlated (Pearson's  $r$  between 0.92 and 0.99), suggesting that they capture the same concept. Given that actors' establishment was measured based on their discounted number of legislative periods in the dictionary, it is unsurprising that these measures are also correlated with the novelty indicator (Pearson's  $r$  between 0.77 and 0.82).

### *Summary*

To measure the agenda-building factors introduced in Chapter 2.4, I created 13 variables capturing actors' *executive authority* (categorical variable with four levels: chancellor, minister, party chairperson, other actor), their *issue-specific relevance* (categorical variable with three levels: federal environment minister, state environment minister, other actor), their *economic weight* (two continuous variables: share of the total value added to the German economy and share of the German workforce in percentage points), their *scientific expertise* (binary variable: scientific qualification or no scientific qualification), their *issue ownership* (binary variable: issue owner or no issue owner; two continuous variables: mean z-score of civil society actors' membership figures and donations, in combination with either the mean z-score of scientific actors' publications and citations or the z-score of their h-index), their *prominence* (continuous variable: standardized Google Trends scores), their *novelty* (continuous variable: number of legislative periods since an actor was first included in the dictionary), and their *mainstream or challenger status* (three continuous indices measuring actors' discounted cumulated status across legislative periods). Since established measures for actors' economic weight, their issue ownership across domains, and their mainstream or challenger status were not available, I relied on multiple measures to operationalize these concepts. Measures for the same concepts are highly correlated and the novelty indicator is additionally correlated with the mainstream-challenger variables.

## **Chapter 5: Modeling Actors' Ability to Build the Media Agenda**

To test whether and how the agenda-building factors influenced actors' ability to build the media agenda, I ran a series of regression models explaining actors' visibility in the media coverage and the reception of actors' press materials in newspaper articles as a function of their agenda-building factors. The first subchapter describes the modeling strategy for actors' visibility, which was measured with four count variables for which negative binomial regression models provided the best fit. To account for the longitudinal structure of the data and correct autocorrelation, fixed effects for the legislative periods and up to two lags of the dependent variable were added to the models. The second subchapter details the modeling strategy for the portrayal of actors' perspectives in newspaper articles. The indicators for similarity and journalistic sentiment are continuous and their approximately normal distribution was best modeled with linear regressions. The measure for exclusivity is primarily a count variable and was therefore most adequately modeled with negative binomial regressions. Since the agenda-building factors constituting the independent variables were measured at the actor level, whereas the dependent variables capture variations at the level of individual press materials, random effects for the actors were added to the models. Neither fixed effects for the legislative periods nor lagged dependent variables were required to obtain unbiased standard errors, as the reception metrics could only be collected for the period 2017-2020.

In both parts of the analysis, the full model based on the complete (comparison) corpus was supplemented with specific models for the four domains, the five newspapers, and the seven newspaper sections introduced in Chapter 4.1. These additional models allow me to explore effects within domains, which could be masked in the full model, as well as differences in the weight attached to the individual agenda-building factors across newspapers or newspaper sections. For the first part of the analysis, the effects for periods of interest derived from the expectations in Chapter 3.3 were also estimated separately. To avoid multicollinearity, the effects of the two alternative economic weight measures, as well as the four indicators for actors' novelty and their mainstream or challenger status, were estimated in different models. For the most recent legislative period, additional separate models were estimated for the continuous issue ownership indicators.

To keep the description of the results concise, Chapter 6 focuses on the number of articles in which actors were mentioned as the main dependent variable. The effects of the agenda-

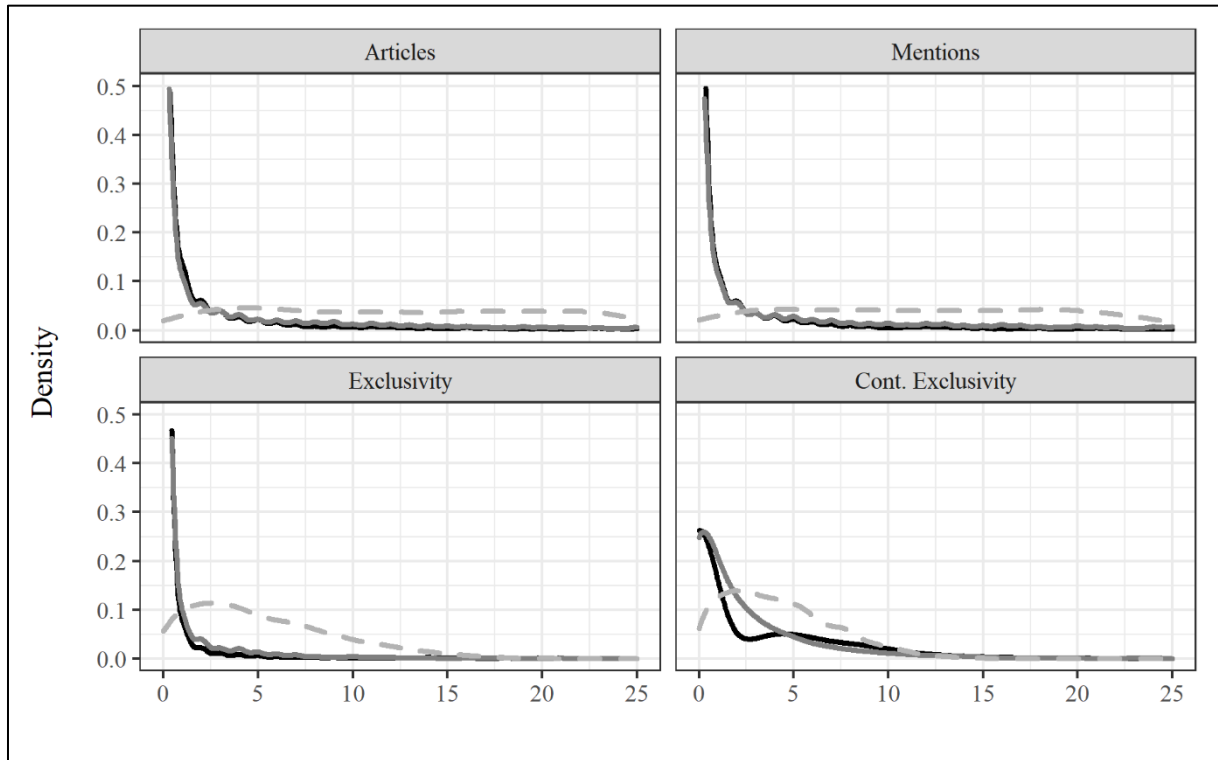
building factors were generally very similar across the visibility metrics. Models with alternative specifications of the dependent variable were therefore included in the appendix unless the results suggested diverging interpretations. For the same reason, Chapter 7 focuses on the 30-day frame for the regression analyses, discussing effects for the 90-day frame and the entire legislative period only if the results differed substantively from the presented findings.

### 5.1 Modeling Actors' Visibility in the Media

Actors' visibility in newspaper articles was measured with four count variables, which were best modeled using negative binomial regressions. From the heavy-tailed distribution of these variables (black lines) displayed in Figure 5.1, it is evident that a negative binomial distribution (dark gray lines) fitted the data much more closely than a normal distribution (light gray dashed lines). The implied non-normality of the residuals and pronounced heteroscedasticity in the error terms also clearly violate the assumptions of linear regression models. Although Poisson distributions are generally suited to model count data, the variance of the visibility measures markedly exceeds their mean, indicating overdispersion which is better approximated using negative binomial distributions. Given the high number of zeros in the visibility variables,<sup>24</sup> I additionally considered hurdle models that estimate the probability of receiving a zero separately from the function for higher outcomes (cf. J. A. Green, 2021). While it is conceivable that the decision whether an actor is mentioned is based on different criteria than the decision how many times an actor is mentioned, hurdle models predicted more zeros than observed for the visibility variables. Hence, negative binomial models offered the best fit for the data in terms of distribution, scedasticity, and dispersion (see `analyses_visibility.R` in the replication materials for a comparison of all considered models).

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<sup>24</sup> Another option would have been zero-inflated negative binomial regression models (ZINB-RM). However, ZINB-RM assume that the number of zeros in the data overestimates the number of zeros in the population, leading to a distinction between 'true' and 'false' zeros. Given that the zeros in the visibility variables all represent true zeros in the sense that actors are not mentioned in the climate change coverage of the considered newspapers, ZINB-RM do not adequately model the data generation process.

**Figure 5.1: Distribution of the visibility metrics**

**Notes:** Black lines depict the density distributions for the number of articles in which actors were mentioned (Articles), the number of mentions (Mentions), the number of articles in which actors were mentioned exclusively (Exclusivity), and the number of other actors mentioned in the same article (Cont. Exclusivity). Dark gray lines depict the density of simulated negative binomial distributions based on the mean of the respective visibility metric, and light gray dashed lines depict the density of simulated normal distributions based on the mean and standard deviation of the respective visibility metric.

Given that the visibility of the same actors is assessed across legislative periods, introducing issues of correlated observations, and that I expect the influence of the individual agenda-building factors to vary over time (see Chapter 3.3), fixed effects for the legislative periods (LP-FE) were included in all models comprising more than one legislative period.<sup>25</sup> To correct for existing autocorrelation, I moreover added up to two lags of the visibility variables as independent variables (cf. Keele & Kelly, 2006). These lags account for path dependencies in the news production process and journalists' professional networks, which can be expected to increase the probability that an actor who received more coverage in the preceding period will have more opportunities to push their perspectives onto the media agenda in the current period. The number of lags was limited to two for theoretical as well as methodological reasons. Although model fit statistics like AIC and BIC improved with every additional lag, it seems

<sup>25</sup> Models with LP-FE also provided the better fit compared to models without LP-FE (see analyses\_visibility.R in the replication materials).

implausible that the influence of path dependencies and professional networks extends over more than eight years. Improvements in model fit thus likely indicate that the models are better suited to explain the agenda-building ability of established actors compared to newer actors, who are excluded from the model when the number of lags exceeds their presence in the dictionary. Moreover, decreases in the number of observations severely curtail the variance of some agenda-building factors when more than two lags are added, resulting in uncertain estimates.

As the inclusion of just one lag is sufficient to correct the existing autocorrelation while preserving the most variance, the results presented in the following chapters are based on single-lag models. These results are largely consistent with the estimates from corresponding two-lag models (see Appendix 15), included to account for the possibility of longstanding relationships between journalists and sources, but substantive differences are discussed in the context of the respective models. Compared to models without lags (see Appendix 16), the coefficients in the lagged models are not consistently smaller or insignificant (cf. Achen, 2000). However, the positive coefficients for 'older' and more mainstream actors tend to be insignificant and are sometimes reversed in the lagged models, suggesting that the lags effectively control for existing relationships between newspapers and established actors. Additional differences with substantive meaning are discussed in the context of the respective models. Hence, the main model takes the form:

$$\begin{aligned} \text{Visibility} = \exp( & \alpha + \beta_1 * \text{Lag}_{t-1} + \beta_{2-4} * \text{executive authority} \\ & + \beta_{5,6} * \text{issue-specific relevance} + \beta_7 * \text{economic weight}_{1,2} \\ & + \beta_8 * \text{scientific expertise} + \beta_9 * \text{issue ownership}_d \\ & + \beta_{10} * \text{prominence} \\ & + \beta_{11} * \text{novelty or mainstream status}_{1,2,3} \\ & + \beta_{12-21} * \text{legislative period} + \epsilon) \end{aligned}$$

where actors' visibility in the newspaper articles is a function of the exponentiated linear combination of the intercept and the effects of the lagged dependent variable, actors' executive authority, their issue-specific relevance, one of two economic weight indicators, their scientific expertise, their dichotomous issue ownership, their prominence, their novelty or one of three mainstream status indicators, and the fixed effects for the twelve observed legislative periods.



## 5.2 Modeling the Portrayal of Actors' Press Materials in the Media

The reception of actors' press materials in newspaper articles addressing climate change was measured with three indicators capturing different aspects expected to influence the utility of the received coverage for actors attempting to shape public perceptions. The similarity between actors' press materials and newspaper articles, as well as the sentiment of journalists' contextualization of actors' perspectives, are continuous and approximately normally distributed (see black lines in Figure 5.2). Hence, linear regression models (light gray dashed lines) provided the best fit for these variables. In contrast, the exclusivity of the received coverage is a count variable, which was best modeled with a negative binomial distribution (dark gray lines), despite its continuous operationalization between 0 and 1. Since the variance of the exclusivity measures substantially exceeds their mean and zero-inflation is not an issue, alternative distributions such as Poisson or hurdle models cannot be expected to offer an improved fit for the data (see `analyses_similarity.R` in the replication materials). Effects were estimated for the indicators based on the lemmatized as well as the non-lemmatized versions of the corpus as the manual validity checks offered no indication that one set of measures generally outperformed the other.

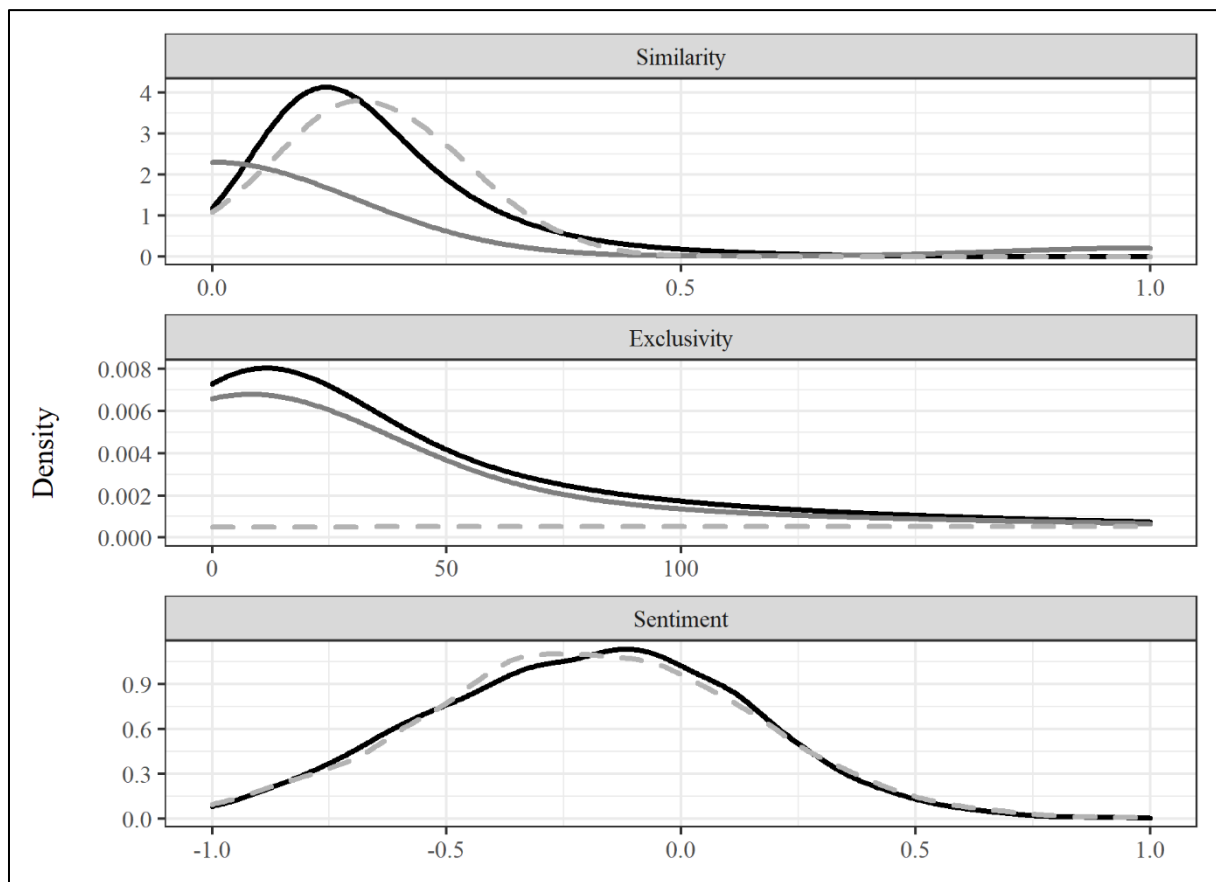
The data have a nested structure, in which press materials are clustered at the actor level. To account for this structure, the models included random effects for the 64 actors whose press materials on climate change could be collected (ACT-RE). Unlike actors' visibility, the reception metrics were only available for the most recent legislative period. In consequence, neither fixed effects at the period level nor lagged dependent variables were required to obtain unbiased standard errors. The linear models for the similarity and sentiment indicators thus take the form:

$$\begin{aligned} \text{Similarity OR Sentiment} = & \alpha + \beta_1 * \text{political domain} + \beta_2 * \text{executive authority} \\ & + \beta_3 * \text{economic weight}_{1,2} + \beta_4 * \text{scientific expertise} \\ & + \beta_5 * \text{issue ownership}_d + \beta_6 * \text{prominence} \\ & + \beta_7 * \text{novelty or mainstream status}_{1,2,3} + (\mu + \epsilon) \end{aligned}$$

where the similarity between actors' press materials and newspaper articles, or the sentiment of journalists' evaluations, is a function of the intercept and the effects of actors' affiliation with the political domain, their affiliation with the current government coalition, one of two

economic weight indicators, their scientific expertise, their dichotomous issue ownership, their prominence, their novelty or one of three mainstream status indicators, and the random effects for the included actors. Since actors' continuous issue ownership could only be measured for a comparatively small sample of civil society and scientific actors, the full model failed to converge when these indicators were included. The effects of actors' continuous issue ownership could therefore only be estimated in bivariate models.

**Figure 5.2: Distribution of the reception metrics**



**Notes:** Black lines depict the density distributions for the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of the received coverage (Exclusivity), and the journalistic sentiment associated with actors' perspectives (Sentiment) based on the non-lemmatized version of the corpus. Light gray dashed lines depict the density of simulated normal distributions based on the mean and standard deviation of the respective reception metric. Dark gray lines depict the density of simulated negative binomial distributions based on the means for similarity and exclusivity. Since the mean for sentiment is negative, no negative binomial distribution could be simulated for this variable.

The negative binomial model for the exclusivity indicator is based on the same set of independent variables but takes the form:

$$\begin{aligned}
 \textit{Exclusivity} = \exp(&\alpha + \beta_1 * \textit{political domain} + \beta_2 * \textit{executive authority} \\
 &+ \beta_3 * \textit{economic weight}_{1,2} + \beta_4 * \textit{scientific expertise} \\
 &+ \beta_5 * \textit{issue ownership}_d + \beta_6 * \textit{prominence} \\
 &+ \beta_7 * \textit{novelty or mainstream status}_{1,2,3} + (\mu + \epsilon))
 \end{aligned}$$

where the exclusivity of coverage for actors' perspectives is a function of the exponentiated linear combination of the intercept and the effects of actors' affiliation with the political domain, their affiliation with the current government coalition, one of two economic weight indicators, their scientific expertise, their dichotomous issue ownership, their prominence, their novelty or one of three mainstream status indicators, and the random effects for the included actors. The effects of actors' continuous issue ownership were again estimated in binary models to achieve convergence.



## **Chapter 6: Actors' Visibility in Climate Change Coverage**

To understand which actors are best equipped to build the media agenda, I first considered their visibility in newspaper articles addressing climate change. The theoretical discussion in Chapter 2.2 suggests that actors should benefit from mentions in issue-related coverage because such mentions can increase audiences' awareness that actors exist and imply that their interpretation of the issue is worth considering. Even negative visibility increases the salience of actors' association with an issue and could thus allow them to influence public perceptions. Assuming that higher levels of visibility indicate stronger associational links between actors and issues, additional mentions will be more important for actors who are not as well known or have not yet established their issue association. Conversely, strong agenda-builders are unlikely to derive the same benefits from additional mentions, yet they can be expected to be relatively more visible. The first subchapter explores patterns of actors' visibility in climate change coverage, describing changes over time as well as differences across newspapers and newspaper sections. To gain an impression which perspectives visible actors likely promoted, these patterns are investigated across domains, as well as for actor groups presumed to represent different positions within domains. The second subchapter analyses the influence of the agenda-building factors introduced in Chapter 2.4 on actors' visibility in newspaper articles on climate change. The effects for the full sample, periods of interest defined by changes in the context conditions discussed in Chapter 2.5, individual newspapers, and newspaper sections are estimated in separate regression models to detect potential changes over time, as well as variations across newspapers or newspaper sections. Finally, the effects of the individual agenda-building factors are compared to understand the relative importance attached to each factor.

### **6.1 Descriptive Results for Actors' Visibility**

Considering the visibility of actors over time, we can observe similar patterns for the number of mentions, the number of articles in which an actor was mentioned, and the number of articles in which an actor was mentioned exclusively. Panels (a)-(c) in Figure 6.1 show average frequencies of mentions, articles, and exclusive articles for each domain. To account for the increasing salience of climate change over time, values were normalized based on the total number of mentions or articles in the respective legislative period. In line with considerations

about the initial dominance of scientific actors in climate change discourse (see Chapter 3.2), actors from the scientific domain were mentioned more frequently than business or civil society actors until the 1990s, when civil society actors started to close the visibility gap. However, even early climate change coverage mentioned political actors more frequently than scientific actors, with the exception of exclusive mentions, where scientific actors tended to have an edge. This could indicate that articles mentioning scientific actors described individual perspectives in detail, whereas articles mentioning political actors contrasted several views, possibly reflecting different prioritizations of individual agenda-building factors across newspaper sections. The visibility of individual actors (see Appendix 7.1 for the 20 most visible actors per legislative period) mirrors this pattern, with political parties and scientific actors receiving the most attention in newspaper coverage of climate change. More surprising is the considerable visibility of large companies in this period that points to the relevance of economic weight for business actors with incentives to shape public perceptions of climate change (Hypothesis 1.3). However, these interpretations need to be taken with a grain of salt as climate change was hardly covered until the 1990s (N between 21 and 188, see Notes for Figure 6.1).

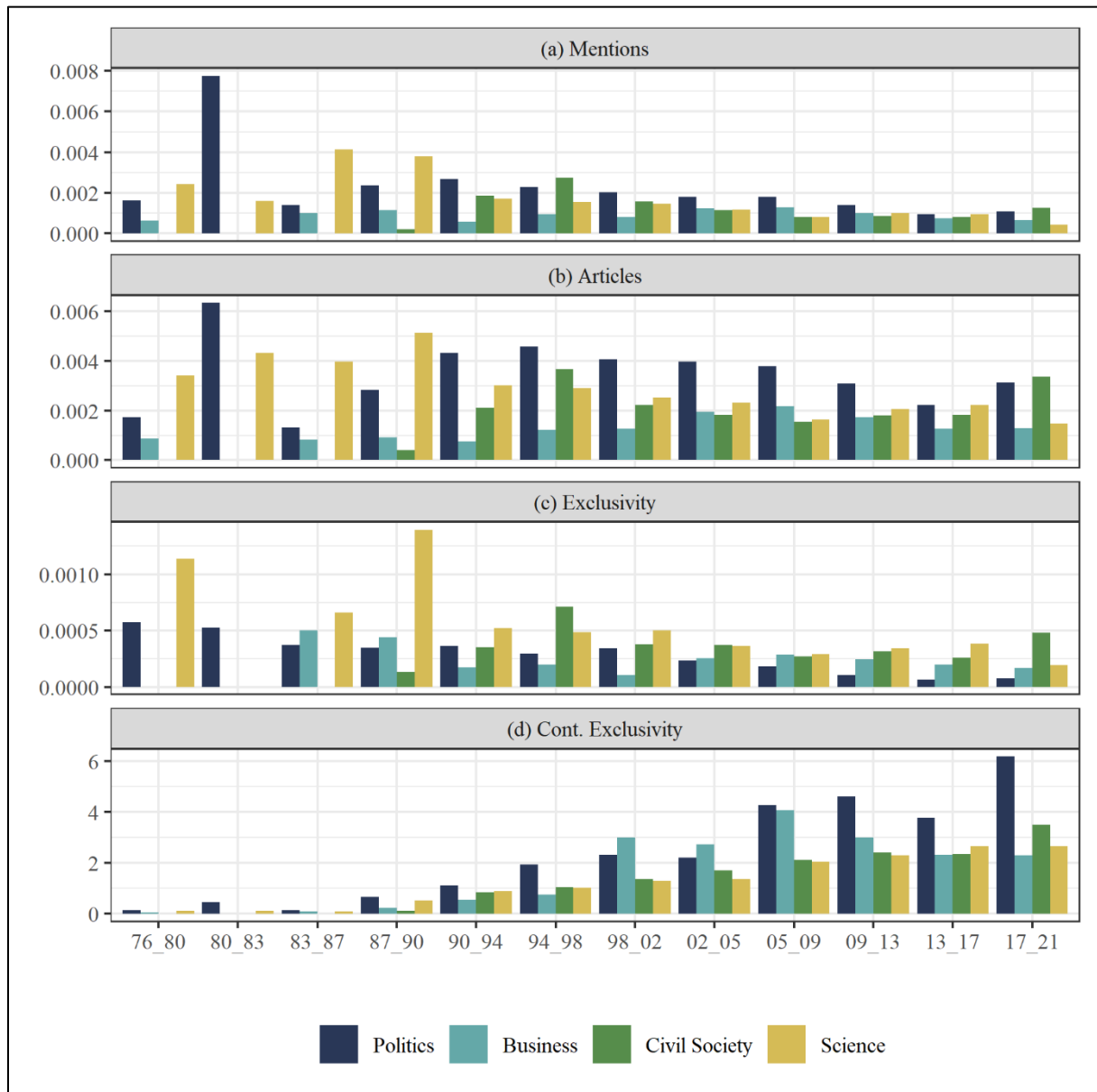
In the 1990s, political actors were still generally more visible in newspaper coverage of climate change than actors from other domains, followed by scientific actors. However, civil society actors gained considerable ground in this period and were at times mentioned more frequently and in more (exclusive) articles than actors from the scientific and even the political domain. While the dominance of political actors matches expectations about the politicization of climate change in the mid-1980s (see Chapter 3.3), the relatively early gains in visibility for civil society actors are more surprising. Looking at the most visible actors in the three legislative periods from 1990 to 2002, *Greenpeace*, *WWF*, and *BUND* were among the 20 most frequently mentioned actors in all legislative periods, and *Greenpeace* even ranked third in the legislative period from 1994 to 1998. While sensational protests catering to audiences' demand for controversy in a period of broad consensus on climate change could account for the visibility of *Greenpeace* (Hypothesis 6.2), the attention for the more institutionalized *WWF* and *BUND* points to issue ownership or prominence (Hypotheses 2.2-3). In the mid-1990s, the *Alliance of Small Island States* was the 14<sup>th</sup> most visible actor in climate change coverage, possibly reflecting the relevance of personal expertise (Hypothesis 2.1), which cannot be empirically assessed in this dissertation. Business actors remained the least visible actor group and fewer individual actors were mentioned very frequently throughout the 1990s, supporting the notion

that business actors lacked incentives to influence public perceptions of climate change during ecological modernization (see Chapter 3.2).

The visibility of business actors increased in the 2000s, when they were mentioned with a similar frequency and in a similar number of (exclusive) articles as scientific and civil society actors. The rise in business actors' visibility thus coincided with the gradual realization of the limits of ecological modernization. Political actors continued to be mentioned more frequently and in more articles than actors from the other three domains, though these mentions were hardly ever exclusive. This shift is mirrored in the attention for individual actors, as more equal numbers of business, civil society, and scientific actors domains were mentioned very frequently in this period. The visibility gap between political and other actors narrowed in the following legislative periods, with civil society actors taking the lead on mentions, articles, and exclusive articles in the most recent legislative period. Perhaps due to an increased focus on salient, newly emerged civil society actors such as *FFF* and *XR* (Hypotheses 2.3-4), business and especially scientific actors received less media attention in this timeframe.

The interpretation for the continuous exclusivity measure displayed in Panel (d) of Figure 6.1 differs from the other metrics insofar as higher values imply less exclusivity and thus less visibility. In addition, the average number of actors mentioned in the same article as an actor was not normalized across legislative periods and therefore reveals changes in the composition of newspaper articles over time. Because continuous exclusivity measures an average rather than an absolute value, it is comparable over time despite the changing volume of climate change coverage. The small values across domains in the earlier legislative periods indicate that articles tended to focus on individual actors until the late 1980s, though political actors were already mentioned somewhat more frequently alongside other (political) actors. Over time, the number of actors mentioned in the same article increased across all domains, most markedly for political actors who were mentioned alongside an average of six other actors in the most recent legislative period. Business actors experienced similar levels of (non-)exclusivity as political actors in the 2000s, before the average number of actors mentioned alongside them decreased to two to three in the 2010s. For civil society and scientific actors, this number rose from about one to slightly above two between 1990 and 2013, but still remained comparatively low. With their overall increase in visibility in the most recent legislative period, mentions of civil society actors became somewhat less exclusive.

**Figure 6.1: Actors' visibility in climate change coverage over time**



**Notes:** Depicted are domain averages for (a) the share of actor mentions, (b) the share of articles naming an actor, (c) the share of articles naming an actor exclusively, and (d) the mean number of actors named in the same article as an actor per legislative period. All shares are relative to the total number of mentions or articles in the same legislative period (76\_80: 22 articles, 80\_83: 21 articles, 83\_87: 56 articles, 87\_90: 188 articles, 90\_94: 505 articles, 94\_98: 1125 articles, 98\_02: 2216 articles, 02\_05: 2087 articles, 05\_09: 9054 articles, 09\_13: 6624 articles, 13\_17: 6902 articles, 17\_21: 13058 articles).

Actors' visibility also differed across the five collected newspapers, which represent different ideological positions. Panel (a) in Figure 6.2 depicts the number of articles per newspaper that mentioned actors from the four domains across the ideological spectrum from left-leaning (taz)



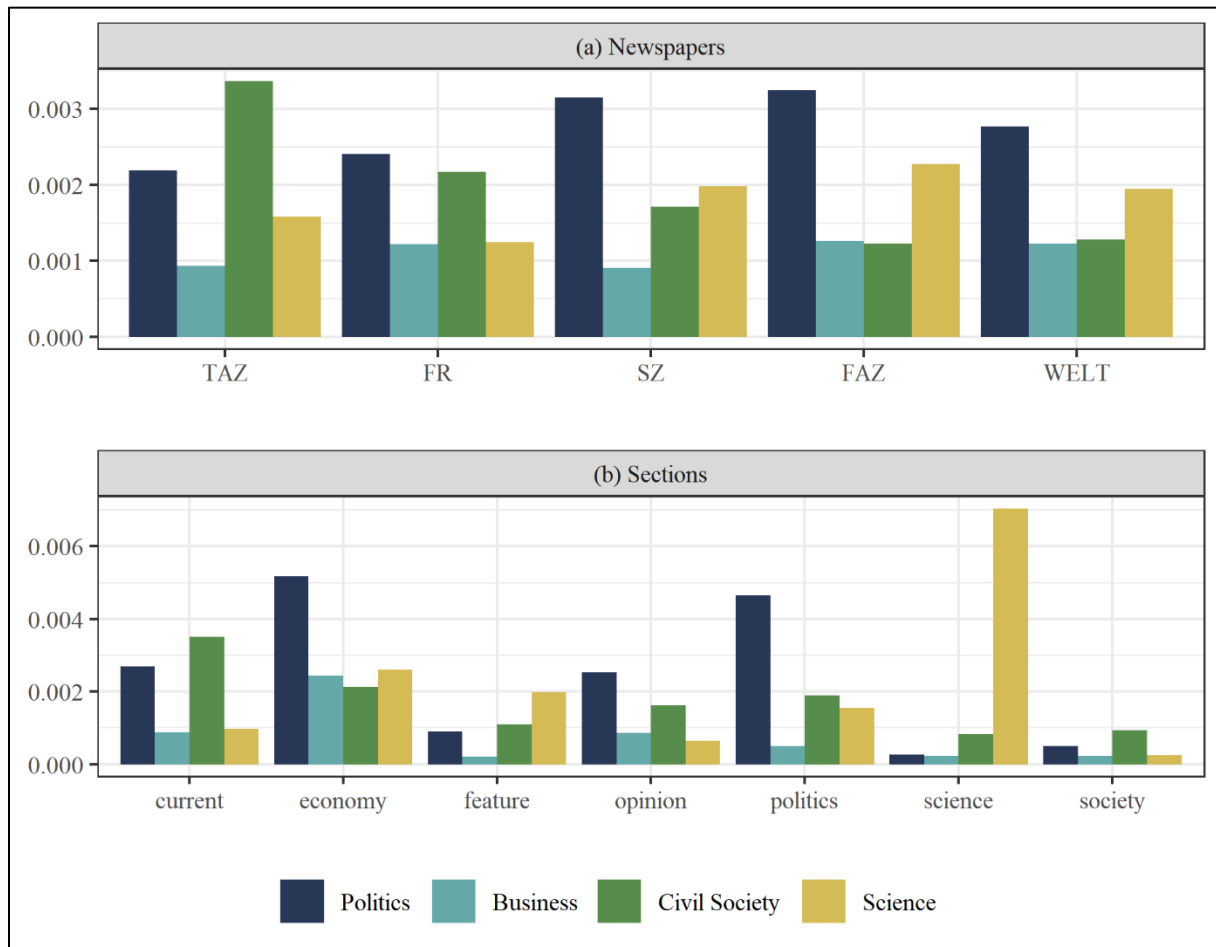
to right-leaning (Welt).<sup>26</sup> Left-leaning newspapers gave considerably more attention to civil society actors than more right-leaning newspapers, whereas the latter favored scientific actors more than the former. Business actors were mentioned the least in left-leaning newspapers, but in roughly the same number of articles as civil society actors in right-leaning newspapers. In comparison, the pattern observed for the number of mentions in right-leaning newspapers shows a slight advantage for business actors over civil society actors (see Appendix 8.1). These differences lend tentative support to the notion that leftist newspapers give more coverage to actors who promote stricter climate protection, whereas their rightist counterparts focus more on actors whose interests conflict with climate protection (see Chapter 4.1). However, the somewhat greater visibility of scientific actors in right-leaning newspapers mitigates this tendency and the visibility of individual actors does not automatically imply that newspapers support their issue interpretations. Considering the visibility of political actors across the ideological spectrum, we see that moderate newspapers mentioned political actors in more articles than newspapers with stronger ideological leanings. This tendency is more pronounced on the left than on the right.

The set of the 20 most visible actors for each newspaper largely overlaps, with eleven political actors (parties and environment ministers), two civil society actors (*FFF* and its founder *Greta Thunberg*), and one scientific actor (the broad term *Universität*) being among the most frequently mentioned actors in all newspapers (see Appendix 7.2). Two additional actors, *Olaf Scholz* (SPD) and *Greenpeace*, were among the most visible actors for four out of five newspapers, with *Olaf Scholz* missing in the *taz* and *Greenpeace* in the *Welt*. The composition of the remaining set mirrors the observed aggregate attention patterns insofar as the left-leaning newspapers, particularly the *taz*, mentioned additional civil society actors most often. In contrast, the more right-leaning *Welt* and *FAZ* were the only newspapers to mention business actors (*Bayerische Motoren Werke AG* and *Volkswagen AG*) among the most visible actors. All other actors named in the set of the 20 most visible actors for the five newspapers are political actors, specifically ministers and party chairs.

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<sup>26</sup> Values are normalized based on the total number of articles in the legislative period. Distributions for the number of mentions and the number of articles are almost identical across newspapers (see Appendix 8.1), but substantive differences are discussed where appropriate. Exclusivity measures were not calculated for individual newspapers or newspaper sections.

**Figure 6.2: Actors' visibility across newspapers and newspaper sections**



**Notes:** Depicted are domain averages for the share of articles naming an actor (a) across newspapers and (b) across newspaper sections. All shares are relative to the total number of articles in the same legislative period (see Notes for Figure 6.1).

Panel (b) in Figure 6.2 shows the distribution of articles that mentioned actors from the four domains across newspaper sections, providing a first test for the expectation that different newspaper sections attach more or less importance to the domain-specific agenda-building factors depending on their thematic focus. Specifically, executive authority and issue-specific relevance may be perceived as more important in the politics section, whereas economic weight could be considered decisive in the economy section, and scientific expertise may be valued most in the science section. The results in Figure 6.2 support this expectation for the science section, where actors with scientific qualifications were markedly more visible than actors from other domains, and the politics section, where articles mentioned parties and politicians most often. The divergence from the overall pattern is less significant in the latter case because political actors generally received more coverage than scientific actors. The picture for the economy section is more ambiguous, as business actors were mentioned more frequently than

in any other section, but political actors remained the most visible group in economic climate change coverage. Moreover, scientific and civil society actors were mentioned at similar rates as business actors, indicating that economic weight was relatively more important for the economy section but not important enough to provide business actors with an absolute advantage over actors from other domains. Since the current and opinion sections are exclusive to the left-leaning taz, it is not surprising that civil society actors were most visible in the current section (compare the distribution for the taz in the upper panel). Yet, the dominance of political actors in the opinion section suggests that executive authority and issue-specific relevance could have been valued more in this section than in other sections of the taz.

The visibility of individual actors largely conforms to the distribution across domains (see Appendix 7.3 for the ten most visible actors per newspaper section). Seven of the ten actors who received the most coverage in the science section were collective scientific actors, two were civil society actors, and one was the longstanding government party *Christlich Demokratische Union Deutschlands* (CDU). A similar picture emerges for the politics section, where eight out of the ten most visible actors were parties or environment ministers. Political actors also received the most coverage in the opinion and current sections, where eight, respectively seven, parties and environment ministers ranked among the ten most visible actors. The sets for the economy and society sections were somewhat more balanced, with six political actors, three civil society actors, and one scientific actor among the most frequently mentioned actors in the former and two civil society actors and two scientific actors in the latter. The most visible business actor, the car manufacturer *Volkswagen*, ranked thirteenth in the economy section, and only three of the 20 most visible actors were companies. The most diverse set of actors was named in the feature section, with four political, three civil society, and three scientific actors. *FFF* and its founder *Greta Thunberg* were among the most frequently mentioned actors across all sections, accounting for some of the visibility of civil society actors in each section shown in Figure 6.2. Conversely, no business actors were among the ten most visible actors for any of the considered sections, emphasizing the low overall visibility of this group in climate change coverage.

### ***Political Actors***

The visibility of actors from different domains in the newspaper coverage of climate change reveals nothing about the content or the diversity of the presented issue interpretations. To get

an impression which perspectives visible actors advocated, we need to consider the balance of actors who can be expected to promote or oppose climate protection. Figure 6.3 illustrates the share of articles mentioning political actors from different parties, normalized by the total number of articles in the respective legislative period.<sup>27</sup> Panel (a) shows that the visibility of party actors in climate change coverage varied considerably over time. Green party actors were far more visible than actors from other parties in the legislative period following the party's foundation in 1980, indicating that newspaper articles mainly covered perspectives promoting more climate protection during that time. Whether the coverage endorsed or criticized the positions of Green party actors remains unknown, but the focus on this newly emerged party perceived as radical by large audience shares implies that surprise and controversy were relatively more important in the early climate change coverage (Hypotheses 2.4-5). This interpretation is in line with the somewhat greater visibility of actors affiliated with the CDU and the *Christlich-Soziale Union in Bayern* (CSU) during this legislative period, as their positions offered the strongest contrast to Green party actors' perspectives. Interestingly, actors from the government parties SPD and FDP were not particularly visible despite the unsettled consensus regarding climate change (Hypothesis 6.1) and the traditional media system (Hypothesis 3.1). This could be due to the sustained conflict between the coalition partners, which potentially undermined the perceived executive authority of the government actors and culminated in a constructive vote of confidence that resulted in an interim coalition of CDU, CSU, and FDP governing for the last six months of the legislative period.

In the following legislative period, there is a curious spike in the visibility of the *Sozialistische Einheitspartei Deutschlands* (SED), predecessor of the Left party *DIE LINKE* (LINKE) in the German Democratic Republic (GDR), which is not easily explained within the theoretical framework proposed in this dissertation. While the SED represented an ideological extreme and its perspectives likely offered substantial controversy and perhaps surprise (Hypotheses 2.4-5), the remarkably low visibility of actors from other parties and the number of articles in which the SED was mentioned exclusively (see Appendix 8.2.1) suggest that many articles did not contrast the perspectives of SED actors with other issue interpretations. Given the state of German-German relations at the time, it is conceivable that mentions of the SED in West German dailies were perceived as controversial even in the absence of opposing

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<sup>27</sup> Substantive differences between the number of articles in which political actors were mentioned and the other visibility metrics are minimal (see Appendix 8.2), but meaningful deviations are discussed throughout the section.

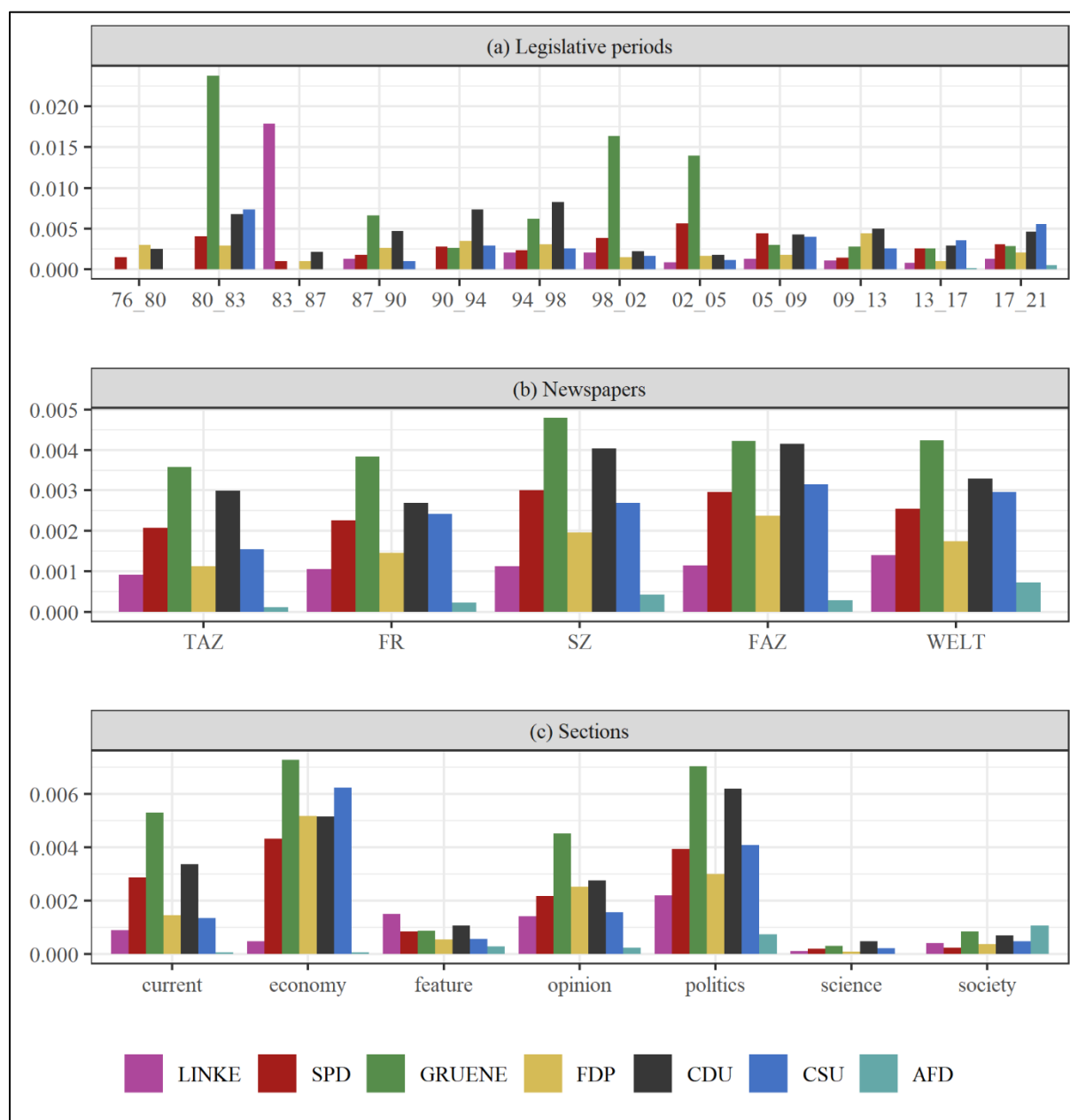
perspectives, but this would be a strong assumption that cannot be empirically tested as the indicators for political actors' mainstream or challenger status are based on the composition of West German governments and parliaments. After their prevalence in the climate change coverage of the preceding legislative period, the absence of Green party actors is similarly surprising. To reiterate, the results for the early legislative periods are based exclusively on the small number of FAZ articles addressing climate change during this time. Despite the similar visibility of party actors across newspapers (see Panel (b) in Figure 6.3), and the collection of all relevant FAZ articles for the respective periods, the visibility of individual actor groups should therefore be interpreted with caution.

The pattern for the following legislative periods indicates higher relative visibility for government party actors (Hypothesis 1.1), though Green party actors reappear as visible issue owners (Hypothesis 2.2) and potential challengers (Hypothesis 2.5) in the periods 1987-1990 and 1994-1998. The first red-green coalition government formed in 1998 by the SPD and the Green party increased the share of articles naming actors affiliated with these parties, particularly the Green party, and decreased the visibility of actors from former government parties. The marked difference in the visibility of Green party and SPD actors in this period, as well as compared to government actors in previous legislative periods, supports the notion that each agenda-building factor adds to actors' visibility in the media, as the combination of executive authority, issue-specific relevance, and issue ownership is associated with higher visibility than the individual factors. After the end of the second red-green coalition in 2005, Green party actors remained more visible than actors from other opposition parties, but less visible than actors from the respective government parties. Overall, the visibility of political actors over time suggests that newspaper coverage of climate change tended to favor the positions of government actors, although Green party actors, and presumably their ambitious climate protection positions, received considerable attention.

The visibility of individual actors over time offers further anecdotal evidence that higher executive authority and issue-specific relevance are associated with greater visibility. For instance, *Angela Merkel* was not mentioned in newspaper articles on climate change before she became environment minister in 1994. As the environment minister, she was mentioned in around 15.5 percent of all newspaper articles addressing climate change and was thus markedly more visible than the average political actor during that time (0.4 percent, compare Figure 6.1). Despite holding prestigious positions as the secretary general of her party (CDU) and the minority leader in parliament, her visibility decreased to around 1.4 and 2.2 percent in the

subsequent legislative periods. After winning the chancellorship in 2005, her visibility rose again to around 13.1 percent of the climate change coverage. This development suggests that executive authority increases actors' visibility and that issue-specific relevance offers an added advantage for environment ministers.

**Figure 6.3: Share of articles naming political actors by party**



**Notes:** Depicted are average shares of articles naming party actors (a) across legislative periods, (b) across newspapers, and (c) across newspaper sections. All shares are relative to the total number of articles in the same legislative period (see Notes for Figure 6.1).

This preliminary conclusion also holds for other actors such as *Gerhard Schröder*, who was mentioned in between 7.0 and 7.7 percent of the newspaper articles on climate change when he held the chancellorship between 1998 and 2002, compared to between 1.0 and 1.6 percent as the prime minister of Lower Saxony. Likewise, *Sigmar Gabriel* was named in around 9.4 percent of the newspaper articles on climate change when he was environment minister in the period 2005-2009, compared to 0.04 percent as the prime minister of Lower Saxony (1998-2002), and around 6.9 percent as the economy minister (2013-2017). In short, the trajectories observed for individual actors who held meaningful political offices are in line with the expectations regarding the agenda-building advantage of actors with higher executive authority and issue-specific relevance.

The distribution of visible political actors across newspapers depicted in the center panel of Figure 6.3 reveals strikingly similar patterns. Considering that newspapers with stronger ideological leanings mentioned political actors less frequently than newspapers closer to the midpoint of the scale (see Figure 6.2), the most remarkable difference is the greater share of articles mentioning AfD actors in the SZ and the Welt. Whether the left-leaning profile of the SZ suggests that its coverage evaluated these actors and their perspectives differently than the right-leaning Welt remains to be seen. While the overall visibility of political actors across newspaper sections (see Panel (c) in Figure 6.3) follows the pattern found for the political domain (see Panel (b) in Figure 6.2), some interesting differences can be observed for individual sections. FDP and CSU actors were mentioned comparatively more frequently in the economy section, reflecting their corresponding programmatic focus that could indicate stronger associative ownership of economic issues. This pattern is even more marked for mentions than for articles (see Appendix 8.2.3). Because issue ownership was only measured for climate change, this tendency is not accounted for in the regression models presented in Chapter 6.2. FDP actors were also relatively more visible in the opinion section of the taz; another tendency that is not readily explained by the discussed agenda-building factors.

Left party actors received disproportional attention in the feature section, especially looking at the number of mentions (see Appendix 8.2.3). While this could indicate that the feature section attached greater importance to controversy (Hypothesis 2.5), there is no corresponding increase in the visibility of other challenger actors. Such an increase can be observed for the society section, where both Left party and AfD actors were mentioned relatively more often, whereas SPD and FDP actors were less visible than in other sections. The society section thus offered an interesting constellation of actors, giving most of its attention to

AfD actors, closely followed by Green party, CDU, and Left party actors. This section thus contrasted the leftmost position in the ideological spectrum (Left party), the most radical position on climate change (Green party), and the rightmost ideological position, which was also the only interpretation to deny the existence of climate change (AfD), creating considerable potential for controversy. The consistent visibility of CDU actors likely reflects their status as the senior partner in the government coalitions of the four most recent legislative periods (Hypotheses 1.1-2), during which roughly 85 percent of the collected newspaper articles on climate change were published. Moreover, CDU actors' issue interpretations could have served as a more moderate reference point for other actors' perspectives. In short, different newspaper sections seem to have weighed the agenda-building factors differently, though some more subtle variations are beyond the scope of the presented analysis.

### ***Business Actors***

Business actors from energy-intensive industries contributing substantially to the national carbon dioxide emissions (con actors) have incentives to portray climate change as less serious and to promote different responses than actors selling solutions to mitigate or adapt to climate change (pro actors), who should benefit from more ambitious climate protection. Figure 6.4 depicts the normalized share of articles mentioning business actors, differentiating associations and companies with different positions.<sup>28</sup> In the first two legislative periods, when newspaper attention for climate change was scarce, companies with vested interests in less ambitious climate protection were the only visible business actors (see Panel (a) in Figure 6.4). Specifically, coverage referred to the international oil companies *Shell* and *Texaco*. In the United States, the oil industry already felt the pressure from the environmental regulations established in response to the demands of the growing environmental movement in the 1970s (Brulle, 2020), providing international companies with incentives to prevent the regulation of other national markets. In the mid-1980s, companies from other energy-intensive industries joined these efforts, which were counterbalanced by the greater visibility of the *Arbeitsgemeinschaft Deutscher Waldbesitzerverbände* (AGDW), an association of private forest owners who could expect to profit from government subsidies to mitigate climate change.

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<sup>28</sup> There are no substantive differences between the number of articles naming business actors and the interpretation suggested by the other visibility metrics shown in Appendix 8.3.



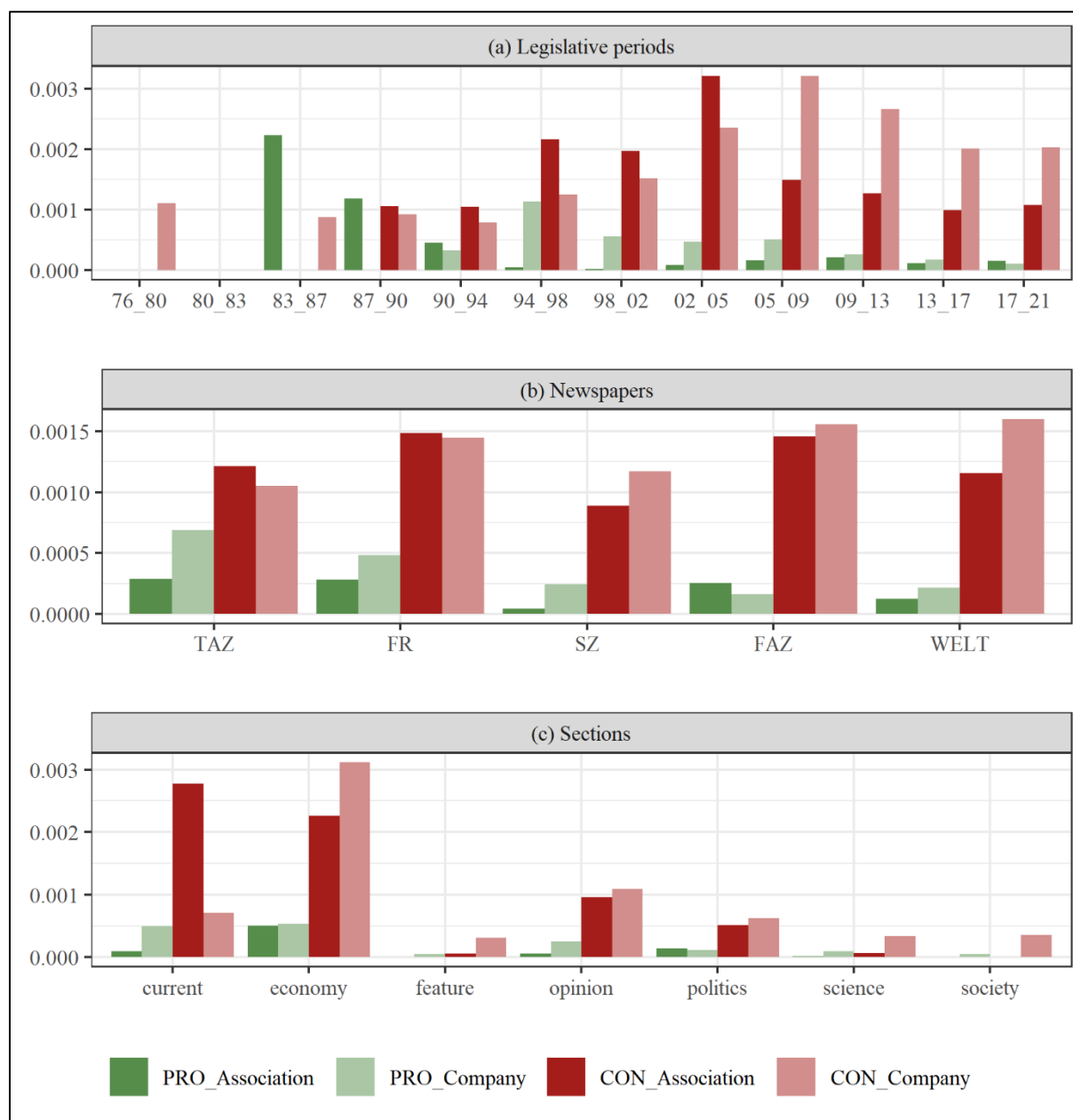
In the late 1980s, industry associations consolidated the efforts of individual companies to prevent further regulations, shifting the balance in favor of business actors opposing firmer climate protection.

Over the following legislative periods, companies and associations with incentives to prevent decisive climate action were mentioned in an increasing share of articles, whereas the visibility of business actors favoring stricter climate protection dwindled. Although climate change coverage mentioning the former group started to decrease in the mid-2000s, the balance did not shift again in favor of the latter group. Looking at the different types of actors expected to promote less stringent climate protection, associations received more attention in the legislative periods between 1987 and 2005. In the remaining legislative periods, individual companies were mentioned more frequently. This reversal seems surprising, as it coincides with the onset of the global financial crisis, which should have increased the relative importance of economic weight (Hypothesis 5.1), favoring large associations combining the economic weight of individual companies. One possible explanation for this pattern is linked to the ability of individual companies to make relatively swift and incisive decisions about budgets and jobs, whose implementation for all members of an association would require an unfeasible amount of coordination and cooperation. In consequence, associations may be perceived as paper tigers, unable to trade on their greater economic weight to compete for media attention with less weighty companies that can make more consequential decisions. To account for this possibility, I estimated an additional regression model including the interaction between economic weight and actor type (see Appendix 18).

Overall, business actors opposing stricter climate protection were considerably more visible than their more environmentally friendly counterparts in most legislative periods. This is in line with the expectations regarding the impact of economic weight (Hypothesis 1.3), as business actors who should favor more rigorous climate protection to advance their business interests possess considerably less economic weight than large companies from high-emission industries such as energy, chemicals, or automotive. While business actors often received less coverage than political or civil society actors (compare the scales for Panel (a) in Figures 6.3, 6.4, and 6.5), they were mentioned relatively frequently throughout the 2000s (see Figure 6.1) when the limits of ecological modernization became apparent and they had incentives to temper issue interpretations promoting immediate and pervasive action to mitigate climate change (see Chapter 3.2). This suggests that the perspectives that business actors pushed onto the media agenda were predominantly aimed at preventing compulsory climate protection regulations

and, thus, more in line with the climate change interpretations of political actors on the right than on the left of the ideological spectrum.

**Figure 6.4: Share of articles naming business actors by climate protection position**



**Notes:** Depicted are average shares of articles naming individual or collective business actors (a) across legislative periods, (b) across newspapers, and (c) across newspaper sections. All shares are relative to the total number of articles in the same legislative period (see Notes for Figure 6.1).

The tendency to favor business actors with incentives to decelerate climate action was less pronounced in left-leaning than in right-leaning newspapers, which could indicate that the latter attach greater importance to economic weight. Although it is equally plausible that the

perspectives of business actors opposing advances in climate protection simply provide a better fit for the ideological orientation of right-leaning newspapers, such an ideologically motivated pattern could not be observed for the visibility of political actors (see Panel (b) in Figure 6.3). If associations really were perceived as less capable of making critical decisions despite their higher economic weight, the slight advantage of associations over companies in the taz and the FR and the reversed pattern in the SZ, the FAZ, and the Welt would offer additional support for the notion that actors' economic weight is less relevant for their visibility in left-leaning than in right-leaning newspapers. Only the taz mentioned business actors expected to benefit from stricter climate protection in a noteworthy share of their climate change articles and thus offered their audience a diverse account of business actors' climate change perspectives. However, assuming that actors from different domains with similar aims promote similar issue interpretations, the other newspapers may create diversity through the inclusion of contrasting views from other domains.

Given the greater balance between business actors with incentives to promote or oppose climate protection in the taz, the focus on the latter group in the current and opinion sections collected exclusively for the taz is rather surprising. The disproportionate visibility of associations that can be expected to oppose climate protection in the current section indicates that the observed pattern cannot be explained by actors' economic weight. Considering that issue ownership is assumed only for specialized business actors and thus reserved for actors who can expect to benefit from stricter climate protection (see Chapter 4.4), this factor is also not relevant here. Although the list of visible actors for the current section includes some comparatively new associations like the *Bundesverband der Deutschen Luftverkehrswirtschaft* (BDL) founded in 2010, and the *Bundesverband der Energie- und Wasserwirtschaft* (BDEW) founded in 2007, it seems unlikely that these actors provided particularly surprising perspectives in their press materials (see Chapter 2.4). Since the pattern observed for the current section does not recur in other sections, even in an attenuated form, it seems similarly unlikely that the mentioned associations were exceedingly prominent. Hence, the visibility of business actors in the current section seems to reflect idiosyncratic rather than systematic factors.

The visibility of business actors in the other sections largely follows the general pattern and thus favors business actors with incentives to oppose climate protection. Overall, companies were mentioned in more articles than associations. This mirrors the distribution of climate change articles across newspapers, as coverage in the SZ, the FAZ, and the Welt, where companies were more visible than associations, accounts for about 74 percent of all collected

articles. The pattern persists for the feature, science, and society sections, though business actors were hardly ever mentioned in these sections. The findings for the business domain do not suggest the same differences in the relative importance of the agenda-building factors across newspaper sections as the visibility of political actors, which is to be expected for controversy and consonance as business actors lack incentives to challenge the societal consensus. Lastly, economic weight seems to consistently prevail over issue ownership for business actors.

### *Civil Society Actors*

The majority of civil society actors included in the dictionary advocate more resolute climate protection, but the remaining minority promotes climate change skeptic views. Depending on the visibility of actors from these opposing interest groups, the at times considerable attention for civil society actors in the newspaper coverage of climate change could imply very different interpretations of the issue. Figure 6.5 shows the normalized share of articles that mentioned civil society actors advocating either climate protection (pro actors) or climate change skepticism (con actors).<sup>29</sup> As the visibility of activist compared to institutionalized actors likely indicates the presence of more radical climate change perspectives and vice versa, Figure 6.5 additionally distinguishes between these actor types. Activist actors promoting climate protection were by far the most visible actors in newspaper articles on climate change, irrespective of the considered legislative period, newspaper, or newspaper section. Institutionalized actors advocating more ambitious climate protection received the second-most attention, but the distance between this group and climate change skeptic actors is negligible for the feature and opinion sections. Climate change skeptics were largely absent in the collected climate change coverage, supporting previous findings that their views are marginalized in German news media (Adam et al., 2020; Kaiser, 2017). Collectively, the three panels in Figure 6.5 imply that the large majority of visible civil society actors demanded ambitious actions to mitigate climate change.

Contrary to the expectation that civil society actors should profit from the transition to a hybrid media system (see Chapter 2.5), their visibility over time suggests that civil society actors were most visible in the 1990s, when climate change first started to become more salient

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<sup>29</sup> The distribution of the number of articles naming civil society actors is almost identical to the distribution of actor mentions, and all visibility metrics support the presented interpretation (see Appendix 8.4).

in the media (see Panel (a) in Figure 6.5). The greater visibility of activist compared to organizational actors could indicate that challenger actors from the civil society domain benefited from audiences' appetite for surprise and controversy in a time of broad societal consensus on climate change. Interestingly, although climate change skeptic actors were named more often in the legislative period 1994-1998 than in other periods, their overall visibility remained very low and organizational actors received more coverage than their activist counterparts. This constellation could suggest that newspapers mentioned challenger actors advocating positions perceived as legitimate in light of the prevailing societal consensus to generate controversy, yet largely marginalized climate change skeptic actors whose perspectives could have markedly increased the controversy of news items but were outside this consensus. If climate change skeptic actors were mentioned in newspaper articles, the presumably less extreme institutionalized actors were preferred over activists, potentially reversing the effect of actors' mainstream or challenger status for this group and resulting in an underestimation of the corresponding coefficient.

Considering that the activist climate protection actor *Greenpeace* was the most frequently named civil society actor throughout the 1990s, an alternative explanation for the high visibility of climate protection activists could be the prominence (Hypothesis 2.3) and/or the perceived issue ownership (Hypothesis 2.2) of this specific actor, which should have become more relevant with increasing issue salience (Hypothesis 4.2). Unfortunately, this explanation cannot be adequately tested with the available data, as the measure for actors' prominence first became available in 2004 and the continuous issue ownership indicator for civil society actors could only be collected for the most recent legislative period. Although *Greenpeace*'s comparatively low prominence in the period 2002-2005 and its extraordinarily high issue ownership in the period 2017-2021 could point to a greater relevance of the latter to explain the high visibility of activist climate protection actors in the 1990s, neither these levels nor the impact of individual agenda-building factors can be assumed to be stable over time. In addition to contextual changes like the transition to a hybrid media system, the rising salience of climate change, the partial disintegration of the societal consensus, and the perception of climate change as a crisis, the emergence of new and highly visible climate protection activists such as *FFF* and its founder *Greta Thunberg*, *XR*, or *Ende Gelände* severely limits the validity of generalizations over time.

In light of the increasingly explicit challenge to the societal consensus posed by the AfD, as well as the proclamation of the climate crisis, the increased visibility of climate protection

activists in the most recent legislative period compared to the preceding periods is rather surprising, as newspapers are expected to attach less weight to controversy and surprise in times of uncertainty and crisis. While the observed increase in visibility could be driven by the considerable prominence of individual actors or high degrees of issue ownership, it is equally plausible that newspapers did not attach less weight to controversy and surprise despite the disintegration of the societal consensus and the perception of a climate crisis (contradicting Hypotheses 5.2 and 6.2). Alternatively, the challenge to the societal consensus and the proclaimed critical nature of climate change may not have been perceived as sufficiently severe to prompt such changes.

Interestingly, climate change skeptic actors were completely absent from the newspaper coverage in the most recent legislative period, again pointing to an issue-specific understanding of challenger actors in the news production process. In Chapter 4.4, actors' mainstream or challenger status was defined relative to their general rather than their climate change position. However, it is conceivable that journalists instead base their expectations of controversy on actors' (dis-)agreement with the prevailing societal consensus and thus expect consonance from actors whose positions are in line with the societal consensus and controversy from actors who oppose it. To test the relevance of this alternative definition, the domain models were re-estimated with an additional independent variable indicating actors' presumed agreement with the long-standing societal consensus that climate change exists and requires action to prevent serious harm (see Appendix 20).

Taking into account the higher overall visibility of civil society actors in left-leaning newspapers (see Panel (a) in Figure 6.2), the article shares for activist and institutionalized actors promoting different climate change positions is remarkably consistent across newspapers (see Panel (b) in Figure 6.5). Although civil society actors were named less frequently in right-leaning newspapers, climate change skeptic actors did not receive more attention in the FAZ or the Welt than in their more left-leaning counterparts. Contrary to findings reported by Adam et al. (2020), this is not due to right-leaning newspapers allocating less space to the issue of climate change (see Figure 4.1). Like the distribution of visibility within the political domain (see Panel (b) in Figure 6.3), the pattern observed for different civil society actors thus offers no indication that newspapers favored individual actors for ideological reasons, further strengthening the notion that right-leaning newspapers attached more importance to economic weight.

**Figure 6.5: Share of articles naming civil society actors by climate protection position**

**Notes:** Depicted are average shares of articles naming civil society actors (a) across legislative periods, (b) across newspapers, and (c) across newspaper sections. All shares are relative to the total number of articles in the same legislative period (see Notes for Figure 6.1).

Although the visibility of civil society actors across newspaper sections (see Panel (c) in Figure 6.5) largely follows the described general pattern, some interesting deviations can be observed for the current, feature, opinion, and society sections. Once again, actors' visibility in the current section does not reproduce the overall pattern found in the taz, as the current section named climate protection activists in an even larger share of its articles, whereas climate change skeptic actors were virtually excluded from coverage. Considering that many climate protection

activists emerged comparatively late in the investigated period, this deviation could suggest that novelty was relatively more important for the current section than for other sections (Hypothesis 2.4). Though the notion that the current section emphasizes current developments seems quite plausible, a similar pattern could not be observed for political actors' visibility in the current section and the assumed mechanism seems unlikely for business actors, indicating that novelty is less decisive than competing (domain-specific) agenda-building factors.

Climate protection activists were also overrepresented in the feature and society sections. Since issue owners from the political and business domains were not mentioned more frequently in these sections and other challenger actors from the civil society domain received less rather than more coverage, novelty could generally have been more important for civil society actors than for stakeholders from other domains. In addition, the unequal representation of challenger actors from the civil society domain in the society section does not support the preliminary conclusion derived from the high visibility of political challengers in this section (see Panel (c) in Figure 6.3) that controversy could have been more important in this section than in others. Lastly, climate change skeptic actors were relatively more visible in the opinion section of the taz, continuing a pattern of increased coverage for actors opposing ambitious climate protection goals in this section (compare Panel (c) in Figures 6.3 and 6.4). Given the decidedly left-leaning profile of the taz, this coverage may very well evaluate these actors and their perspectives negatively, but it nonetheless increases their visibility.

### *Scientific Actors*

Almost all scientific actors included in the dictionary (88 percent) represent perspectives which conform to the consensus about the existence and the implications of climate change expressed in the IPCC reports (pro actors), however, the remaining twelve percent are so-called contrarian scientists who promote contending interpretations (con actors). As with civil society actors, the visibility of scientific actors could thus indicate the presence of very different climate change positions, warranting a closer look at the shares of articles naming conformist or contrarian scientific actors (see Figure 6.6).<sup>30</sup> Although conformist scientists generally received more attention than their contrarian colleagues, Panel (a) shows that the latter were mentioned in

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<sup>30</sup> The distributions of actor mentions, articles naming actors exclusively, and the mean number of other actors named in the same article as an actor all support the same substantive conclusions (see Appendix 8.5).



substantial article shares in some legislative periods. Specifically, contrarian scientific actors were first named in newspaper articles addressing climate change in the mid-1990s and continuously increased their visibility until the mid-2000s, when the gap between contrarian and conformist scientific actors decreased to less than 50 percent. In the following legislative periods, contrarian scientists were mentioned considerably less frequently, despite another spike in attention in the period 2009-2013. Given the marginalization of climate change skeptic perspectives documented in the literature (Adam et al., 2020; Kaiser, 2017; Weingart et al., 2000) and observed for the civil society domain, the relatively high visibility of contrarian scientific actors in some periods seems surprising.

While their scientific qualification may lend more weight to the perspectives of contrarian scientists compared to other climate change skeptic actors, scientific expertise alone cannot explain the shifting balance between scientific actors with different positions on the existence or ramifications of climate change. However, several universal agenda-building factors could have contributed to the observed pattern. A number of contrarian scientists gained prominence (Hypothesis 2.3) in the United States in the late 1990s and early 2000s, which led to considerable attention for their perspectives in U.S. quality newspapers (Boykoff, 2007). This attention started to wane in 2005 (Boykoff, 2007), mirrored in the perceptible decline in the number of newspaper articles naming contrarian scientific actors in the legislative period 2005-2009. The controversial debate surrounding climate change skeptic publications, which many researchers classified as methodologically flawed but were nonetheless readily adopted by conservative political actors (e.g., in the *Soon and Baliunas* controversy), could have raised the profile of contrarian scientists for German audiences. The presence of *Willie Soon* and *Sally Baliunas*, two main protagonists of the U.S. debate, among the most visible scientific actors for the period 2002-2005 supports this interpretation. Another contrarian scientist often named at the time was *Bjørn Lomborg*, who gained international attention as the author of a controversial book published in 2001 that refuted the IPCC consensus, and whose visibility could likewise have arisen from his prominence. In addition to their (temporary) prominence, many visible contrarian scientists first entered the climate change debate in the early 2000s, whereas conformist scientists tended to be already established during this period. Hence, novelty could have (further) enhanced the visibility of the former group (Hypothesis 2.4).

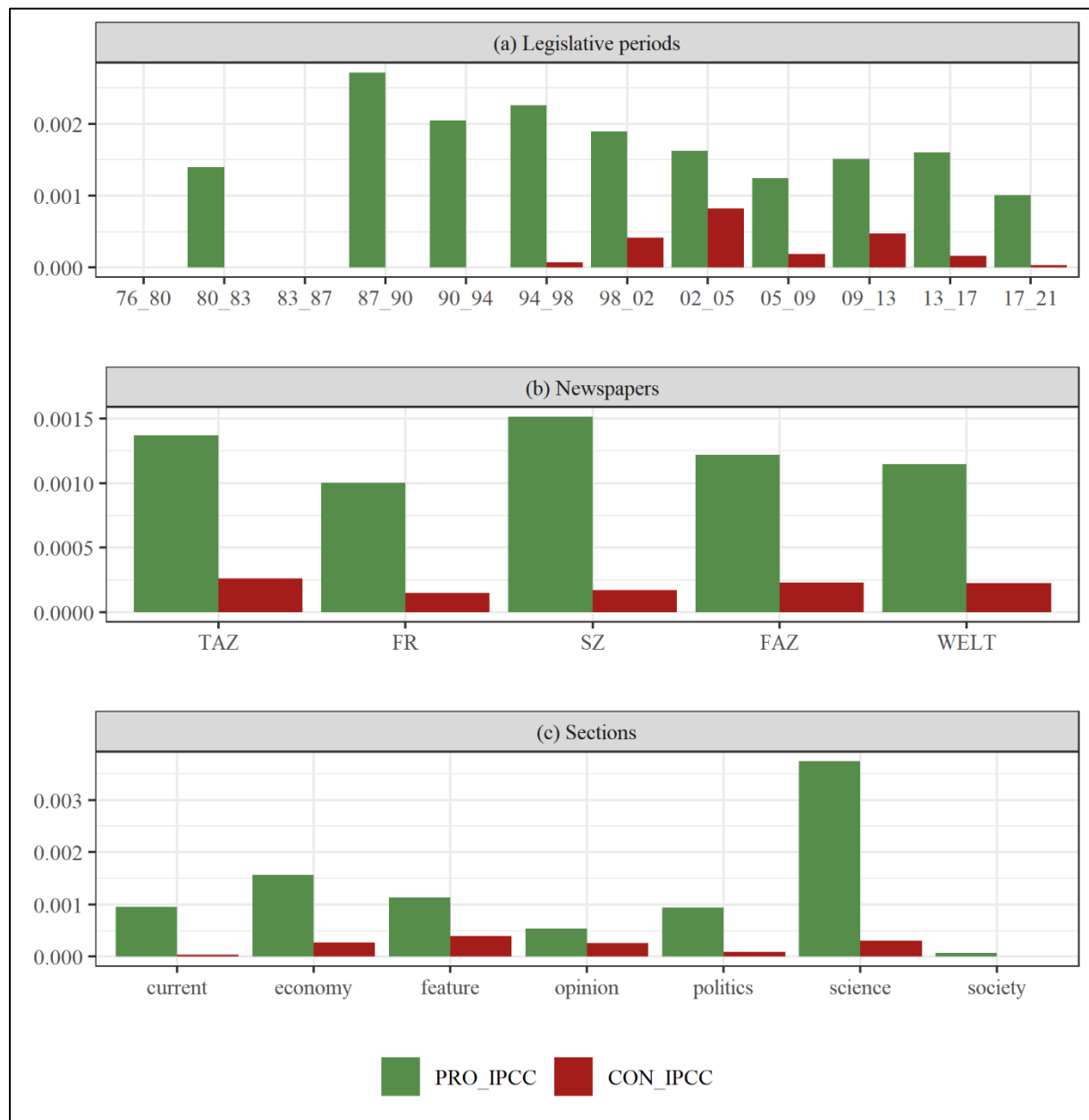
Lastly, contrarian scientific actors were usually not affiliated with traditional academic institutions and were thus likely perceived as challenger actors (see Chapter 4.4). The broad societal consensus on climate change sustained between the mid-1908s and the emergence of

the AfD in 2013, as well as the absence of serious crises during this time, could have amplified audiences' desire for controversy (Hypotheses 5.2 and 6.2), leading to higher coverage shares for challenger actors and thus contrarian scientists. Compared to other climate change skeptic actors, their scientific qualification likely increased the perceived legitimacy of contrarian scientists, giving them an edge over challengers from other domains. In contrast, contrarian challenger actors were comparatively less visible than conformist mainstream actors in the last two legislative periods when the societal consensus came under attack and climate change was increasingly conceived of as a crisis. As contrarian scientific voices were largely absent in Germany,<sup>31</sup> the absence of challenger actors from the scientific domain in earlier newspaper coverage likely reflects the lack of available challenger perspectives rather than an unexpected focus on mainstream scientific actors. In consequence, climate change coverage should have given more attention to challenger actors from other domains, which is partly supported by the visibility of the Green party in earlier periods.

Given that the work of most contrarian scientists was not recognized by the academic community, their continuous issue ownership tends to be significantly lower than for renowned conformist scientists, making this factor an unlikely candidate to explain increases in the visibility of contrarian scientific actors. Interestingly, the visibility of scientific actors who disagreed with the IPCC consensus declined when the salience of climate change increased in the period 2005-2009 but rose when salience decreased in the following legislative period, before declining again when the salience of climate change started to surge in the mid-2010s. This anticyclic pattern lends tentative support to the expectation that the relative importance of issue ownership is higher when an issue is salient (Hypothesis 4.2), as the distribution within the scientific domain shifted in favor of conformist mainstream actors with higher degrees of issue ownership when climate change was salient. At the same time, the relatively high visibility of conformist scientific actors across legislative periods seems to contradict the expectation that (scientific) expertise is relatively more important when an issue is salient. Furthermore, there is no indication that journalists attached more weight to scientific expertise when the societal consensus on climate change was challenged, supporting the notion that accuracy is not valued more in the absence of societal consensus (Hypothesis 6.3).

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<sup>31</sup> The only noteworthy German scientific actor who denies the IPCC consensus on climate change is *Fritz Vahrenholt*, who entered the debate around 2012.

**Figure 6.6: Share of articles naming scientific actors by position on the IPCC consensus**

**Notes:** Depicted are average shares of articles naming scientific actors (a) across legislative periods, (b) across newspapers, and (c) across newspaper sections. All shares are relative to the total number of articles in the same legislative period (see Notes for Figure 6.1).

Looking at the visibility of conformist and contrarian scientific actors across newspapers (see Panel (b) in Figure 6.6), we see that conformist scientists were considerably more visible in all newspapers but contrarian scientists received slightly more relative attention in the taz, the FAZ, and the Welt. While we can speculate that these actors were evaluated differently in the left-leaning taz than in the more right-leaning FAZ and Welt, the question how closely actors' perspectives were reproduced must be relegated to the second part of the analysis. Once again,

the article shares mentioning different actors from the same domain do not indicate an ideological slant in the source selection of more left- or right-leaning newspapers, strengthening the impression that newspapers with different ideological leanings mentioned a similar range of actors in their climate change coverage.

The differences in the relative visibility of contrarian scientific actors are more marked for different newspaper sections. Whereas scientific actors who deny the IPCC consensus were hardly ever mentioned in the current section and received comparatively less attention in the science and politics sections, they were named considerably more frequently in the feature and opinion sections. The higher visibility of conformist scientists in the current section is in line with the observation that this section tends to diverge from the overall pattern for the taz in ways not readily explained with the discussed agenda-building factors. While civil society and scientific actors with higher degrees of issue ownership received disproportionate attention in the current section, this does not hold for the political domain, where the Green party was only marginally more visible compared to the overall distribution in the taz, or the business domain, where issue owners were named relatively less frequently (compare Panel (c) in Figures 6.3, 6.4, and 6.5). At the same time, the higher visibility of established scientific actors in the current section contradicts the tentative conclusion that novelty was more important in this section, suggested by the greater article shares for newer civil society and business actors, though the assumed mechanism seems unlikely for the latter group. Given the potentially confounding influence of domain-specific agenda-building factors, which may conceal consistent patterns based on issue ownership or novelty, the regression analyses in the following chapter are better suited to discern whether the observed divergence is driven by one or more of the discussed agenda-building factors.

The greater attention for conformist scientists in the science section may reflect an increased importance of actors' academic impact captured by their continuous issue ownership for this section. Although there is no indication that issue ownership is generally more important for actors' visibility in the science section (compare Panel (c) in Figures 6.3, 6.4, and 6.5), it seems plausible that science journalists would draw on this criterion to differentiate more and less credible scientific actors for their coverage. Alternatively, prominence (Hypothesis 2.3) or consonance (Hypothesis 2.6) may be particularly important for coverage in the science section, as conformist scientists tended to be more prominent and were likely perceived as mainstream actors. A similar divergence can be observed for the politics section, where conformist scientific actors received slightly more attention, though neither issue ownership, nor prominence, or

mainstream status are more important across domains. This suggests that individual universal agenda-building factors could be more relevant for actors from specific domains, which is tested with domain-specific regression models (see Chapter 6.2).

The higher visibility of contrarian scientists in the opinion section corresponds to the pattern observed for the other domains, where actors opposing greater climate protection were generally mentioned in disproportionate article shares (see Panel (c) in Figures 6.3, 6.4, and 6.5), though the evaluation of these actors and their perspectives in the left-leaning taz remains to be determined. The picture for the feature section is less clear. The article shares naming political and civil society actors indicate that some challenger actors tended to be more visible in this section, whereas others were largely ignored. Moreover, the challenger actors from these domains who received more attention in the feature section generally promoted more ambitious climate protection, but the opposite pattern is observed for scientific actors. This could indicate that articles in the feature section generated controversy by including contrasting perspectives from challenger actors from different domains. However, the selection of challenger actors within domains does not seem to be systematically linked to the agenda-building factors.

### *Summary*

The visibility of actors from different domains varied over time, as well as across newspapers and newspaper sections. In many legislative periods, political actors were mentioned most frequently, but scientific actors tended to be more visible before the 1990s, and civil society actors received greater coverage shares in the periods 1994-1998 and 2017-2021. Civil society actors thus gained visibility earlier than expected, closing the gap to scientific actors and surpassing business actors at the beginning of the 1990s. The large article shares mentioning civil society actors in the period 2017-2021 likely reflect the recent emergence of several salient climate protection activists. Business actors were often named in the mid-1980s, when international oil companies attempted to prevent further environmental regulations, and again in the 2000s, when the limits of ecological modernization became apparent. Overall, articles tended to focus on individual actors until the late 1980s, but mentioned an increasing number of actors in later legislative periods, especially when covering political actors.

Left-leaning newspapers dedicated more coverage to civil society actors, whereas right-leaning newspapers mentioned scientific and business actors relatively more often. Political actors were more visible in newspapers closer to the center of the ideological spectrum than in

newspapers with stronger ideological leanings. As expected, newspaper sections tended to attach more weight to agenda-building factors that are specific to the covered domain, with political actors being mentioned relatively more frequently in the politics section, business actors in the economy section, and scientific actors in the science section. In short, the observed patterns across domains are largely in line with the expectations and can be explained by the agenda-building factors introduced in Chapter 2.4.

A closer look at different actor groups within domains, which had incentives to promote more or less ambitious climate protection, revealed that newspapers named actors with a range of positions in their climate change coverage. Overall, actors promoting climate protection tended to be more visible than actors opposing stricter climate protection, as the Greens were mentioned relatively more frequently in the political domain, as were climate activists in the civil society domain, and scientists who agree with the IPCC consensus in the scientific domain. The exception was the business domain, where companies and associations with incentives to prevent further environmental regulations received more coverage than actors expected to profit from stricter regulations. However, the share of articles mentioning business actors was much smaller than the share naming actors from the other three domains, suggesting that the overall coverage still featured more perspectives advocating climate protection.

The visibility of different actor groups changed over time, in many cases reflecting the expectations regarding domain-specific agenda-building factors and contextual variations introduced in Chapters 2.4, 2.5, and 3.3. For instance, political actors with executive authority and business actors with more economic weight generally received more coverage, whereas the visibility of issue owners tended to increase with the salience of climate change, and challenger actors were often more visible in the context of broad societal consensus. Furthermore, the concurrence of several agenda-building factors increased actors' visibility more than individual factors. However, some observed patterns like the rising article share for climate activists against the backdrop of an increasingly challenged consensus and the climate crisis did not fit the expectations regarding contextual variations. Especially before the 1990s, deviations may be due to the low number of newspaper articles, but unexpected patterns in later periods seem to indicate that some contextual variations did not have the hypothesized effects, or that journalists' perceptions differed from the account in Chapter 3.3.

The visibility of actors promoting different interpretations of climate change was remarkably similar across newspapers, offering no indication that newspapers favored actors with more ideologically congruent perspectives, though visibility does not equal affirmation.

More pronounced differences in the visibility of actor groups could be observed across newspaper sections. While some of these patterns held across domains, pointing to the differential importance of individual agenda-building factors, others only emerged for individual domains, suggesting the possibility that even universal agenda-building factors had domain-specific effects. Other deviations were inconsistent, which could reflect the confounding influence of domain-specific factors or point to omitted factors in the proposed theoretical framework.

Regarding the objectivity and diversity of the coverage, the visibility of individual actor groups suggests that the collected newspapers named a similar set of actors and that diversity tended to be generated through the inclusion of actors with different climate change positions across rather than within domains. Moreover, different newspaper sections gave more or less attention to actor groups promoting different issue interpretations, increasing the diversity of the set of actors named in the same newspaper. Overall, newspaper articles thus offered avid readers a range of perspectives on climate change, though the issue interpretations presented in individual newspaper sections tended to be less diverse. Since the general focus on actors favoring more ambitious climate protection mirrors the higher prevalence of such perspectives in Germany, as well as the current scientific consensus that decisive action is required to prevent profound and irreversible changes in the global climate, the lack of (artificial) balance (cf. Boykoff, 2007) supports rather than disconfirms the objectivity of the coverage.

## **6.2 Regression Results for Actors' Visibility**

The effects of the agenda-building factors introduced in Chapter 2.4 are very similar for the number of mentions in newspaper articles on climate change, the number of articles naming an actor, and the number of articles naming an actor exclusively. The following subchapters thus depict the effects of individual agenda-building factors on the number of articles naming an actor, unless the results for the number of mentions or exclusive articles suggest a different substantive interpretation. In contrast, the effects on continuous exclusivity, that is the mean number of actors named in the same articles as the considered actor, are less consistent with the results for the other indicators. Contrary to the theoretical expectation, the effects for this indicator are not consistently reversed compared to the other measures. The effects for continuous exclusivity are thus displayed alongside the effects for the number of articles in the

full models and are discussed for other models when the results diverge from the findings for the full model.

In addition to the full models, separate models were estimated for actors from different domains, as well as for different periods of interest, newspapers, and newspaper sections. The domain models allow me to examine the potentially domain-specific impact of individual agenda-building factors and to explore how the domain-specific operationalization of some universal factors influences the observed effects. The period models enable me to trace changes in the effects over time to investigate the expectations regarding the influence of changing context conditions discussed in Chapter 2.5. The agenda-building factors may also be more or less relevant for newspapers with different ideological leanings, which address climate change in different shares of their coverage. Specifically, newspapers dedicating larger coverage shares to climate change should attach more weight to issue-specific relevance, scientific expertise, and issue ownership. The same applies to newspaper sections, where climate change is more or less salient and which likely give more attention to actor groups that are relevant to their thematic focus. Accordingly, political actors may have an advantage over other actors in the politics section, business actors in the economy section, and scientific actors in the science section. Newspaper sections may also attach more weight to agenda-building factors with particular relevance for their focus. Hence, executive authority and issue-specific relevance could be relatively more important in the politics section, economic weight in the economy section, scientific expertise in the science section, and novelty in the current section. On the other hand, the four domain-specific factors could also be more relevant for other sections, where actors from the respective domain receive less attention and journalists can draw on these factors to select actors for coverage.

All depicted effects are incidence rate ratios (IRRs)<sup>32</sup> based on estimates from negative binomial regression models. Multiple estimates for the same agenda-building factor based on different operationalizations of actors' economic weight and mainstream or challenger status are superimposed in the figures to show the range of estimates. Filled points with 95 percent

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<sup>32</sup> IRRs capture differences in the incidence rate between groups, where values below 1 indicate that the incidence rate is lower in the considered group than in the reference group, the value 1 indicates that the incidence rate is equal in both groups, and values above 1 indicate that the incidence rate is higher in the considered group than in the reference group. To give an example, an IRR of 0.7 for issue owners would indicate that this group received 30 percent less coverage than non-owners, an IRR of 1 would show that both groups received equal coverage, and an IRR of 1.7 would indicate that issue owners received 70 percent more coverage than non-owners.

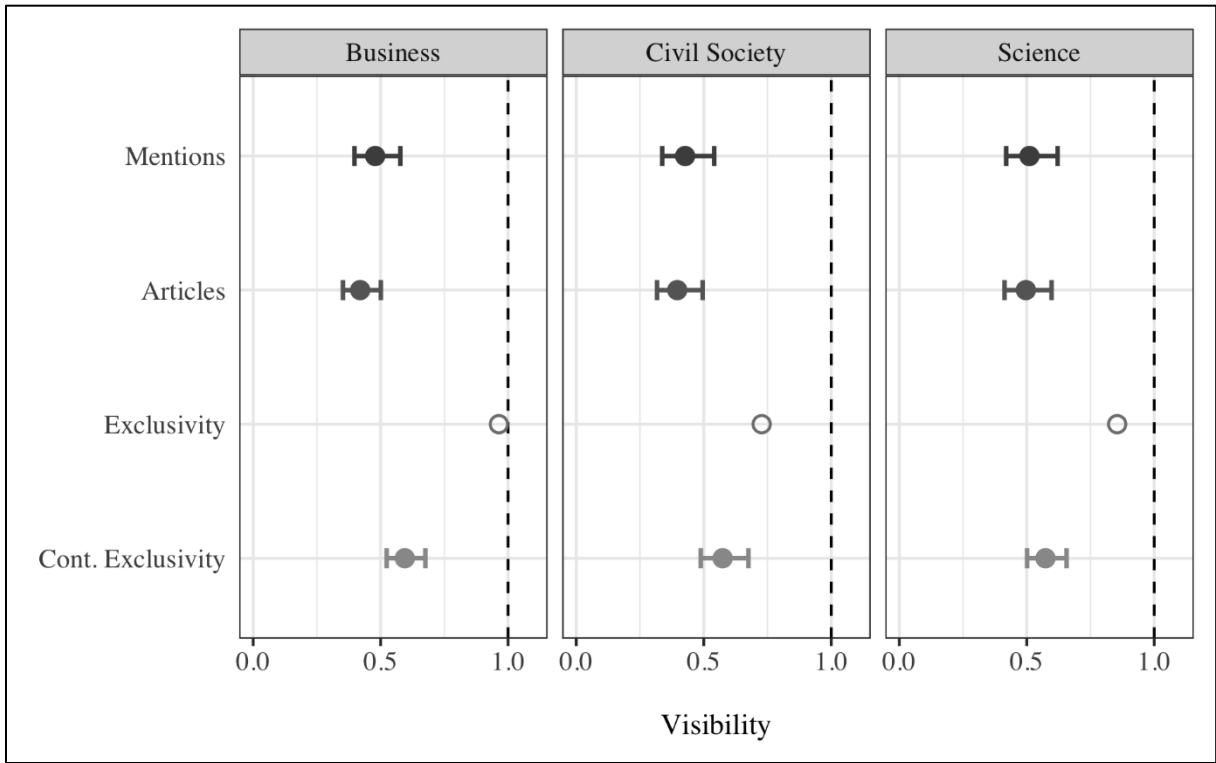


confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. The width of the confidence interval line increases with the number of superimposed estimates. To keep the figures readable, I refrained from depicting confidence intervals for insignificant estimates, but the full regression results include standard errors for all estimates. Since the indicator for actors' prominence is unavailable before 2004, all models including earlier legislative periods were estimated with and without the prominence variable. Models without the prominence measure are based on the full collection of newspaper articles published between 1976 and 2020 ( $t_1$ ), whereas models with the prominence measure are based on newspaper articles published between 2002 and 2020 ( $t_2$ ). All models not marked as binary include fixed effects for the respective legislative periods included in the model as well as one lag of the dependent variable (see Appendix 15 for models with two lags and Appendix 16 for models without lags). References to the full regression results, further model specifications, and the respective sample sizes are available in the figure notes.

### ***Executive Authority***

Actors with executive authority can make decisions which are consequential for people's lives, and their positions can therefore be expected to be of interest to large audience shares. Actors' visibility in the newspaper coverage of climate change should thus increase with their level of executive authority (Hypothesis 1.1), with chancellors having the largest probability to be named, followed by ministers, party chairs, and other political actors. To capture the difference between political actors and actors from other domains, I first estimated four base models for the visibility metrics, including one lag of the respective visibility metric, a categorical indicator for actors' domain, and fixed effects for the legislative periods as independent variables (see Appendix 9 for the full regression results). The results in Figure 6.7 indicate that political actors (reference category) were named at higher rates and in more articles than actors from other domains, although actors from all domains received similar shares of exclusive coverage. In line with the descriptive findings (see Figure 6.1), political actors were also named alongside more other actors. Due to the structure of the data, the effect of the domain variable could not be estimated in the full model controlling for the agenda-building factors. Hence, the results offer an intuition that political actors were dominant in newspaper articles on climate change, but cannot preclude that the observed differences wholly or partially reflect the influence of agenda-building factors other than executive authority.

Figure 6.7: The visibility of actors from different domains



**Notes:** Depicted are IRRs of actors' domain affiliation for the number of mentions (Mentions), the number of articles in which an actor was mentioned (Articles), the number of articles in which an actor was mentioned exclusively (Exclusivity), and the average number of actors mentioned in the same article as an actor (Cont. Exclusivity; see Appendix 9). Estimates are based on 41,864 articles. N is 4,890. The reference category are political actors. **Legend:** Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. Estimates are based on negative binomial regression models with one lag including LP-FE.

To test the influence of executive authority on the visibility of political actors more rigorously, I estimated whether chancellors, ministers, and party chairs were named at higher rates than other actors in newspaper articles on climate change, controlling for the other agenda-building factors (see Appendices 10 and 11 for the full regression results). Figure 6.8 shows the effect of different degrees of executive authority on the number of articles mentioning actors from all domains (Articles) or the political domain (Politics), as well as on the average number of actors named alongside actors from all domains (Cont. Exclusivity). For the domain models, other actors are parties as well as members of the national or state parliaments. For the full models, this group also includes actors from the other domains. Given that executive authority is specific to the political domain, the estimates for the full model and the domain model are based on the same set of political actors, with the difference that the domain model contains fewer other actors and cannot control for economic weight and scientific expertise. Hence, it is not surprising that these estimates only differ in the width of their confidence intervals. Supporting

Hypothesis 1.1, executive authority generally had a positive effect on the number of articles naming an actor, as chancellors, ministers, and party chairs were all mentioned at higher rates than other (political) actors.

Although the differences between chancellors, ministers, and party chairs are not statistically significant,<sup>33</sup> the point estimates suggest that chancellors were named in around 10.9 times as many articles as other (political) actors in the period between 1976 and 2020 ( $t_1$ ), and 12.4 times as many articles when controlling for prominence in the period between 2002 and 2020 ( $t_2$ ). They thus tended to have a larger advantage than ministers, who were named around 4.1 times as often as other (political) actors in  $t_1$  and around 8.9 times as often in  $t_2$ , in both cases controlling for the issue-specific relevance associated with the Department of the Environment. In comparison, party chairs were named in 6.5 times as many articles as other (political) actors in  $t_1$  and around 8.0 times as often in  $t_2$ . Hence, they were tendentially better able to build the media agenda than ministers in  $t_1$ , whereas the two groups had a similar advantage over other (political) actors in  $t_2$ . This could indicate that the decisions of ministers were perceived as less relevant for audiences during earlier periods, as the difference between  $t_1$  and  $t_2$  is statistically significant for this group, but may also reflect the missing control for prominence. The rather large confidence intervals were to be expected as the number of actors with executive authority in general, and chancellors in particular, was comparatively small even for the longer period between 1976 and 2020 (four chancellors). For the shorter period, *Angela Merkel* was the only actor to hold the chancellorship, resulting in high uncertainty of the estimated effects.

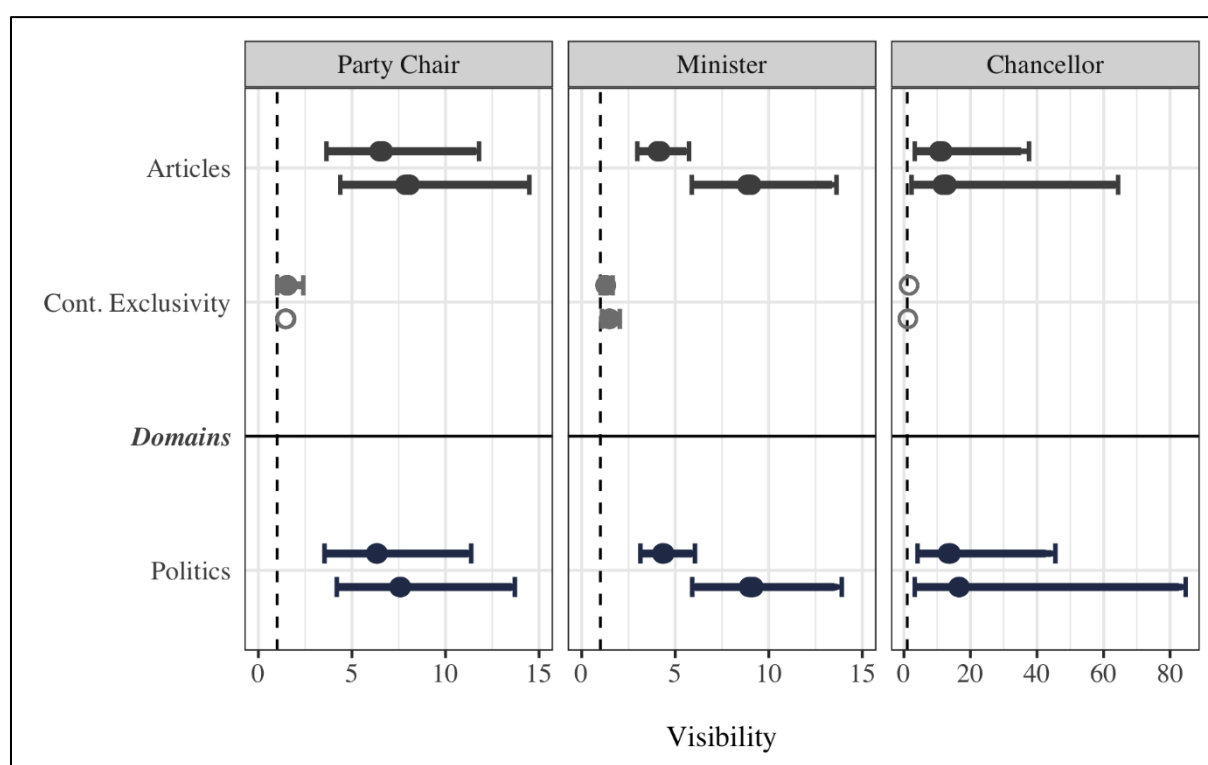
Executive authority had very similar effects on the number of mentions and exclusive articles (see Appendix 10.2-3). However, the pattern for continuous exclusivity depicted in Figure 6.8 clearly departs from the expectations. If executive authority increased actors' chances of being mentioned alongside fewer other actors, the effect would be negative. Instead, we observe comparatively small but statistically significant positive effects for party chairs in  $t_1$ , as well as for ministers. On average, party chairs were named alongside 1.5 times as many actors as other (political) actors between 1976 and 2020, though this effect is not statistically significant when controlling for prominence. Ministers were mentioned alongside 1.3 times as many actors in  $t_1$  and 1.5 times as many actors in  $t_2$ . This is somewhat perplexing given the

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<sup>33</sup> The statistical significance of differences between effects could often be determined through visual inspection of the confidence intervals, but the p-value was calculated in ambiguous cases (cf. Cumming & Finch, 2005).

positive effects of executive authority on the number of articles naming actors exclusively. However, the effects for continuous exclusivity could reflect a general tendency to include actors with executive authority in all newspaper articles, independent of their exclusivity. In other words, actors with executive authority could be covered on their own as well as alongside other actors, whereas other (political) actors would tend to be named alongside actors with (higher) executive authority.

**Figure 6.8: The effect of executive authority on visibility**

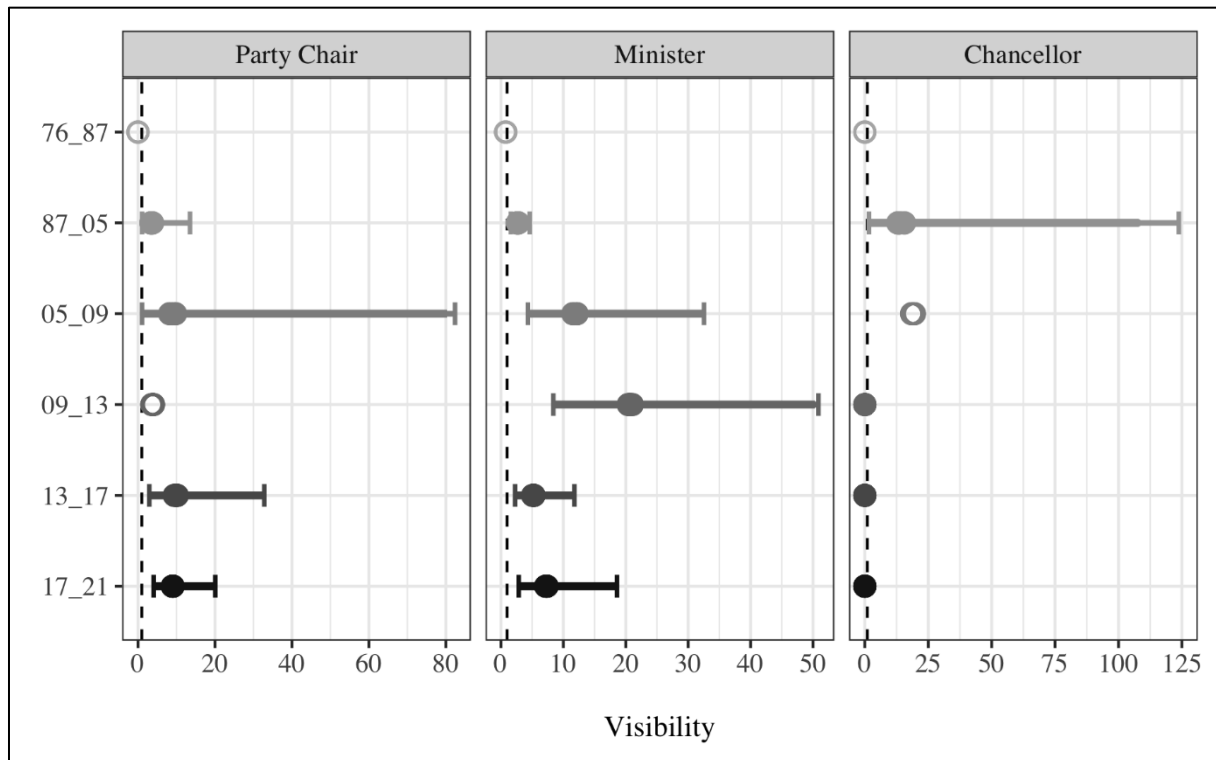


**Notes:** Depicted are IRRs of executive authority for the number of articles naming an actor (Articles) and the average number of actors named in the same article as an actor (Cont. Exclusivity) for all domains, as well as the number of articles naming an actor from the political domain (Politics). The reference category for the full model are other actors; the reference category for the domain models are other political actors. **Legend:** Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. For each specification, the upper estimate shows IRRs from models without the prominence variable based on newspaper articles from all periods ( $t_1$ ), and the lower estimate shows IRRs from models with the prominence variable based on newspaper articles published between 2002 and 2020 ( $t_2$ ). Estimates and confidence intervals for the same specification based on different operationalizations of economic weight and mainstream status are superimposed to show the range of estimates. The width of the confidence interval line indicates the number of superimposed confidence intervals. Estimates are based on negative binomial regression models with one lag controlling for other agenda-building factors and including LP-FE (see Appendix 10 for the full models and Appendix 11 for the domain models). Estimates are based on 41,864 articles in  $t_1$  and 37,724 articles in  $t_2$ . N for the full model is 4,386 in  $t_1$  and 2,771 in  $t_2$ ; N for the political domain model is 2,089 in  $t_1$  and 1,445 in  $t_2$ ; N for the business domain model is 772 in  $t_1$  and 383 in  $t_2$ ; N for the civil society domain model is 577 in  $t_1$  and 353 in  $t_2$ ; N for the scientific domain model is 948 in  $t_1$  and 590 in  $t_2$ .

To reveal potential changes in the relevance of executive authority over time, the effect was estimated separately for the periods of interest identified in Chapter 3.3 (see Appendix 12 for the full regression results). The results in Figure 6.9 show some interesting deviations from the pattern observed in the full model. Most notably, the effect of holding the chancellorship is significantly negative in later legislative periods, indicating that the chance for Chancellor *Angela Merkel* to be named in climate change articles was more than 99.9 percent lower than for other actors. Considering the consistently high visibility of Chancellor *Merkel* compared to other actors from the political domain in the relevant legislative periods, this finding seems to be an artifact of the lagged dependent variable term and the singular observation of being a chancellor. The models without lags show large positive effects (average IRR 61.6 in 2009-2013, 54.1 in 2013-2017, and 21.8 in 2017-2021), some of which are statistically significant at the 90 percent confidence level, while the coefficients for party chairs and ministers remain largely unchanged (see Appendix 16.3). In short, the low number of observations for this category does not allow me to calculate meaningful effects for individual periods of interest.

Considering the remaining two categories, the comparatively larger effects for party chairs than for ministers in  $t_1$  observed above seems to stem at least partly from the greater weight of later legislative periods in this specification, as party chairs did not significantly differ from other actors before 2005 or between 2009 and 2013 (irrespective of the number of lags, see Appendices 14.3 and 15.3). Contrary to the expectations derived in Chapter 2.5, there is no discernible pattern in the effect of executive authority over time. The changes for party chairs and ministers are not statistically significant and consistently move in different directions, offering no indication that executive authority became less important for newspaper coverage when the media system transitioned from traditional to hybrid between 2005 and 2009 (Hypothesis 3.1). Although the difference between party chairs and other actors was only statistically significant when issue salience was high (2005-2009 and 2013-2021, see Figure 3.1), the difference between ministers and other actors tendentially widened in the period 2009-2013, when climate change was comparatively less salient. Hence, the results do not systematically support the expectation that executive authority becomes relatively more important when issues are salient (Hypothesis 4.3). The case is reversed for the notion that the media values executive authority more in times of crisis (Hypothesis 5.1), which holds for ministers but not for party chairs. The effects for neither category indicate that executive authority was less important in periods of broad societal consensus (Hypothesis 6.1).

**Figure 6.9: The effect of executive authority on visibility over time**



**Notes:** Depicted are IRRs of executive authority for the number of articles naming an actor by period of interest. The reference category are other actors. **Legend:** Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. Estimates and confidence intervals for the same specification based on different operationalizations of economic weight and mainstream status are superimposed to show the range of estimates. The width of the confidence interval line indicates the number of superimposed confidence intervals. Estimates are based on negative binomial regression models with one lag controlling for other agenda-building factors and including LP-FE (see Appendix 12). Estimates for the individual periods are based on 99 articles in 76\_87; 6,125 articles in 87\_05; 9,083 articles for 05\_09; 6,638 articles for 09\_13; 6,922 articles for 13\_17; and 12,993 articles for 17\_21. N is 433 for 76\_87; 1,578 for 87\_05; 453 for 05\_09; 522 for 09\_13; 595 for 13\_17; and 800 for 17\_21.

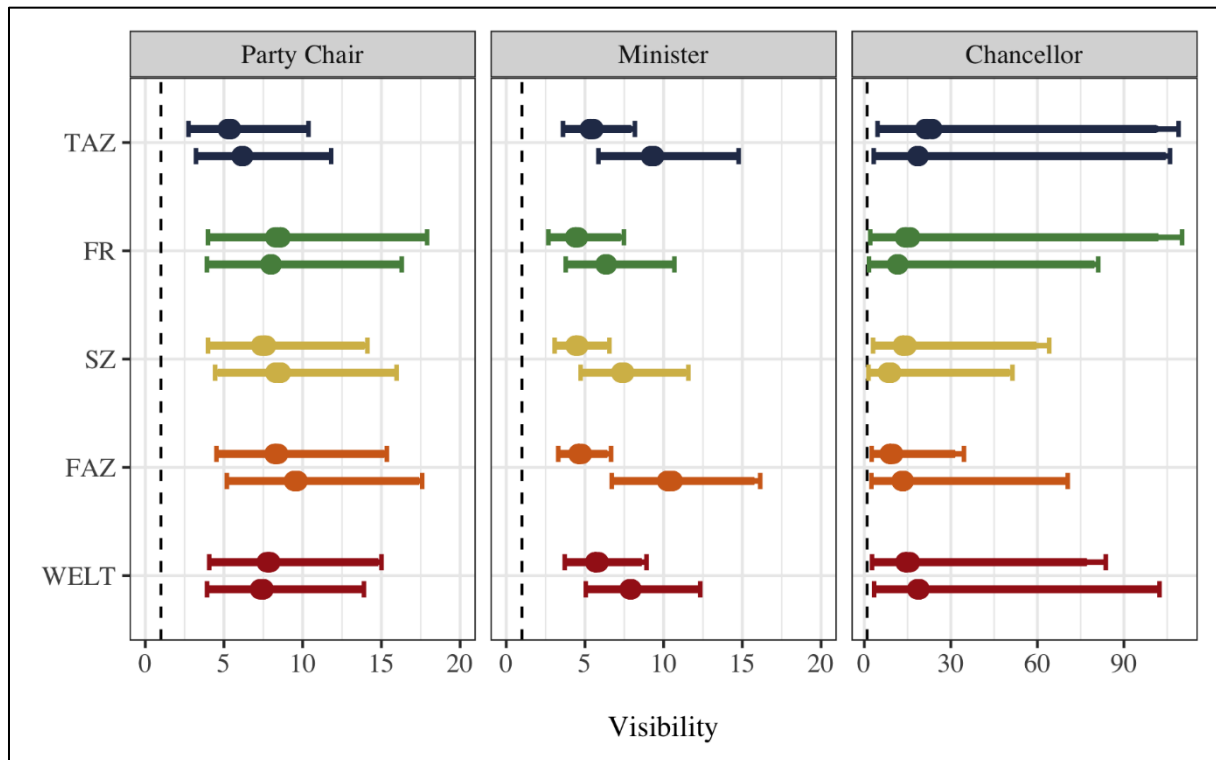
These findings allow different interpretations. First, the importance of executive authority could have been consistent over time despite changing context conditions, as suggested by the overlapping confidence intervals in Figure 6.9. If the importance of the other agenda-building factors changed over time, this consistency does not preclude that executive authority was relatively more important in some periods than in others. If the relevance of the other agenda-building factors was equally constant, this would indicate that the considered context conditions did not affect the weight attached to individual factors in the expected ways. Second, the observed patterns could represent actual changes in the relevance of party chairs or ministers. Excepting the possibility that the executive authority of party chairs and ministers changed over time, which is conceivable depending on the power balance within parties, the inverse patterns observed for party chairs and ministers could point to an omitted variable in the theoretical

framework. Third, the observed sample of actors with executive authority could be too small to obtain reliable estimates for individual periods. In this case, the observed patterns support no conclusions about the importance of executive authority over time.

To further test the tentative conclusion from the descriptive results that government actors were more visible in many legislative periods (see Figure 6.3), I re-ran the period models replacing executive authority with a dummy variable capturing political actors' affiliation with the current government parties. The estimated effects for the alternative measure are considerably smaller (average IRRs between 1.6 and 3.6, see Appendix 17), reflecting the lower executive authority of members of parliament affiliated with the government parties compared to cabinet members and party leaders. Yet, the effects remain positive and statistically significant, except for the periods 1976-1987 and 2005-2009. Despite the much larger sample of actors affiliated with the government, the differences across periods remain statistically insignificant, strengthening the first interpretation that the importance of executive authority was consistent over time.

Given that moderate newspapers covered political actors more frequently than their counterparts with stronger ideological leanings, these newspapers may also attach more weight to executive authority. Figure 6.10 shows the effects of executive authority separately for each newspaper (see Appendix 13 for the full regression results). Strengthening the support for Hypothesis 1.1, executive authority increased the visibility of party chairs, ministers, and chancellors compared to other actors for all collected newspapers. The different propensities to mention actors from the political domain cannot be traced to the weight attached to executive authority, as there is not even a tendential pattern to suggest that the SZ and the FAZ mentioned party chairs, ministers, or chancellors in more articles than the other newspapers. Overall, the observed effects mirror the results from the full models as chancellors tend to have the greatest advantage over other actors, though the differences between the effects for the three actor groups are not statistically significant. The difference in the effect for ministers in  $t_1$  and  $t_2$  observed in the full model is only statistically significant for the FAZ (average IRR 4.7 in  $t_1$  and 10.3 in  $t_2$ ), most likely because articles from the other newspapers could only be collected for later years.

**Figure 6.10: The effect of executive authority on visibility across newspapers**



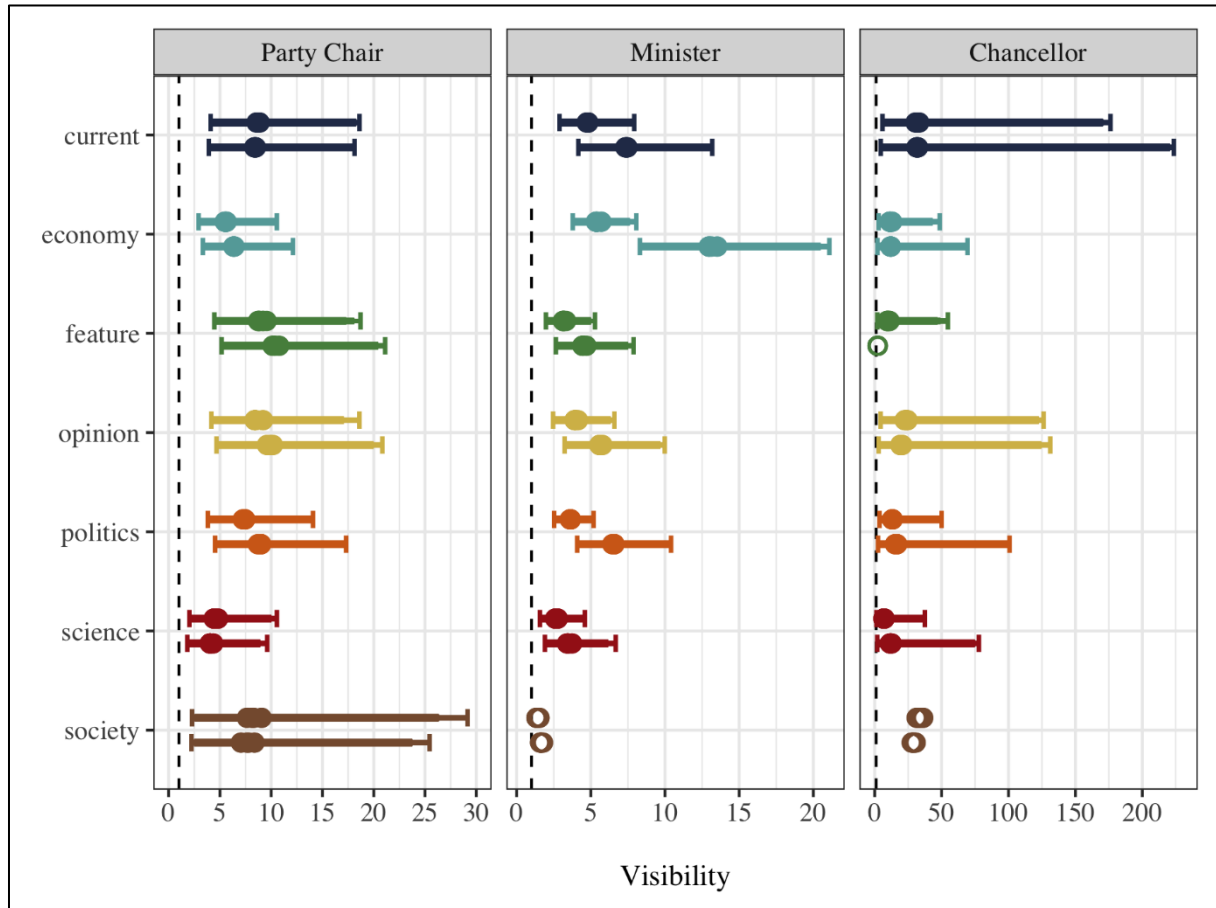
**Notes:** Depicted are IRRs of executive authority for the number of articles naming an actor by newspaper. The reference category are other actors. **Legend:** Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. For each specification, the upper estimate shows IRRs from models without the prominence variable based on newspaper articles from all periods ( $t_1$ ), and the lower estimate shows IRRs from models with the prominence variable based on newspaper articles published between 2002 and 2020 ( $t_2$ ). Estimates and confidence intervals for the same specification based on different operationalizations of economic weight and mainstream status are superimposed to show the range of estimates. The width of the confidence interval line indicates the number of superimposed confidence intervals. Estimates are based on negative binomial regression models with one lag controlling for other agenda-building factors and including LP-FE (see Appendix 13). Estimates are based on 7,294 TAZ articles; 3,470 FR articles; 13,701 SZ articles; 12,773 FAZ articles; and 4,622 WELT articles. N is 4,386 in  $t_1$  and 2,771 in  $t_2$ .

Lastly, executive authority may be more important for the politics section given its thematic focus. Alternatively, executive authority could be less important for the politics section, where political actors routinely received more attention (compare Figure 6.2), and more important for other sections that may only mention political actors when they are more newsworthy than actors from other domains. The results for the individual newspaper sections depicted in Figure 6.11 lend further support to Hypothesis 1.1, since the effect of executive authority is consistently positive and mostly statistically significant, except for the feature and society sections (see Appendix 14 for full regression results). While this can be explained by the much smaller number of articles collected for the society section ( $N = 234$ ), the same cannot be assumed for the feature section ( $N = 2,710$ ). However, since the effects for party chairs and ministers are significantly different from the rate observed for other actors in the feature section,



this divergence is likely due to the singular observation for holding the chancellorship in  $t_2$ . Expectedly, the differences between party chairs, ministers, and chancellors within sections are not statistically significant.

**Figure 6.11: The effect of executive authority on visibility across sections**



**Notes:** Depicted are IRRs of executive authority for the number of articles naming an actor by newspaper section. The reference category are other actors. **Legend:** Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. For each specification, the upper estimate shows IRRs from models without the prominence variable based on newspaper articles from all periods ( $t_1$ ), and the lower estimate shows IRRs from models with the prominence variable based on newspaper articles published between 2002 and 2020 ( $t_2$ ). Estimates and confidence intervals for the same specification based on different operationalizations of economic weight and mainstream status are superimposed to show the range of estimates. The width of the confidence interval line indicates the number of superimposed confidence intervals. Estimates are based on negative binomial regression models with one lag controlling for other agenda-building factors and including LP-FE (see Appendix 14). Estimates are based on 1,002 articles for the current section; 18,994 articles for the economy section; 2,917 articles for the feature section; 1,346 articles for the opinion section; 14,515 articles for the politics section; 2,851 articles for the science section; and 235 articles for the society section.  $N$  is 4,386 in  $t_1$  and 2,771 in  $t_2$ .

Considering the differences across newspaper sections, Figure 6.11 indicates neither more nor less relevance of executive authority for the politics sections. The effects of executive authority do not significantly differ across sections and the point estimates for the politics section are not

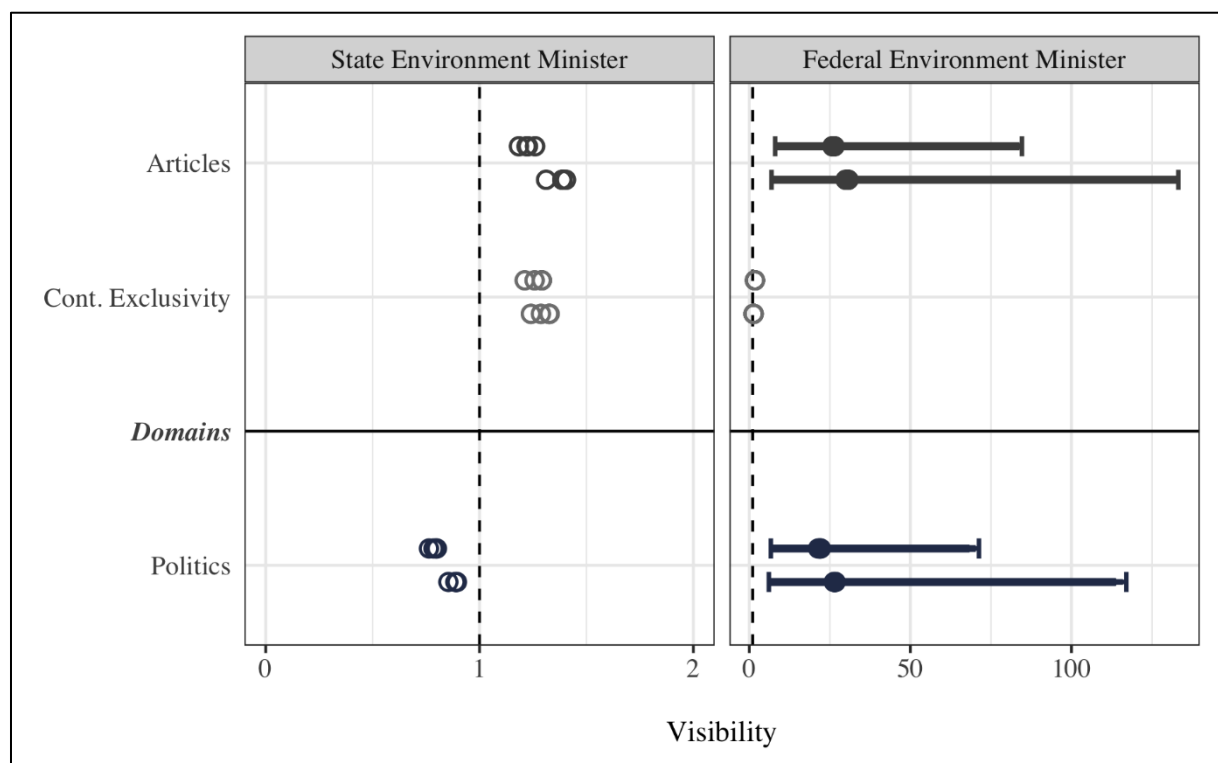
particularly high compared to the other sections. Instead, executive authority seems to be tendentially least important for the science section, and perhaps the economy section excepting ministers, suggesting that these sections focus more on other political actors such as party spokespersons for health and economic policy. This tendency is more pronounced in the science section, where party chairs were named in 4.3 times as many articles as other actors on average, compared to 6.0 times in the economy section and 7.7 times across domains. Ministers actually had the largest advantage over other actors in the economy section (average IRR 9.3), whereas they were only covered in 3.1 times as many articles as other actors in the science section (average IRR across domains: 4.8). Their advantage is even more marked when controlling for prominence. The distance between the science and economy sections is smaller for chancellors, who received on average 9.4 times as much coverage as other actors in the science section and 11.8 times as much coverage in the economy section (average IRR across domains: 18.1).

In summary, executive authority consistently increased actors' visibility, largely irrespective of the considered period, newspaper, or newspaper section. Chancellors tended to have the largest advantage over other (political) actors, though the singular observation for holding the chancellorship in the period between 2005 and 2021 inflated the confidence intervals for this category. Contrary to the expectation, ministers were not generally covered at higher rates than party chairs, as the latter gained an (insignificant) advantage in the periods since 2013. Moreover, the findings tentatively support the notion that political actors were generally mentioned at higher rates than actors from other domains. Changes in the relative importance of executive authority over time are not statistically significant and do not follow any systematic pattern. In consequence, no conclusions about the influence of contextual changes can be drawn without considering changes in the relevance of the other agenda-building factors. Executive authority was equally important for all newspapers in the sample, but the effects for individual newspaper sections indicate that less weight was attached to executive authority for the science section. The tendential pattern for the economy section is somewhat contradictory, as the advantage for party chairs and chancellors was smaller in this section, whereas the advantage for ministers was larger. This may point to the influence of issue-specific relevance for economic issues, which was not accounted for in the analyses. Hence, the results provide strong support for Hypothesis 1.1 but do not offer any evidence regarding the impact of contextual changes (Hypotheses 3.1, 4.3, 5.1, and 6.1).

### Issue-Specific Relevance

The decisions of political actors may be especially consequential if their office increases the likelihood that their positions will be considered in policy outcomes. Hence, environment ministers at the state and federal levels should be covered at higher rates than other (political) actors when climate change is salient and executive authority is controlled for (Hypothesis 1.2). Figure 6.12 displays the effects of issue-specific relevance on the number of articles naming actors from all domains (Articles) or the political domain (Politics), as well as the continuous exclusivity for actors from all domains (Cont. Exclusivity), controlling for the other agenda-building factors (see Appendices 10 and 11 for the full regression results). The results show that state environment ministers were not more visible than other (political) actors, whereas federal environment ministers were mentioned at substantially higher rates (average IRRs 13.9 in  $t_1$  and 15.9 in  $t_2$  for the full model; 21.8 in  $t_1$  and 26.5 in  $t_2$  for the domain model).

**Figure 6.12: The effect of issue-specific relevance on visibility**



**Notes:** Depicted are IRRs of issue-specific relevance for the number of articles naming an actor (Articles) and the average number of actors named in the same article as an actor (Cont. Exclusivity) for all domains, as well as the number of articles naming an actor from the political domain (Politics). The reference category for the full model are other actors; the reference category for the domain models are other political actors. **Legend:** see Figure 6.8.

These effects mirror the findings for the number of mentions and exclusive articles (see Appendix 15.1), but issue-specific relevance did not affect the continuous exclusivity of the received coverage. Considering that the sample contains only nine federal environment ministers, appointed between 1986 and 2018, the rather large confidence intervals are once again unsurprising. Overall, the findings point to an added advantage for federal environment ministers over other federal ministers, but suggest that issue-specific relevance is effective only if actors' positions in the political hierarchy provide them with the executive authority to weigh in on decisions about policy outcomes.

Given that the importance of issue-specific relevance is expected to rise with the salience of an issue (Hypothesis 4.2), state environment ministers could still have been more visible than other actors when climate change was high on the media agenda. Figure 6.13 shows the effect of issue-specific relevance for periods with different context conditions (see Appendix 12 for the full regression results). The effect for state environment ministers is statistically insignificant for all observed periods, adding support to the conclusion that issue-specific relevance only takes effect when actors have the executive authority to influence policy outcomes.<sup>34</sup> For federal environment ministers, Figure 6.13 suggests that they had an advantage over other actors in the periods 1987-2005 and 2009-2021, but not before 1987 or in the period 2005-2009. Given that federal environment ministers were as visible as other actors in the high salience period from 2005-2009, but more visible in the low salience period from 1987-2005 and the medium salience period from 2009-2013, the results offer no indication that the importance of issue-specific relevance followed the salience of climate change. This cannot be explained by the high uncertainty associated with the effects for federal environment ministers, as the point estimates follow the same pattern (average IRR 0.00 in 1976-1987, 38.1 in 1987-2005, 16.1 in 2005-2009, 89.2 in 2009-2013, 28.6 in 2013-2017, and 28.3 in 2017-2021).

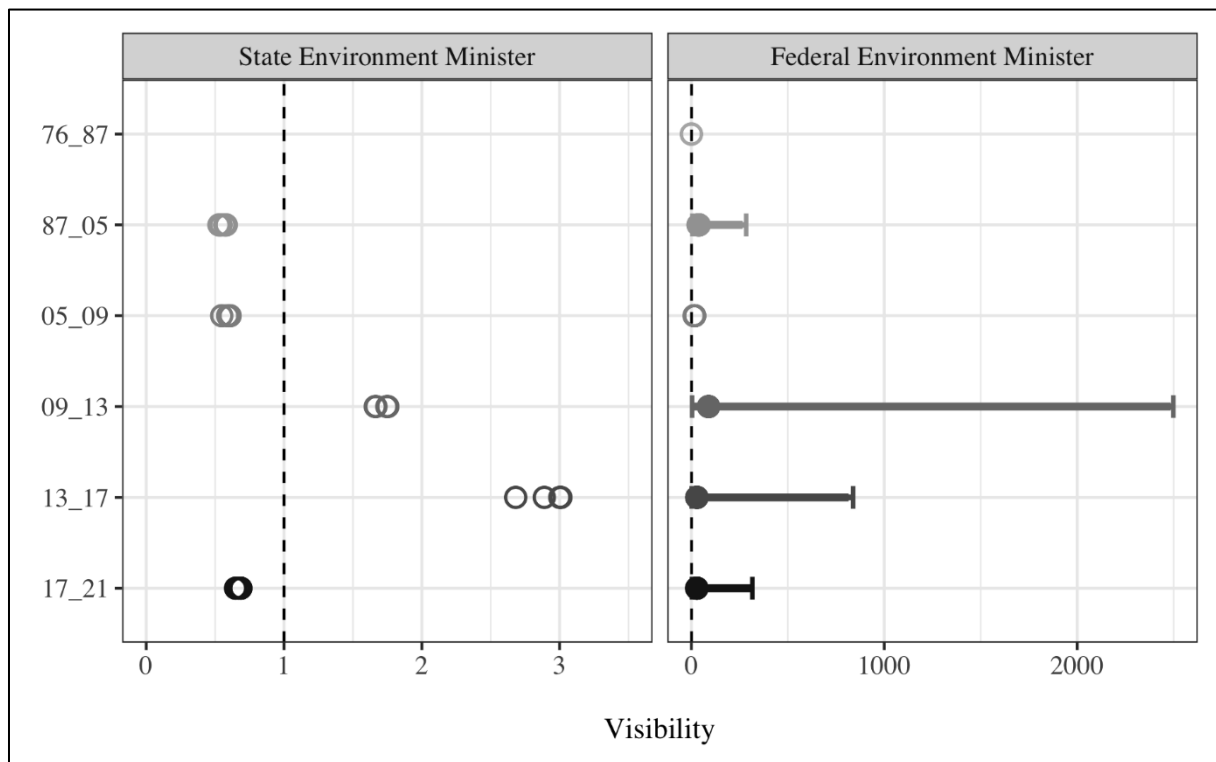
However, the observed pattern could reflect changes in several other context conditions. The media system transitioned from traditional to hybrid between 2005 and 2009, which should have decreased the importance of issue-specific relevance (Hypothesis 3.1) and corresponds to the loss of the advantage that federal environment ministers had over other actors in the period 2005-2009. The climate crisis in 2019 and the increasingly challenged societal consensus in the two most recent legislative periods should have emphasized the relevance of policy decisions

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<sup>34</sup> Ideally, this conclusion would be tested with an interaction term. However, since all federal environment ministers have the same level of executive authority, there is no variation to be explored here.

for newspaper audiences (Hypotheses 5.1 and 6.1) and can thus explain the increases in relevance in the period 2013-2021. However, neither of these conditions can account for the rise in relative importance in the period 2009-2013, suggesting that changes in the following periods cannot be considered conclusive evidence for the influence of the climate crisis or the changing societal consensus. The higher visibility of federal environment ministers in the period 1987-2005 and the lack of an additional increase that would mirror the steep rise in salience in the most recent legislative period contradict the notion that the importance of issue-specific relevance is tied to the salience of an issue.

**Figure 6.13: The effect of issue-specific relevance on visibility over time**

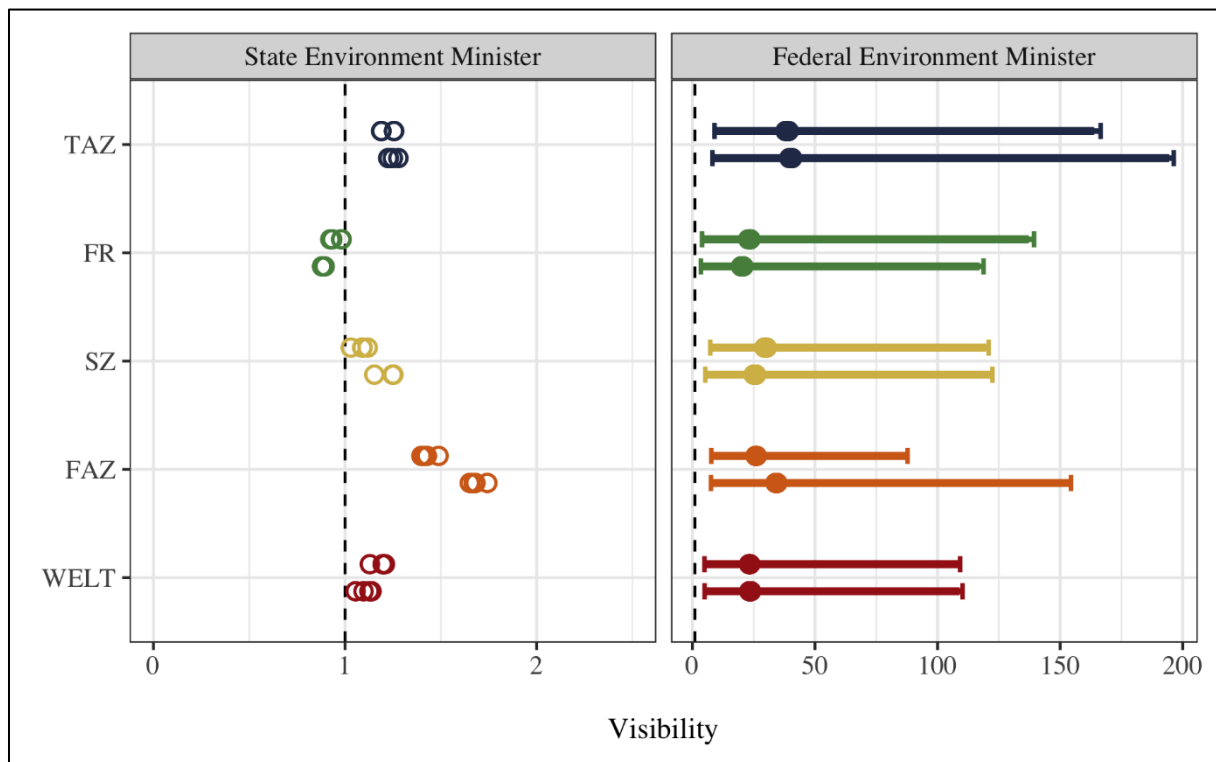


**Notes:** Depicted are IRRs of issue-specific relevance for the number of articles naming an actor by period of interest. The reference category are other actors. **Legend:** see Figure 6.9.

The general pattern persists across newspapers, as state environment ministers were mentioned at similar rates as other actors, whereas federal environment ministers received considerably more attention (see Figure 6.14; see Appendix 13 for full regression results). In line with the findings on executive authority, there is no indication that moderate newspapers, which afforded political actors more coverage than newspapers with stronger ideological leanings (see Figure 6.2), attached greater importance to issue-specific relevance. Looking at the point estimates, we see that the SZ (average IRR 27.7) and the FAZ (average IRR 30.1) tendentially

valued issue-specific relevance more than the more left-leaning FR (average IRR 21.8) and the more right-leaning Welt (average IRR 23.4). Yet, the largest tendency is observed for the left-leaning taz, where federal environment ministers were named in around 39.4 times as many articles as other actors. Following the argument made for newspaper sections in the preceding subchapter, issue-specific relevance may be more important for the taz because it covers fewer political actors than the other newspapers and thus has to be more selective. Overall, the conclusion from the full model (see Figure 6.12) that issue-specific relevance can only add to the effect of executive authority is sustained in the subsets for the individual newspapers.

**Figure 6.14: The effect of issue-specific relevance on visibility across newspapers**

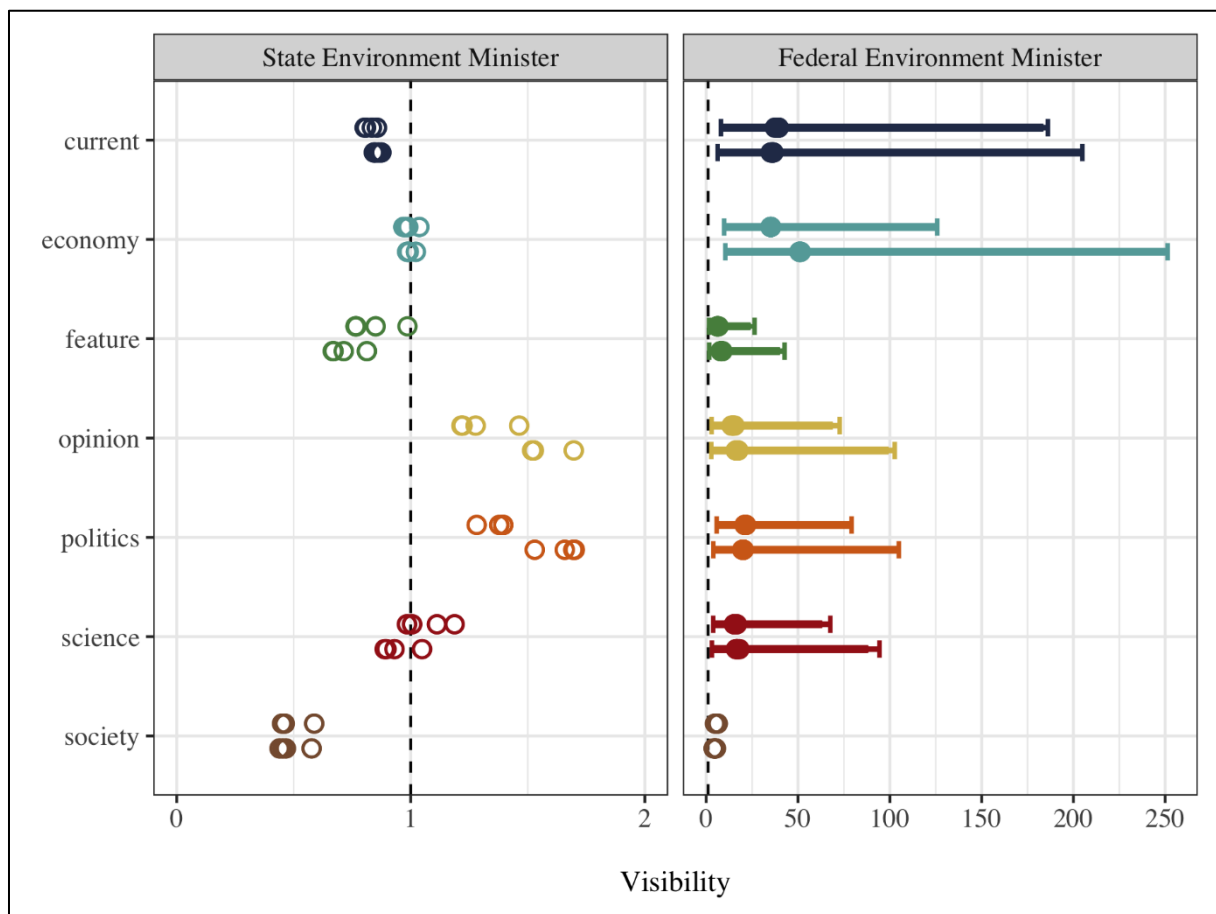


**Notes:** Depicted are IRRs of issue-specific relevance for the number of articles naming an actor by newspaper. The reference category are other actors. **Legend:** see Figure 6.10.

The effects of issue-specific relevance on the rate of articles naming an actor per newspaper section depicted in Figure 6.15 likewise follow the general pattern, though some interesting deviations can be observed for the economy and current sections (see Appendix 14 for the full regression results). Accordingly, state environment ministers were not named more often than other actors in any newspaper section, but federal environment ministers consistently received more coverage. The lack of statistical significance for the society section is to be expected given the small number of federal environment ministers ( $N = 9$ ) and articles collected for this section

(N = 235). Although the differences in the effects for individual newspaper sections are not statistically significant, the tendency in the point estimates suggests that federal environment ministers had the largest advantage over other actors in the economy section (average IRR 43.1, across domains 20.9). This is in line with the findings for executive authority, where ministers were mentioned relatively more frequently in the economy section than in other sections (see Figure 6.11), but does not support the interpretation that this could reflect the higher visibility of economy or finance ministers. While part of the effect observed for ministers may be driven by actors with economic relevance, environment ministers still had a substantial advantage over other cabinet members in the economy section.

**Figure 6.15: The effect of issue-specific relevance on visibility across sections**



**Notes:** Depicted are IRRs of issue-specific relevance for the number of articles naming an actor by newspaper section. The reference category are other actors. **Legend:** see Figure 6.11.

Federal environment ministers also received tendentially more attention in the current section of the taz (average IRR 37.3), suggesting that issue-specific relevance could have been particularly important for this section. This matches the general focus of the current section on

actors promoting climate protection as environment ministers typically push for more ambitious climate action than ministers representing other departments and interests. Hence, federal environment ministers could have been favored more in the current section than in other sections because their climate change positions fit the substantial focus, rather than due to their greater influence over climate policies. Unlike executive authority, issue-specific relevance was not less important in the science section, supporting the interpretation that this section tended to favor actors with greater issue-specific expertise. Mirroring the findings on executive authority, there is no indication that issue-specific relevance was more important for coverage in the politics section.

Taken together, the results show that issue-specific relevance substantially increased federal environment ministers' visibility compared to other (political) actors, but not the visibility of state environment ministers. Hence, Hypothesis 1.2 can only be supported for actors with the executive authority to weigh in on national policy decisions. The changes in the importance of issue-specific relevance over time lend tentative support to the expectation that issue-specific relevance is less relevant in hybrid compared to traditional media systems (Hypothesis 3.1). The pattern also suggests that the slow disintegration of the societal consensus on climate change and the climate crisis may have increased the importance of issue-specific relevance (Hypotheses 6.1 and 5.1), though the findings allow no compelling conclusions on the influence of these conditions. On the other hand, the observed changes contradict the expectation that the importance of issue-specific relevance rises with the salience of the issue (Hypothesis 4.2).

The advantage for federal environment ministers over other actors was similar across newspapers, though the effect was tendentially larger for the taz, possibly reflecting the corresponding effect for the current section collected exclusively for the taz. In light of the general focus of the current section on actors advocating more ambitious climate protection, it is not clear whether these effects indicate an increased importance of issue-specific relevance or an ideological match. Federal environment ministers tended to have the largest advantage over other actors in the economy section, negating the tentative conclusion that the higher visibility of ministers in the economy section may be limited to ministers with economic relevance. On the other hand, issue-specific relevance was as important for the science section as for other sections, further supporting the notion that this section focuses on actors with issue-specific expertise. Although the differences between newspapers and newspaper sections were not statistically significant, the small number of federal environmental ministers in the sample



suggests that they may nonetheless be of substantive interest. In short, the findings corroborate Hypothesis 1.2 for federal environment ministers and tentatively support Hypotheses 3.1, 5.1, and 6.1 but contradict Hypothesis 4.2. Moreover, issue-specific relevance did not affect the number of actors mentioned alongside federal environment ministers.

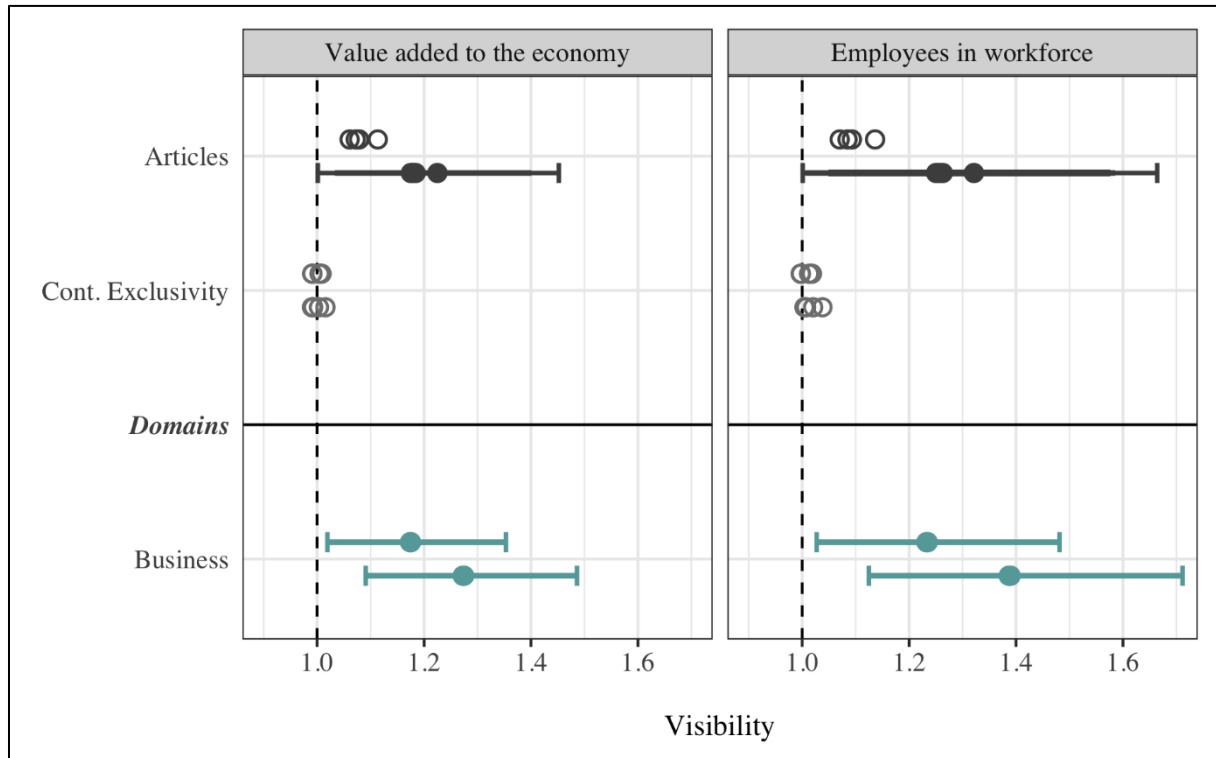
### ***Economic Weight***

The decisions of actors with sufficient economic weight to impact the national economy can be similarly consequential for people's lives as policy outcomes, and their positions should thus be comparatively more relevant for newspaper audiences. In consequence, newspapers should cover actors with more economic weight at higher rates than less weighty actors (Hypothesis 1.3). Figure 6.16 shows the effects of economic weight on the number of articles naming actors from all domains (Articles) or the business domain (Business), as well as on the continuous exclusivity of the received coverage (Cont. Exclusivity), controlling for the other agenda-building factors (see Appendices 10 and 11 for the full regression results). In line with the expectation, the results show that increases in both the added value to the national economy and the represented share of the national workforce raise the number of articles mentioning business actors, though this increase is only statistically significant when controlling for prominence in the full models. With each percentage point added to the total value of the German economy, newspaper coverage increased by roughly 22 percent (average IRRs: 1.20 in  $t_2$  in the full models; 1.17 in  $t_1$  and 1.27 in  $t_2$  in the domain models). With each percentage point of the national workforce, the number of articles increased by almost 30 percent (average IRRs: 1.28 in  $t_2$  in the full models; 1.23 in  $t_1$  and 1.39 in  $t_2$  in the domain models).

Similar patterns can be observed for mentions, where the effects in the domain models were also statistically insignificant unless prominence was controlled for, and exclusive articles, where all specifications were statistically significant (see Appendix 10.2-3). On the other hand, economic weight (like issue-specific relevance) did not influence the number of actors mentioned in the same article. Furthermore, I estimated four base models including one lag of the respective visibility metric, an interaction between economic weight and actor type, and fixed effects for the legislative period to test whether economic weight was less consequential for associations than for companies as suggested by the descriptive findings in Figure 6.4 (see

Appendix 18).<sup>35</sup> The interaction term is statistically insignificant across specifications, indicating that the greater visibility of companies compared to associations is not due to the perception that the latter cannot trade on their larger economic weight because their decisions require more coordination. Hence, this difference may reflect other agenda-building factors such as issue ownership or prominence, but cannot be explained by actors' economic weight.

**Figure 6.16: The effect of economic weight on visibility**



**Notes:** Depicted are IRRs of economic weight for the number of articles naming an actor (Articles) and the average number of actors named in the same article as an actor (Cont. Exclusivity) for all domains, as well as the number of articles naming an actor from the business domain (Business). **Legend:** see Figure 6.8.

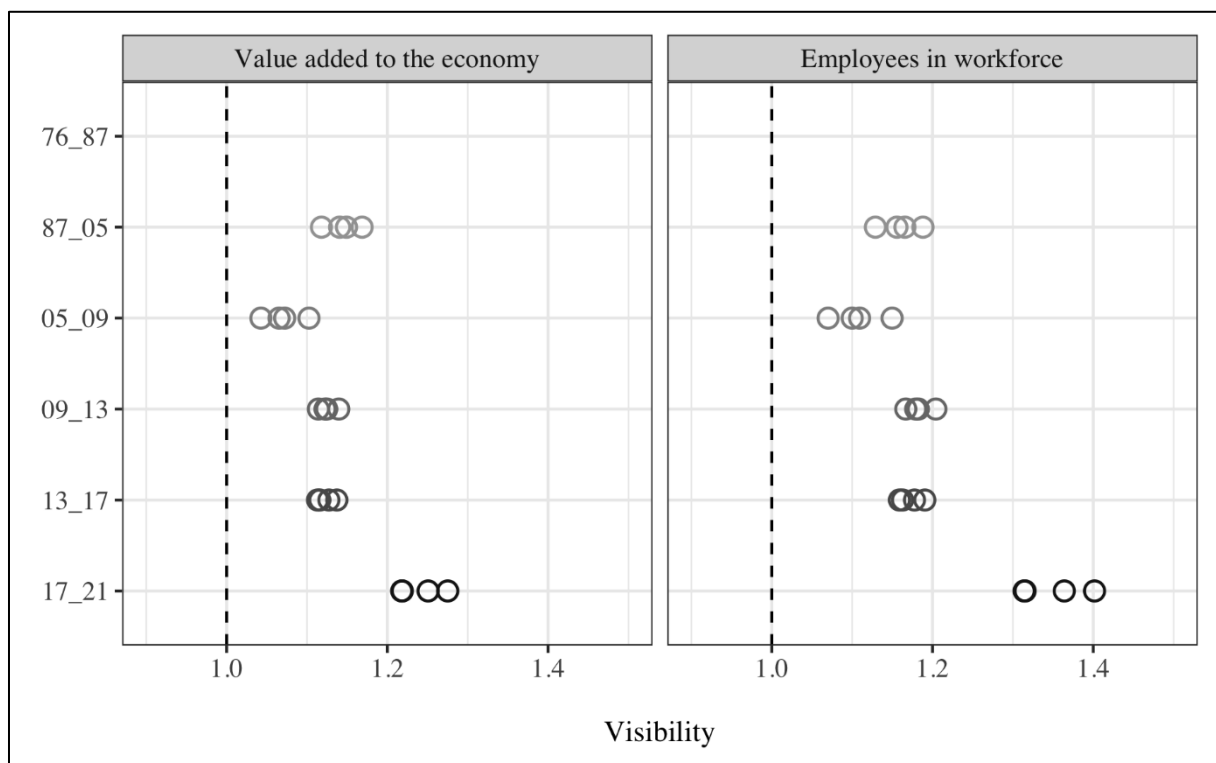
Since economic weight is expected to operate similarly to executive authority, its relative importance should have decreased when the media systems transitioned from traditional to hybrid between 2005 and 2009 (Hypothesis 3.1). On the other hand, increases in issue salience (Hypothesis 4.3) and the crises experienced in the three last legislative periods (Hypothesis 5.1) should have enhanced the relevance of economic weight. Figure 6.17 displays the effects of economic weight on the number of articles naming actors separately for relevant periods (see Appendix 12 for the full regression results). In light of the statistically significant effect

<sup>35</sup> Unfortunately, the collected sample is too small to support the inclusion of the interaction term in the full model.

observed in the full model, the lack of significance in the period models likely indicates that the samples for the individual periods were too small to obtain reliable estimates, rather than challenging the general relevance of economic weight.

Looking at the tendency in the point estimates, we see very similar patterns for the two indicators, which partially mirror the expectations regarding the influence of context conditions. Specifically, economic weight tendentially lost importance with the transition of the media system, but gained importance with the economic crises at the onset of the period 2009-2013. The tendentially larger effects observed for the most recent legislative period may reflect the impact of the climate crisis and the Covid-19 pandemic, but could also plausibly point to the sharp increase in issue salience in this period or a combination of these influences. Although the comparatively low effects for the period 2005-2009, when the salience of climate change first peaked, do not support the expectation that economic weight increased with issue salience, the simultaneous change in the media system may have masked the influence of other context factors.

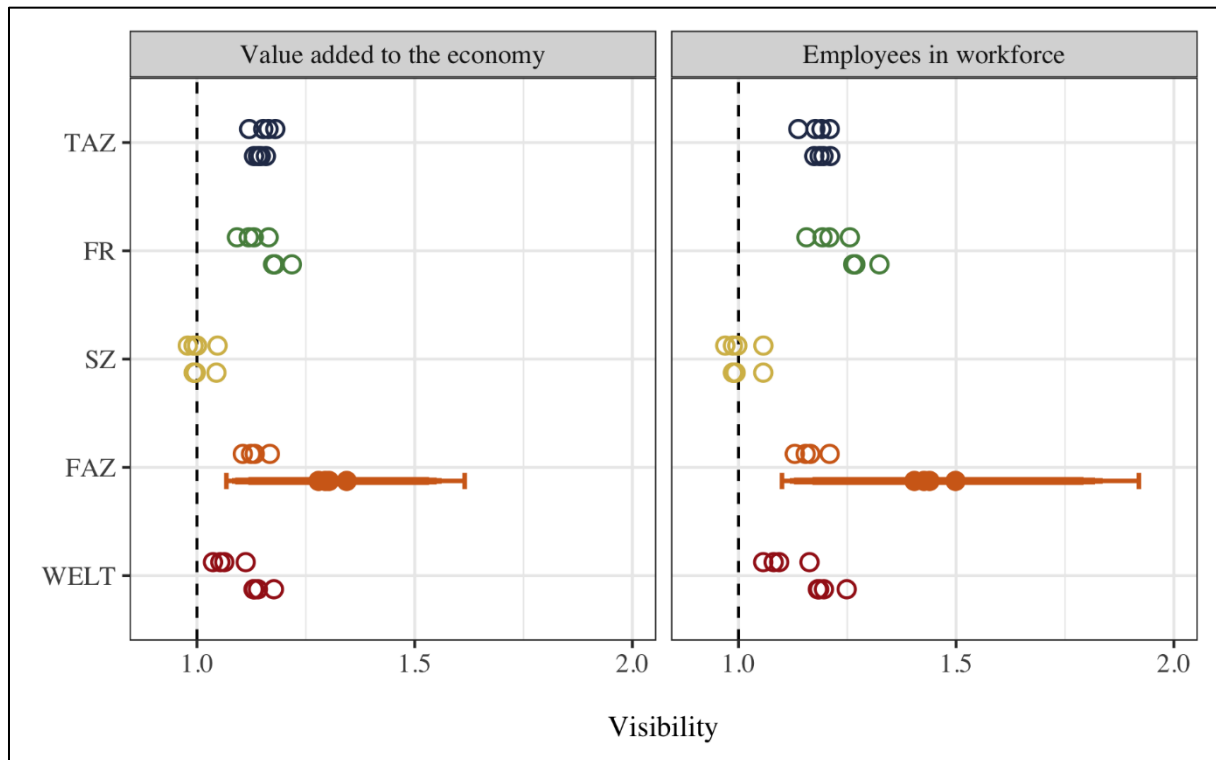
**Figure 6.17: The effect of economic weight on visibility over time**



**Notes:** Depicted are IRRs of economic weight for the number of articles naming an actor by period of interest.  
**Legend:** see Figure 6.9.

The higher visibility of business actors with greater economic weight in right-leaning newspapers (see Figure 6.4) suggests that this factor may be more important for the Welt, the FAZ, and the SZ than for the FR or the taz. Figure 6.18 depicts the effect of economic weight separately for each newspaper, controlling for the other agenda-building factors (see Appendix 13 for the full regression results). As for the periods, the observed effects are largely statistically insignificant, except for the FAZ in  $t_2$ . This is not solely due to smaller sample sizes, as the number of observations for the newspaper models is the same as for the full models and more articles were collected for the SZ than for the FAZ. Looking at the point estimates, the effects for the SZ cluster around one for both indicators, whereas the effects for the other newspapers are generally positive. This suggests that economic weight was irrelevant for coverage in the SZ, but may have increased actors' chances to be mentioned in the taz, the FR, and the Welt, as fewer articles could be collected for these newspapers and the domain models in Figure 6.16 show positive and statistically significant results for both  $t_1$  and  $t_2$ . However, I cannot preclude that economic weight did not affect the visibility of actors in the taz, the FR, and the Welt.

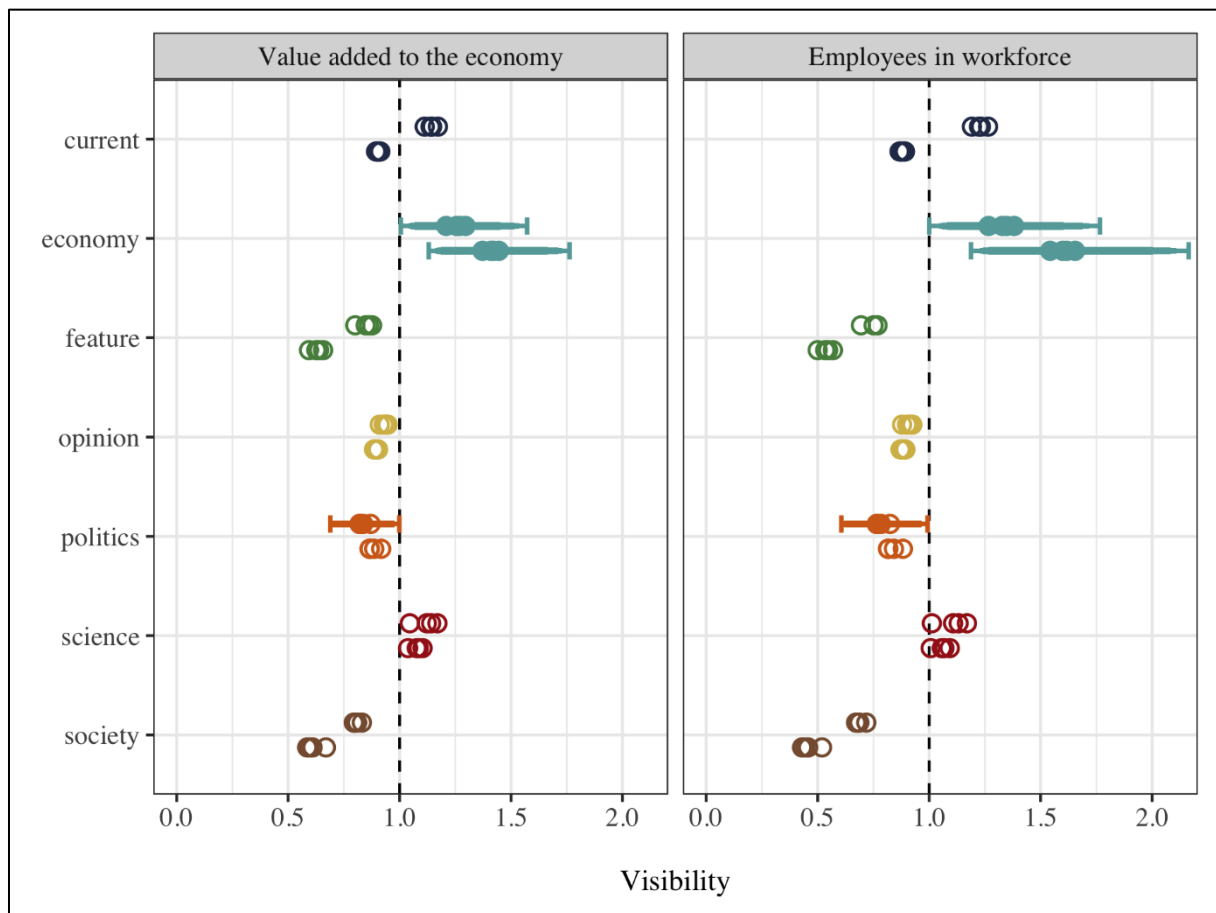
As in the full model, economic weight only significantly increased actors' chances of being mentioned in the FAZ in the period between 2002 and 2020, when prominence could be controlled for. Given the larger number of actors and articles for  $t_1$ , this difference likely reflects an actual difference in effect size. Although not statistically significant, point estimates for the domain models (see Figure 6.16), the FR, and the Welt also show somewhat higher effect sizes for  $t_2$  compared to  $t_1$ . This could either point to an increased relevance of economic weight over time, as later observations had more leverage in the smaller sample for  $t_2$ , or to the confounding influence of prominence in  $t_1$ . Given that the point estimates for period models with and without the control for prominence are very similar in size (see Appendix 13), the findings rather support the first interpretation, adding to the evidence that the relevance of economic weight increased in later legislative periods. Overall, the findings for the individual newspapers do not confirm the expectation derived from the descriptive analysis that more right-leaning newspapers attach greater importance to economic weight than their more left-leaning counterparts. Instead, economic weight was irrelevant for coverage in the SZ, though it tendentially increased actors' chances to be named in the other newspapers, especially in later legislative periods. In consequence, the greater visibility of business actors in right-leaning newspapers likely reflects an ideological preference.

**Figure 6.18: The effect of economic weight on visibility across newspapers**

**Notes:** Depicted are IRRs of economic weight for the number of articles naming an actor by newspaper. **Legend:** see Figure 6.10.

In line with the expectations, Figure 6.19 shows that economic weight was most important for coverage in the economy section (see Appendix 14 for the full regression results). More specifically, economic weight afforded actors a statistically significant advantage only in the economy section. In most other sections, actors with greater economic weight tended to receive less coverage than their less weighty counterparts, though statistically significant effects can only be observed in the larger subsample for the politics section (see Notes for Figure 6.11). Accordingly, the positive effect of economic weight in the full and domain models originates largely from actors with greater economic weight being named at higher rates in the economy section. Unlike the uniform effects observed for executive authority and issue-specific relevance, the range of effects for economic weight offers a first indication that newspapers covered a diverse set of actors, and presumably perspectives, in different sections. Since business actors with higher economic weight had incentives to advocate less ambitious climate protection, the perspectives presented in the economy section may have counterbalanced the coverage in other sections focusing on actors promoting climate protection.

**Figure 6.19: The effect of economic weight on visibility across sections**



**Notes:** Depicted are IRRs of economic weight for the number of articles naming an actor by newspaper section.  
**Legend:** see Figure 6.11.

In conclusion, the findings indicate that economic weight generally had a positive effect on actors' visibility, supporting Hypothesis 1.3. This effect remains positive but loses statistical significance in smaller subsamples, pointing to considerable uncertainty in the results. Like issue-specific relevance, actors' economic weight did not affect the number of actors mentioned in the same article. Moreover, economic weight did not work differently for associations than for companies, though the latter can implement decisions which impact the value of the national economy or sizable numbers of employees more swiftly than the former. The statistically insignificant point estimates for individual periods of interest suggest that the relevance of economic weight may have decreased in the period 2005-2009 when the media system transitioned from traditional to hybrid, and increased in the following periods marked by crises. This pattern very tentatively supports Hypotheses 3.1 and 5.1, but does not allow conclusions about the impact of salience on the importance of economic weight (Hypothesis 4.3).

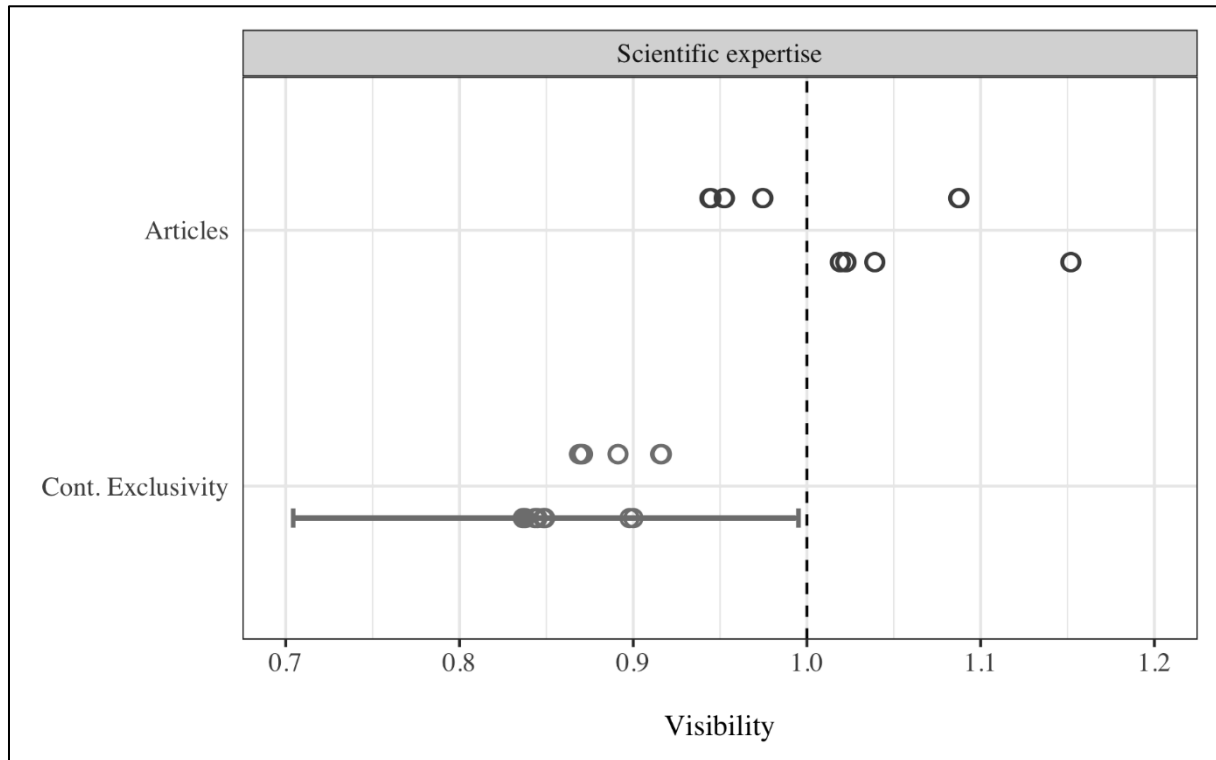
Given that the effects of economic weight are driven by coverage in the economy section, the finding that economic weight did not even tendentially increase actors' visibility in the SZ most likely points to the smaller share of climate change articles published in the economy section of this newspaper (39 percent compared to 45 percent across all newspapers and 48 percent in the FAZ). In turn, greater economic weight decreased actors' chances to be mentioned in the politics section, and tendentially also in the feature, opinion, and society sections. These differences across newspaper sections point to different sets of actors, and likely perspectives, being named in the same newspaper, with the economy section focusing on actors with incentives to prevent more ambitious climate protection. The pattern for the individual newspapers largely reflects the distribution of climate change articles across newspaper sections, suggesting that newspapers may express their ideological leanings through the emphasis put on the issue in different sections. Altogether, the findings support Hypothesis 1.3, but this effect is based exclusively on the higher visibility of actors with greater economic weight in the economy section.

### *Scientific Expertise*

Given the complexity of climate change, it seems unlikely that journalists routinely have the time and competence to evaluate the accuracy of actors' press materials. Instead, they may rely on the expertise of sources to judge the accuracy of the supplied materials. Therefore, actors with scientific expertise on an issue should be more visible in newspaper articles on climate change than actors without relevant scientific qualifications (Hypothesis 1.4). Figure 6.20 shows the effect of scientific expertise on the number of articles naming actors (Articles), and the number of other actors mentioned alongside them (Cont. Exclusivity), controlling for the other agenda-building factors (see Appendix 10 for the full regression results). Given that scientific actors were included in the dictionary based on their issue-specific expertise and that actors from other domains by definition have no relevant scientific qualifications, this effect cannot be estimated for individual domains. The results show that scientific actors were not named in more articles than actors without scientific expertise. Although there is a tendency for scientific actors to be mentioned alongside fewer other actors, which reaches statistical significance in some model specifications (see Appendix 10.4) and mirrors the descriptive finding that scientific actors often received more exclusive coverage than actors from other domains, this tendency is not reflected in the number of mentions or even the number of

exclusive articles naming scientific actors (see Appendix 10.2-3). Overall, the results thus disconfirm Hypothesis 1.4.

**Figure 6.20: The effect of scientific expertise on visibility**



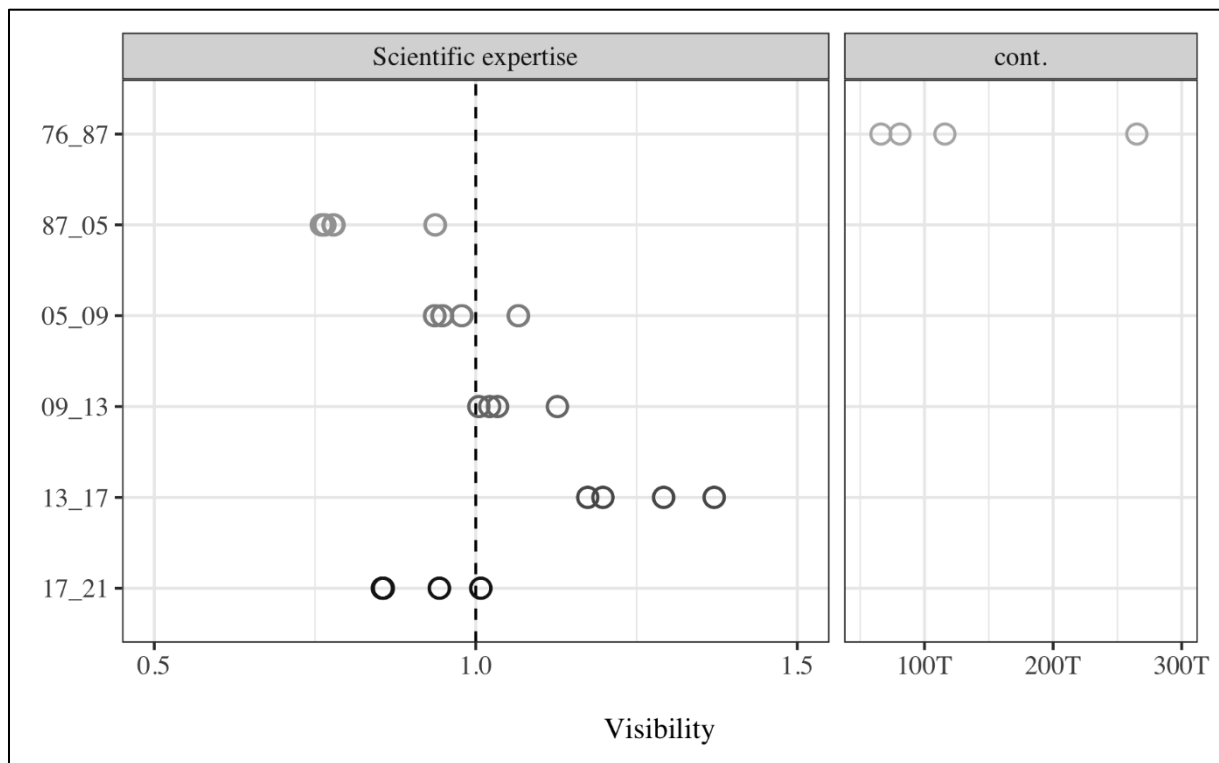
**Notes:** Depicted are IRRs of scientific expertise for the number of articles naming an actor (Articles) and the average number of actors named in the same article as an actor (Cont. Exclusivity). The reference category are actors without scientific qualifications. **Legend:** see Figure 6.8.

Even if scientific expertise did not raise actors' visibility overall, this factor could have had an impact at the beginning of the studied period, when few actors outside the scientific domain knew anything about climate change. The influence of scientific expertise is also expected to increase with the salience of an issue (Hypothesis 4.2), while opposing influences could have been at work in hybrid media systems and during crises. The effects of scientific expertise for individual periods of interest depicted in Figure 6.21 are all statistically insignificant (see Appendix 12 for the full regression results). Although the point estimates suggest that actors with scientific expertise had an advantage over other actors in the earliest period 1976-1987, the corresponding estimates are based on just 99 articles and implausibly high (average IRR around 125.4 Trillion, see right panel of Figure 6.21). The pattern of the point estimates clearly does not follow the salience of climate change over time, as there is no spike around 2007 and no increase in the most recent legislative period. Neither is there a consistent pattern that could



reflect changes in the media system or crises. In short, the results offer no indication that the lack of significance observed in the full model masks differences over time, and thus support neither Hypothesis 1.4 nor the expectations regarding the influence of contextual changes, in general, and issue salience, in particular (Hypothesis 4.2).

**Figure 6.21: The effect of scientific expertise on visibility over time**

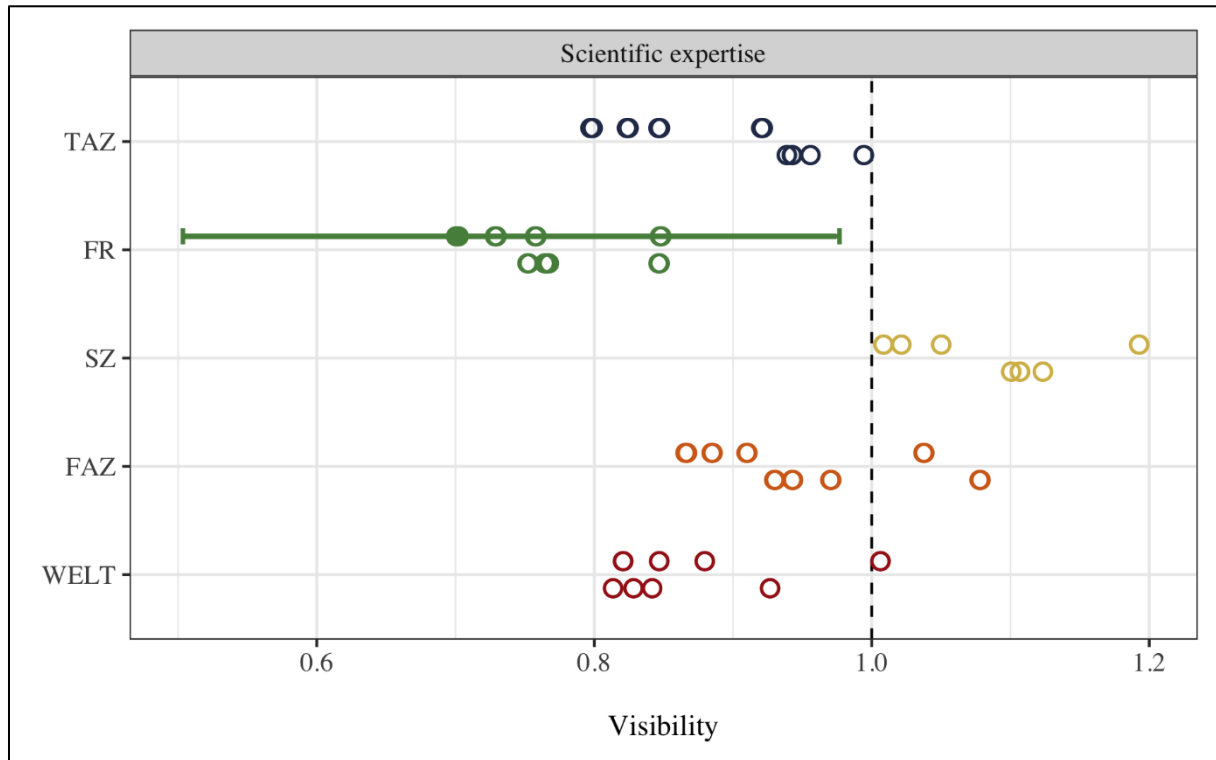


**Notes:** Depicted are IRRs of scientific expertise for the number of articles naming an actor by period of interest. The reference category are actors without scientific qualifications. **Legend:** The right panel continues the scale to depict the vastly larger point estimates for the period 76\_87. For further specifications, see Figure 6.9.

Since scientific actors received slightly more attention in right-leaning newspapers (see Figure 6.2), the different ideological orientations of the collected newspapers may have confounded the overall effect. Figure 6.22 illustrates the influence of scientific expertise separately for each newspaper (see Appendix 13 for the full regression results). The effects remain statistically insignificant except in one model specification for the FR, which indicates that scientific expertise reduced actors' chances to be named in this newspaper by around 30 percent, contradicting Hypothesis 1.4. Considering the tendency in the point estimates, the only newspaper with consistently positive effects is the SZ, whereas the effects for the more left-leaning taz and FR are tendentially negative, and the effects for the more right-leaning FAZ

and Welt are mixed at best. Hence, there is no indication that scientific expertise was more important for the right-leaning newspapers in the sample.

**Figure 6.22: The effect of scientific expertise on visibility across newspapers**

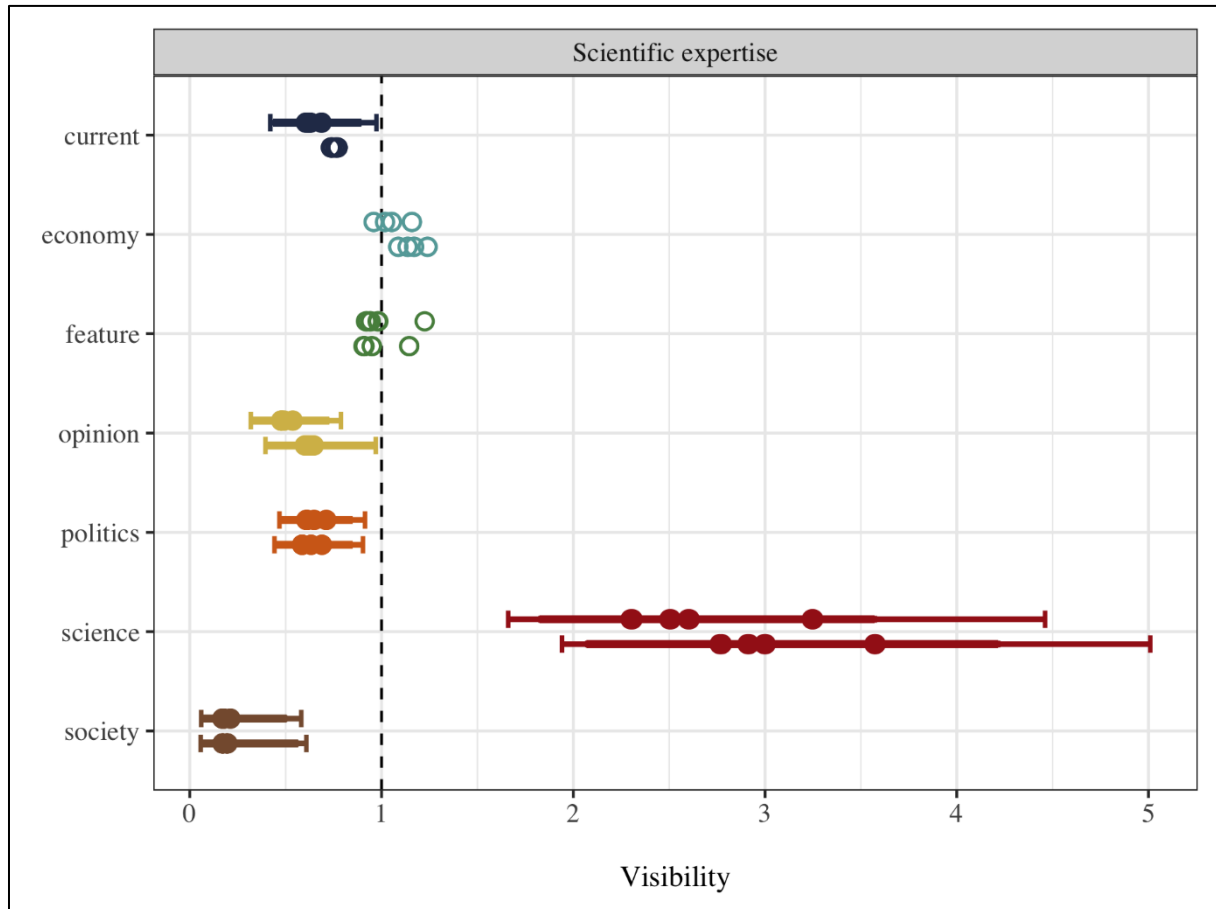


**Notes:** Depicted are IRRs of scientific expertise for the number of articles naming an actor by newspaper. The reference category are actors without scientific qualification. **Legend:** see Figure 6.10.

Lastly, the descriptive results indicate that scientific actors were mentioned far more frequently in the science section than in other newspaper sections (see Figure 6.2). The effects of scientific expertise for individual newspaper sections depicted in Figure 6.23 strongly support this notion, as scientific actors were around 2.7 times as likely as other actors to be named in  $t_1$ , and around 3.1 times as likely to be named in  $t_2$  (see Appendix 14 for the full regression results). On the other hand, scientific actors had a significant disadvantage in the opinion (average IRR 0.50 in  $t_1$  and 0.62 in  $t_2$ ), politics (average IRR 0.64 in  $t_1$  and 0.62 in  $t_2$ ), and society sections (average IRR 0.18 in  $t_1$  and  $t_2$ ), as well as in the current section in  $t_1$  (average IRR 0.64). Like the results for economic weight, the findings for scientific expertise thus point to considerable differences in the importance of individual agenda-building factors in different newspaper sections. Given the general advantage of political actors over actors from other domains (see Figure 6.7), the observed negative effects most likely reflect the greater agenda-building ability of political actors in these sections, rather than an aversion against scientific sources. Since scientific actors

were only more visible in the science section, the tentative finding that actors with scientific expertise tended to be mentioned alongside fewer other actors could point to different conventions across newspaper sections. In other words, articles in the science section may generally be more likely than articles in other sections to discuss individual perspectives in detail rather than to contrast different perspectives.

**Figure 6.23: The effect of scientific expertise on visibility across sections**



**Notes:** Depicted are IRRs of scientific expertise for the number of articles naming an actor by newspaper section. The reference category are actors without scientific qualifications. **Legend:** see Figure 6.11.

In summary, the results show that scientific expertise did not generally raise actors' visibility in newspaper articles on climate change, irrespective of the examined period or newspaper. However, it significantly and substantially increased actors' chances to be named in newspapers' science sections. Hypothesis 1.4 can thus only be corroborated for this section. The effect of scientific expertise is statistically insignificant across periods of interest and the point estimates do not increase with the salience of climate change, disconfirming Hypothesis 4.2. In addition, there is no pattern that would suggest that other contextual changes influenced

the relevance of scientific expertise. The advantage that scientific actors have over actors from other domains in the science section further substantiates the notion that diversity may arise from different sets of actors, and presumably perspectives, being named in different newspaper sections. On the other hand, the share of climate change articles published in the science section offers no indication that newspapers expressed their ideological leanings by covering climate change more or less in this section. In combination with the importance of scientific expertise in the science section, the tendentially negative effects observed for continuous exclusivity could point to different conventions across newspaper sections. Overall, the results support Hypothesis 1.4 only for the science section and contradict Hypothesis 4.2.

### *Issue Ownership*

Issue ownership captures actors' perceived competence based on their reflexive association with and longstanding commitment to an issue. Like scientific expertise, issue ownership provides journalists with positive source cues regarding the accuracy and relevance of the supplied materials. Therefore, actors owning the issue of climate change should be mentioned at higher rates than non-owners in newspaper articles on climate change (Hypothesis 2.2). Figure 6.24 depicts the effect of (dichotomous) issue ownership on the number of articles naming actors from all domains (Articles), the political domain (Politics), or the business domain (Business), as well as on the average number of actors mentioned in the same article as an actor (Cont. Exclusivity), controlling for the other agenda-building factors (see Appendices 10 and 11 for the full regression results). To reiterate, issue ownership denotes the difference between actors affiliated with the Green party and other parties for the political domain, and between specialized and non-specialized actors for the business domain. Actors from the civil society and scientific domains were generally considered issue owners for the depicted models, preventing the estimation of domain-specific effects for these actor groups. The effects in the full models indicate that issue owners are not named in more climate change articles than non-owners. The effect on the number of mentions is similarly insignificant (Appendix 10.2), but issue ownership shows a consistently positive and statistically significant effect on the number of exclusive articles naming an actor (average IRR 1.5 in  $t_1$  and 1.7 in  $t_2$ ; see Appendix 10.3). Moreover, fewer other actors were mentioned alongside issue owners than non-owners, increasing the exclusivity of the received coverage.

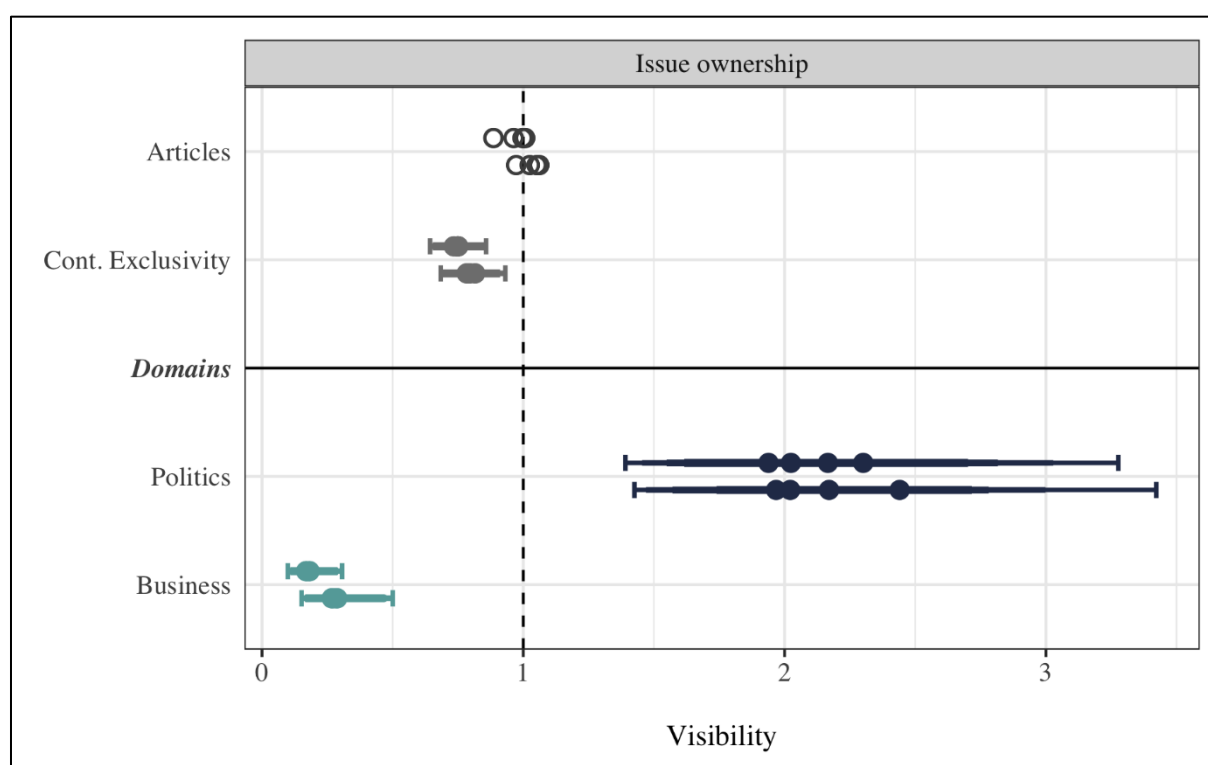
Looking at the domain models, we see that issue ownership increased the visibility of actors from the political domain (average IRR 2.1 in  $t_1$  and 2.2 in  $t_2$ ), corroborating the descriptive finding that Green party actors received disproportionate attention in newspaper articles on climate change (see *Political Actors* in Chapter 6.1). In contrast, issue ownership decreased the visibility of actors from the business domain (average IRR 0.18 in  $t_1$  and 0.28 in  $t_2$ ). These opposite influences may account for the null effects observed for the full model, though these effects are likely at least partly driven by the general advantage of political actors over actors from other domains, including the civil society and scientific actors defined as issue owners for the dichotomous issue ownership measure.<sup>36</sup> Interestingly, issue ownership had a negative effect on all visibility metrics in the business domain (see Appendix 11.2), although the direction should be reversed for continuous exclusivity. In other words, issue owners from the business domain were around 77 percent less likely to be named in climate change articles than non-issue owners, but also around 50 percent less likely to be named alongside an additional actor when they received coverage.

Taken together, the results from the full and domain models only corroborate Hypothesis 2.2 for (continuous) exclusivity, and for issue owners from the political domain, that is actors affiliated with the Green party. Specialized business actors were mentioned at lower rates than their non-specialized counterparts, contradicting either Hypothesis 2.2 or the underlying assumption that actors who specialize in the handling of an issue will be perceived as more competent than actors whose primary focus lies on other issues. Given the opposing effects for political and business actors, the full model allows no substantive conclusions about the effect of issue ownership on the number of mentions and articles for civil society and science actors. To obtain more nuanced estimates for these actors, we need to consider the continuous measures for issue ownership (see Figure 6.25). Yet, the results in Figure 6.7 suggest that executive authority was more important for actors' visibility than issue ownership since political actors were generally mentioned at higher rates than issue owners from the civil society or scientific domains.

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<sup>36</sup> The full model controls for executive authority, but cannot control for the general advantage that political actors have over actors from other domains due to the structure of the data.

**Figure 6.24: The effect of issue ownership on visibility**



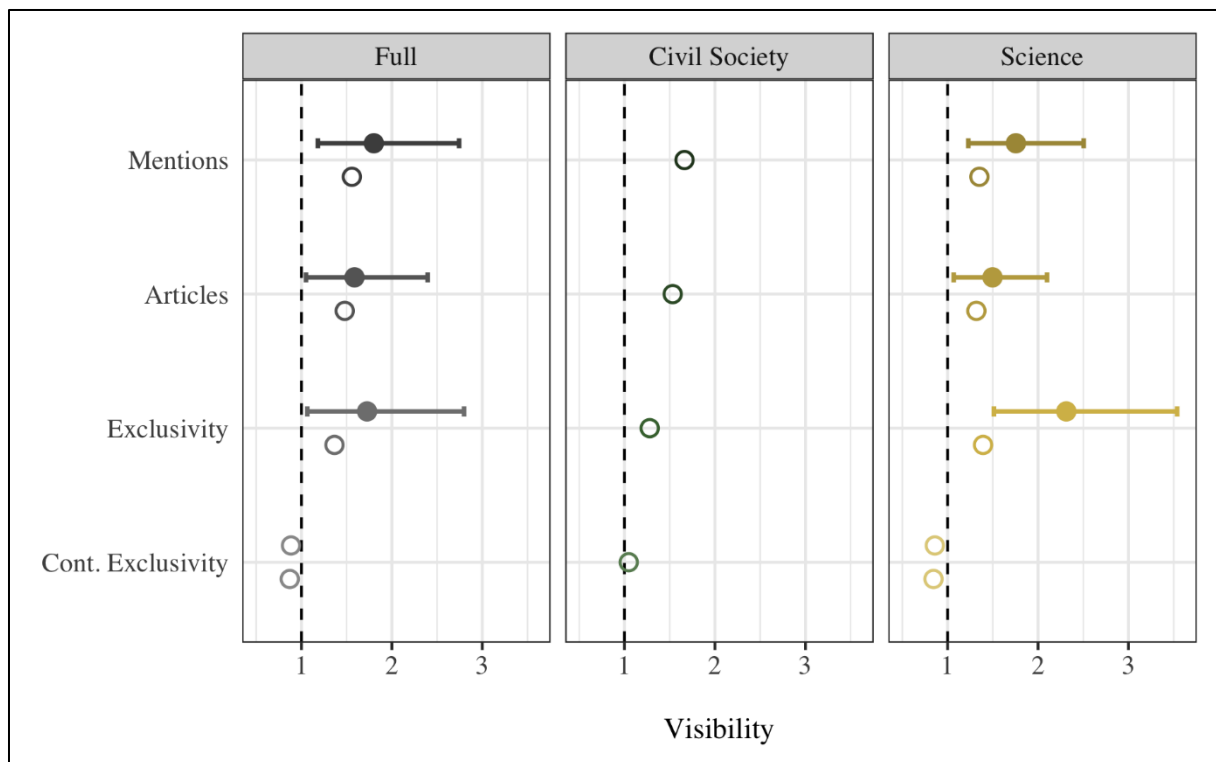
**Notes:** Depicted are IRRs of issue ownership for the number of articles naming an actor (Articles) and the average number of actors named in the same article as an actor (Cont. Exclusivity) for all domains, as well as the number of articles naming an actor from the political (Politics) or business domains (Business). The reference category are non-issue owners. **Legend:** see Figure 6.8.

The influence of the continuous issue ownership indicators for civil society and scientific actors cannot be tested in the full model, since this variable could only be collected for five civil society actors and 24 scientific actors for the most recent legislative period, indicating that the full model would be severely underdetermined. Therefore, I estimated the effect of continuous issue ownership on actors' visibility in four bivariate models for the period 2017-2021, before estimating domain-specific effects (see Appendix 19 for the full regression results).<sup>37</sup> The results depicted in Figure 6.25 show that issue ownership had a positive effect on actors' visibility in the full model, though this effect is not statistically significant for the continuous issue ownership variable based on scientific actors' h-index, for which fewer observations were available, or for continuous exclusivity. The same pattern can be observed for the scientific domain (Science), whereas the effects for the civil society domain (Civil Society) are

<sup>37</sup> Since the models are based solely on data from the most recent legislative period, neither a lagged dependent variable nor LP-FE were required for unbiased estimates (see analyses\_visibility.R in the replication materials for autocorrelation checks).

expectedly insignificant ( $N = 5$ ). Regardless of their statistical significance, all point estimates support the notion that issue owners from the civil society and scientific domains were more visible than non-owners in newspaper articles on climate change. In line with the expectations for this indicator, the effect for the number of other actors named alongside an actor is even tendentially negative in the somewhat larger samples for the full and scientific domain models. While the results from bivariate models lacking controls for the other agenda-building factors should not be overinterpreted, the findings tentatively support the expectation that (continuous) issue ownership increases the visibility of civil society and scientific actors (Hypothesis 2.2). Overall, positive effects for issue ownership in all domains but the business domain challenge the assumption that perceptions of issue ownership reflect the specialization of business actors.

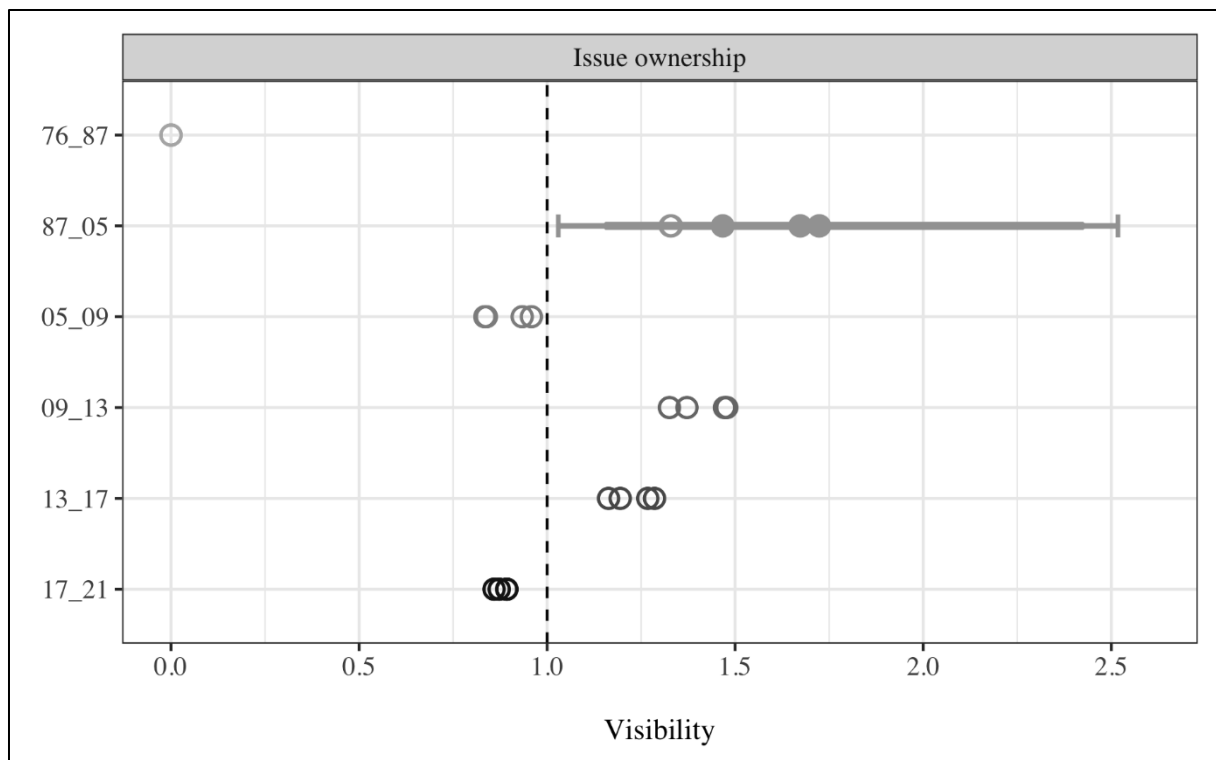
**Figure 6.25: The effect of continuous issue ownership on visibility**



Notes: Depicted are IRRs of civil society and scientific actors' continuous issue ownership for the number of mentions (Mentions), the number of articles naming an actor (Articles), the number of articles naming an actor exclusively (Exclusivity), and the average number of actors named in the same article as an actor (Cont. Exclusivity) for all domains (Full), the civil society domain (Civil Society), and the scientific domain (Science). Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. For each specification, the upper estimate shows IRRs for the continuous issue ownership indicator based on scientific actors' publications and citations (io\_c1), and the lower estimate shows IRRs for the continuous issue ownership indicator based on scientific actors' h-index (io\_c2). Estimates are based on bivariate negative binomial regression models for the period 2017-2021 (see Appendix 19). Estimates are based on 12,993 articles.  $N$  for the full model is 29 for io\_c1 and 26 for io\_c2;  $N$  for the civil society domain model is 5;  $N$  for the scientific domain model is 24 for io\_c1 and 21 for io\_c2.

Like scientific expertise, issue ownership is expected to be especially relevant when an issue is salient (Hypothesis 4.2). Changes in the media system and crises may also affect the importance of this factor, though the direction of potential changes is not easily predicted (see Chapter 2.5). To trace potential changes in the relevance of (dichotomous) issue ownership over time, Figure 6.26 shows the effect of issue ownership separately for periods of interest (see Appendix 12 for the full regression results). In light of the opposing effects for actors from different domains, it is unsurprising that the effect for actors from all domains is statistically insignificant for most periods. Still, the point estimates suggest some changes in the direction of the effect over time. The effect is tendentially negative in the periods 1976-1987, 2005-2009, and 2017-2021, whereas it is positive between 1987 and 2005, and tendentially positive between 2009 and 2017. This pattern does not simply reflect changes in the relative visibility of business actors (see Figure 6.1) and is consistent across the visibility metrics. The exception is the most recent legislative period, where the effects for (continuous) exclusivity are statistically significant and point to a positive effect of issue ownership on actors' visibility in (more) exclusive coverage (see Appendix 12.6).

**Figure 6.26: The effect of issue ownership on visibility over time**



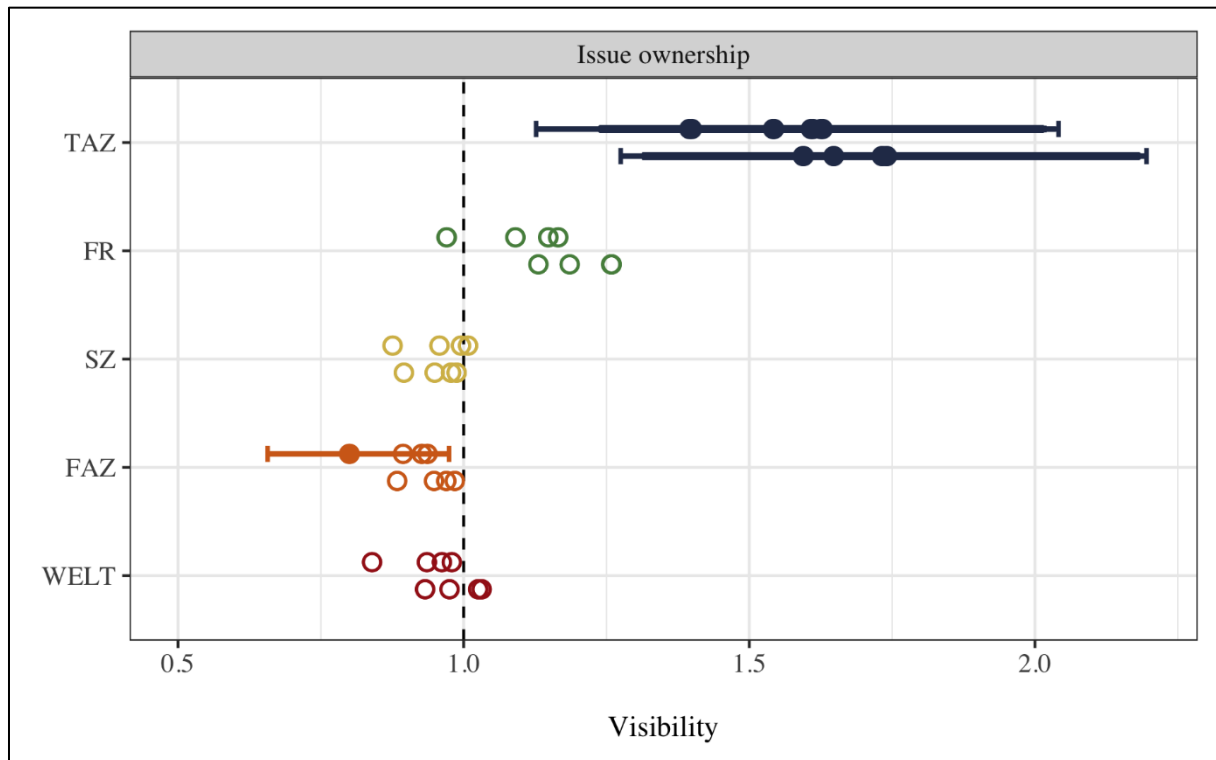
**Notes:** Depicted are IRRs of issue ownership for the number of articles naming an actor by period of interest. The reference category are non-issue owners. **Legend:** see Figure 6.9.



Even assuming a positive influence for the period 2017-2021, the observed changes do not follow changes in the salience of climate change over time (compare Figure 3.1). We neither see very small effects in the earlier legislative periods, nor a spike in importance in the period 2005-2009, nor a marked increase in the most recent legislative period. Hence, the results disconfirm Hypothesis 4.2. The observed pattern also does not match changes in the other context conditions over time. Overall, the few statistically significant effects across the visibility metrics support Hypothesis 2.2 but the results offer no indication that the importance of issue ownership shifted in line with changes in issue salience (Hypothesis 4.2), the media system, or crises.

Depending on their audiences, newspapers could attach more or less weight to the perceived competence of sources compared to other agenda-building factors like consonance (see Chapter 2.5). Figure 6.27 shows the effects of (dichotomous) issue ownership across newspapers (see Appendix 13 for the full regression results). While the observed effects are largely insignificant, mirroring the finding from the full models and likely reflecting the opposing effects for actors from different domains as well as the general advantage for political actors, the point estimates tend to be more positive for left-leaning than for right-leaning newspapers. The positive effect for the taz is statistically significant and indicates that issue owners were named in around 54 percent more articles than non-owners in  $t_1$ , and around 69 percent more articles in  $t_2$ . Though not statistically significant, most of the point estimates for the FR also indicate a positive effect (average IRR 1.09 in  $t_1$  and 1.21 in  $t_2$ ). In contrast, the point estimates for the SZ, the FAZ, and the Welt are closer to one and often negative. These differences do not merely reflect the lower visibility of business actors in more left-leaning newspapers, as actors from the business domain were mentioned least often in the SZ, and received similar coverage shares in the FR and the FAZ (see Figure 6.2). Issue ownership may thus have been more important for coverage in the taz and the FR than in their more right-leaning counterparts.

**Figure 6.27: The effect of issue ownership on visibility across newspapers**



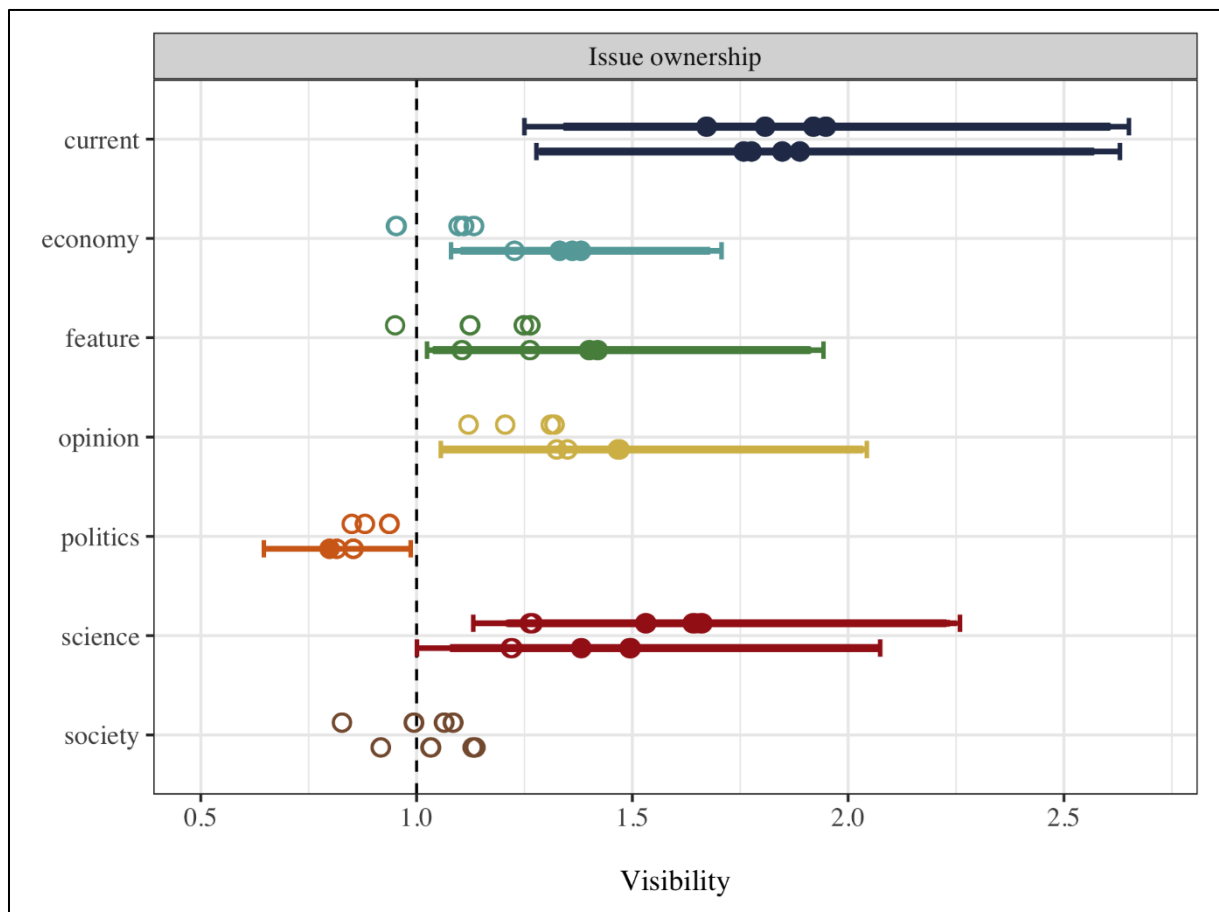
**Notes:** Depicted are IRRs of issue ownership for the number of articles naming an actor by newspaper. The reference category are non-issue owners. **Legend:** see Figure 6.10.

The descriptive findings in Chapter 6.1 suggest that issue ownership may have been relatively more important in the current and science sections. Figure 6.28 shows the effect of (dichotomous) issue ownership separately for each newspaper section, controlling for the domain-specific agenda-building factors which may have confounded the influence of issue ownership in the descriptive results (see Appendix 14 for the full regression results). The findings show that issue owners had an advantage over non-owners in all newspaper sections except the politics and society sections. This positive effect is consistently statistically significant for the current section, where we also observe the largest point estimates (average IRR 1.84 in  $t_1$  and 1.82 in  $t_2$ ), supporting the conclusion that issue ownership was especially relevant for this section. This finding may partially explain the descriptive differences between the visibility of actors in the current section and in the taz overall, but the distance between the average effects of issue ownership for the taz (see Figure 6.27) and the current section is rather small and not statistically significant, pointing to additional idiosyncratic factors.

The effect of issue ownership was comparatively larger for the science section than for other sections in  $t_1$  (average IRR 1.52), but not when controlling for prominence in  $t_2$  (average IRR 1.40). Hence, issue ownership can account for the general advantage of scientific actors

who agree with the IPCC consensus over actors who challenge this consensus, but not for the differences across newspaper sections observed in Figure 6.6. The positive effects for the economy, feature, and science sections are only statistically significant for individual model specifications in  $t_2$ , but the point estimates suggest that issue owners were named in around 30 percent more articles than non-owners in the economy and feature sections, and in around 40 percent more articles in the opinion section. In light of the positive effects observed for all other newspaper sections except the smaller society section ( $N = 235$ ), the tendentially negative average effects for the politics section (average IRR 0.90 in  $t_1$  and 0.83 in  $t_2$ ), where political actors were particularly visible, strengthen the notion that the general advantage of political actors over actors from other domains attenuated the effect of issue ownership in the full model.

**Figure 6.28: The effect of issue ownership on visibility across sections**



**Notes:** Depicted are IRRs of issue ownership for the number of articles naming an actor by newspaper section. The reference category are non-issue owners. **Legend:** see Figure 6.11.

Overall, the results suggest that issue ownership increased actors' chances to be named in newspaper articles on climate change, except for issue owners from the business domain, who

were less likely to be covered than non-owners, challenging the assumption that specialized actors are perceived as more competent than actors whose focus lies elsewhere. The insignificant effects in the full and period models likely reflect the opposing influences for actors from different domains, as well as the general advantage of political actors over actors from other domains that attenuated the observed estimates. There was no indication that the importance of issue ownership varied with issue salience or any other contextual factor. The findings thus contradict Hypothesis 4.2, but do not disconfirm the expectation that issue ownership is unaffected by changes in the societal consensus (Hypothesis 6.3).

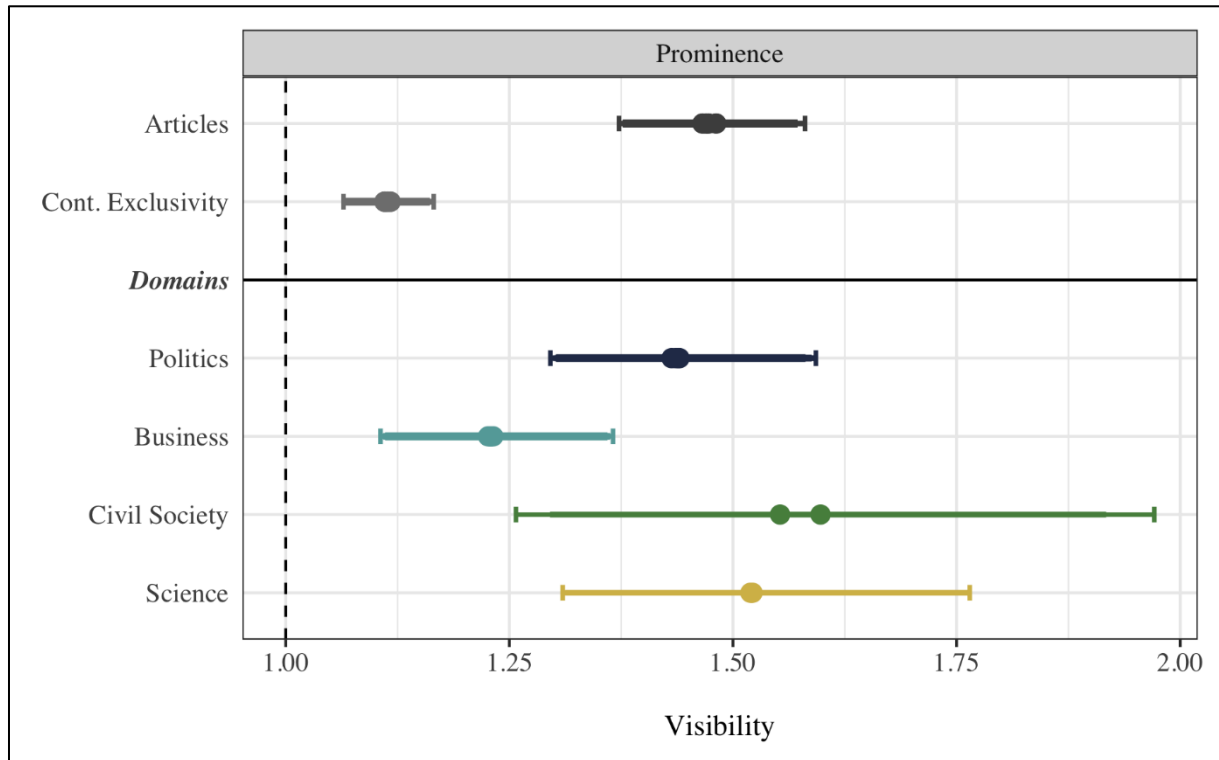
Issue ownership seems to be somewhat more important for coverage in the left-leaning taz and FR, though the effects for all newspapers are likely biased downward by the negative effect for issue owners from the business domain and the inherent advantage of political actors. Issue ownership was also particularly important for coverage in the current section, but issue owners were generally covered at higher rates in almost all newspaper sections. Considering the disproportionate visibility of political actors in the politics section, the tendentially negative effect of issue ownership for this section likely reflects the inherent advantage of political actors. Although the estimates for the effect of continuous issue ownership on the visibility of civil society and scientific actors should be interpreted with caution and the effects for actors from all domains are likely biased downward, the findings generally support Hypothesis 2.2 except for the business domain.

### *Prominence*

People have long been interested in the lives and views of celebrities, and this interest has risen rather than subsided with the emergence of social media sites. More prominent actors should thus intrigue larger audience shares, increasing their value for newspapers competing for readers. In consequence, prominence should enhance actors' visibility in climate change coverage (Hypothesis 2.3). Figure 6.29 shows the effects of prominence on the number of articles naming an actor from all domains, the political domain (Politics), the business domain (Business), the civil society domain (Civil Society), or the scientific domain (Science). Moreover, it illustrates the influence of prominence on the number of actors mentioned in the same article as an actor (Cont. Exclusivity), controlling for the other agenda-building factors (see Appendices 10 and 11 for the full regression results). Since prominence was measured with

Google Trends scores, which first became available in 2004, all models are based on articles published between 2002 and 2020, preventing conclusions for earlier legislative periods.

**Figure 6.29: The effect of prominence on visibility**



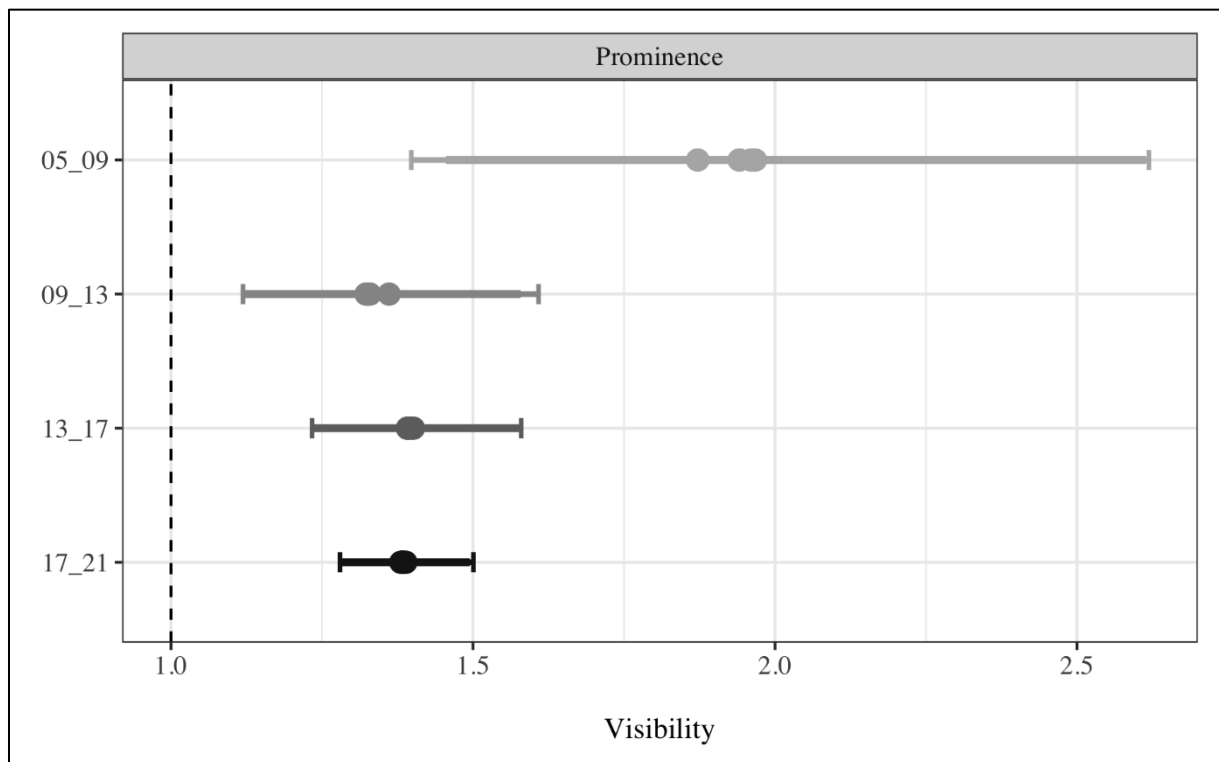
**Notes:** Depicted are IRRs of prominence for the number of articles in which an actor was mentioned (Articles) and the average number of actors mentioned in the same article as an actor (Cont. Exclusivity) for all domains, as well as the number of articles in which an actor from the political (Politics), business (Business), civil society (Civil Society) or scientific domains (Science) was mentioned. **Legend:** see Figure 6.8 ( $t_2$ -models only).

The results show that more prominent actors were named in more articles than their less prominent counterparts, irrespective of the considered domain. Very similar effects can be observed for the number of mentions and the number of exclusive articles in which actors were covered (see Appendix 10.2-3), lending strong support to Hypothesis 2.3. For every percentage point increase in actors' Google Trends score relative to the benchmark, they were covered in around 47 percent more articles. The size of the effect varies across domains, suggesting a larger advantage for civil society (average IRR 1.58) and scientific actors (average IRR 1.52) than for political (average IRR 1.47) and especially business actors (average IRR 1.23), though the differences are not statistically significant. Given that large companies tended to be more prominent than associations in the periods for which Google Trends scores are available, prominence could explain the disproportionate visibility of companies in later legislative

periods (see Figure 6.4). Similarly, the results support the conclusion that contrarian actors' prominence accounts for changes in their visibility over time (see Figure 6.6). Yet, prominence raised the number of other actors named in the same article, indicating that more prominent actors received less exclusive coverage than less prominent actors (average IRR: 1.11).

The relative importance of prominence potentially rose with the emergence of the hybrid media system, which increased audiences' engagement with celebrities and offers journalists readily available metrics like follower counts or search frequencies to evaluate audience interest in individual actors (Hypothesis 3.2). On the other hand, prominence may have been less relevant during crises if audiences were preoccupied with their concern about current events (Hypothesis 5.2). Given that prominence is not linked to any specific issue, its relative importance should be unaffected by the salience of and the societal consensus on climate change (Hypotheses 4.1 and 6.3). To test these hypotheses, Figure 6.30 shows the effect of prominence separately for the periods of interest for which Google Trends scores were available (see Appendix 12 for the full regression results).

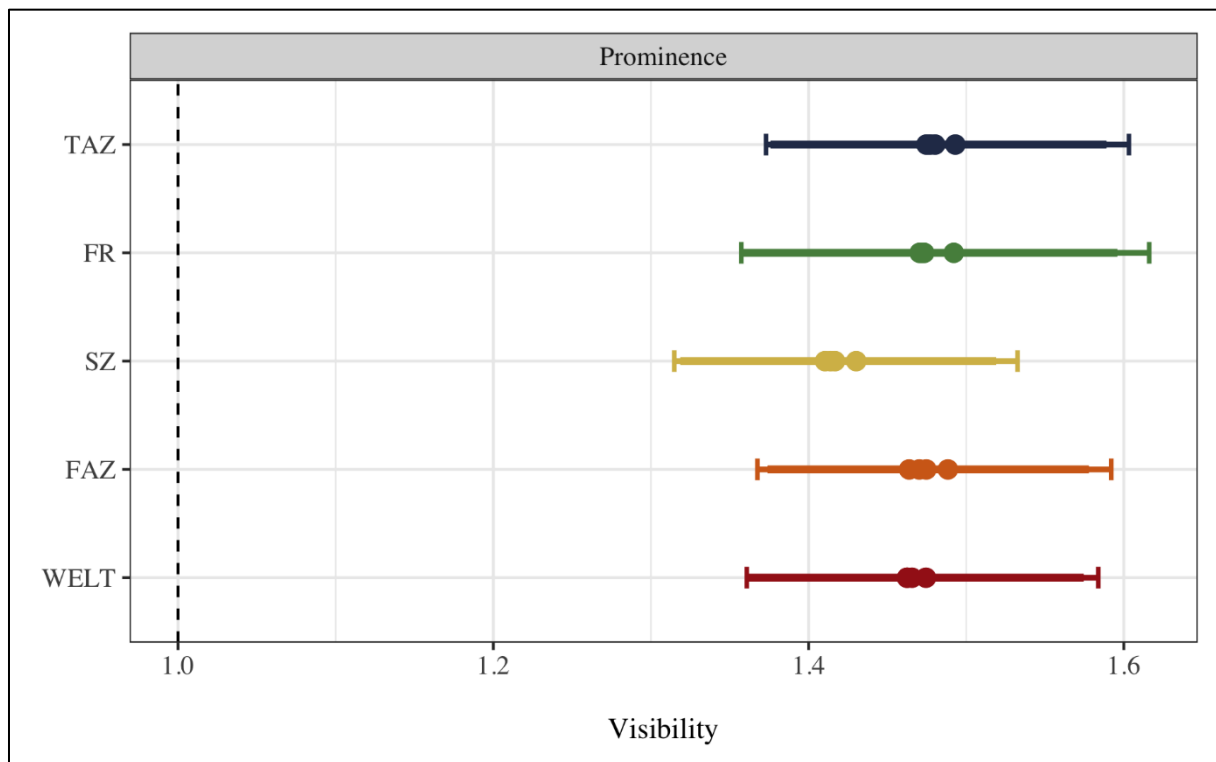
Although the differences over time are not statistically significant, the pattern observed for the point estimates contradicts the notion that prominence became more relevant when the media system transitioned from traditional to hybrid, as the effect for the transitional period 2005-2009 is tendentially larger than the effects for subsequent periods when the hybrid media system was fully established. While the decrease in effect size for the period 2009-2013 could reflect the influence of the economic crises experienced at the time, there is no corresponding decrease in the period 2013-2017. Unless we assume that the European refugee crisis in 2015 impacted newspaper coverage of climate change, the observed pattern thus does not corroborate Hypothesis 5.2. As expected, there is no evidence that issue salience or the societal consensus affected the relative importance of prominence for actors' visibility in newspaper articles addressing climate change. The results for the number of mentions and the number of exclusive articles mirror these findings, but the effect for continuous exclusivity remains positive (see Appendix 12). Like the full model, the effects for individual periods of interest thus strongly support Hypothesis 2.3 except for continuous exclusivity. With regard to the expected influence of contextual changes, the findings are in line with Hypotheses 4.1 and 6.3, but cannot support Hypotheses 3.2 and 5.2.

**Figure 6.30: The effect of prominence on visibility over time**

**Notes:** Depicted are IRRs of prominence for the number of articles naming an actor by period of interest. **Legend:** see Figure 6.9 ( $t_2$ -models only).

Depending on the composition of their audiences, prominence may also be more or less important for some newspapers than for others. Figure 6.31 depicts the effect of prominence for individual newspapers (see Appendix 13 for the full regression results), which are exceedingly similar (average IRRs 1.48 for the taz and the FR, 1.47 for the FAZ and the Welt, and 1.42 for the SZ). The results thus consistently support Hypothesis 2.3 and offer no indication that the relevance of prominence differed across newspapers. This is not to say that newspapers with different ideological leanings necessarily covered the same set of prominent actors. Rather, newspapers likely gave more attention to actors who are of interest to their specific audiences, with different newspapers favoring different sets of prominent actors.

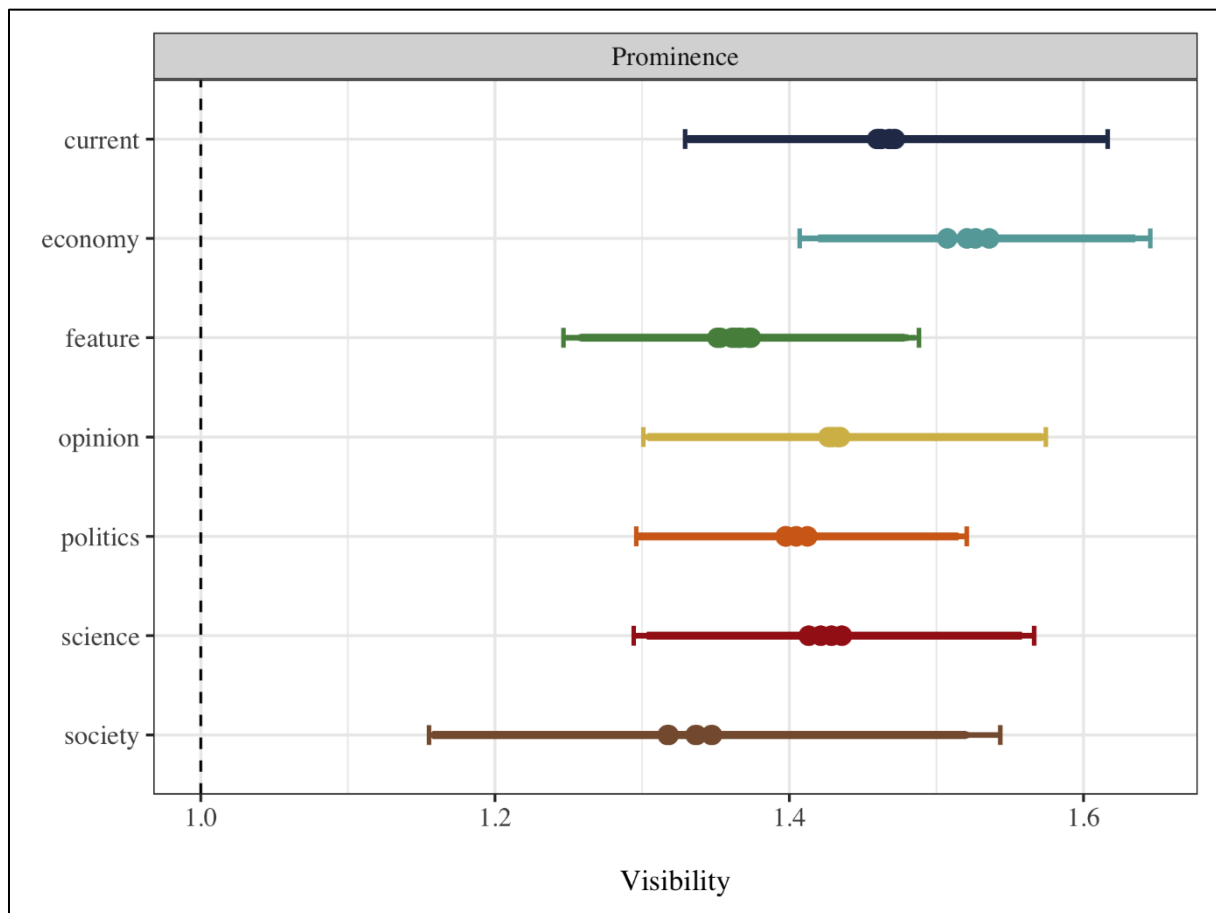
**Figure 6.31: The effect of prominence on visibility across newspapers**



**Notes:** Depicted are IRRs of prominence for the number of articles naming an actor by newspaper. **Legend:** see Figure 6.10 (t<sub>2</sub>-models only).

Despite its very similar relevance across newspapers, differences in the relevance of prominence across newspaper sections could account for some of the deviations in the visibility of actor groups observed in the descriptive analysis. Figure 6.32 shows the effect of prominence for individual newspaper sections, which is consistently positive and statistically significant (see Appendix 14 for the full regression results). Increases in prominence afforded actors a similar advantage in all newspaper sections (average IRRs 1.52 for the economy section, 1.47 for the current section, 1.43 for the opinion section, 1.42 for the science section, 1.41 for the politics section, 1.36 for the feature section, and 1.33 for the society section), further supporting Hypothesis 2.3. Given the lack of significant differences between the effects for individual newspaper sections, as well as the comparatively high point estimates for the current section, prominence cannot explain why (more prominent) companies were mentioned at higher rates than (less prominent) associations in the economy section, but the reverse is true for the current section. The findings thus strengthen the notion that the visibility of actors in the current section is determined by factors beyond the proposed theoretical framework.



**Figure 6.32: The effect of prominence on visibility across sections**

**Notes:** Depicted are IRRs of prominence for the number of articles naming an actor by newspaper section. **Legend:** see Figure 6.11 (t<sub>2</sub>-models only).

In conclusion, the findings indicate that prominent actors were named more often and in more (exclusive) articles than other actors, irrespective of the considered domain, period, newspaper, or newspaper section. Yet, like executive authority, prominence increased rather than decreased the number of other actors named in the same article, and thus the exclusivity of articles covering several perspectives. Hence, the results strongly support Hypothesis 2.3 except for continuous exclusivity, which seems to work differently than the remaining visibility metrics. Surprisingly, the relative importance of prominence tendentially declined over time, contradicting the expectations that prominence is more relevant in hybrid media systems (Hypothesis 3.2) and that audiences, and thus newspapers, attach less weight to prominence during crises (Hypothesis 5.2). In line with Hypotheses 4.1 and 6.3, the observed pattern provides no indication that issue salience or the societal consensus influenced the relevance of this factor. Prominence was similarly important across newspapers and newspaper sections, though the set of prominent actors covered in individual newspapers or sections likely differs.

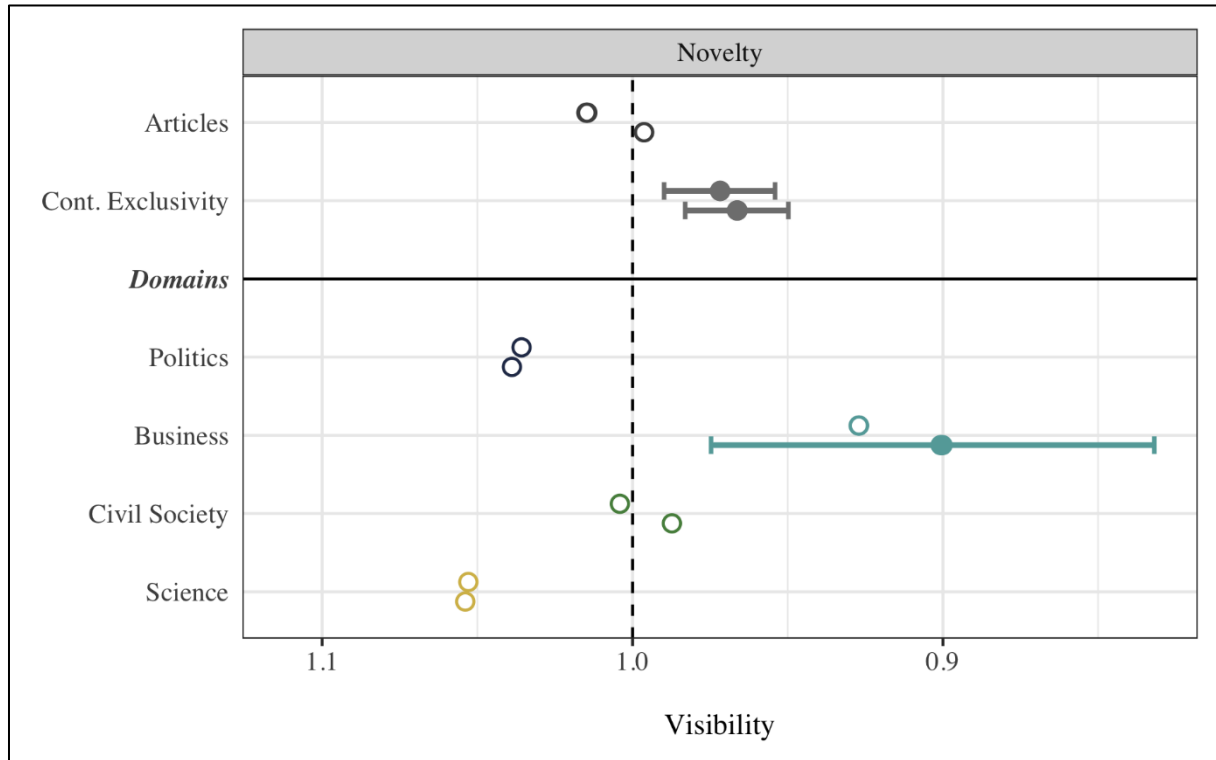
### *Novelty*

The positions of newer actors tend to be more surprising than the positions of established actors, whose actions are constrained by previous decisions. Since surprising coverage arouses audiences' interest, newspapers should name newer actors more often than established actors (Hypothesis 2.4), especially in the absence of crises and societal conflict on an issue (Hypotheses 5.2 and 6.2). Figure 6.33 depicts the effect of novelty on the number of articles naming an actor from all domains (Articles), the political domain (Politics), the business domain (Business), the civil society domain (Civil Society), or the scientific domain (Science), as well as on the number of actors mentioned in the same article as an actor (Cont. Exclusivity), controlling for the other agenda-building factors (see Appendices 10 and 11 for the full regression results). As the indicator for novelty measures the number of legislative periods since actors' first inclusion in the actor dictionary, I reversed the x-axis for the figures in this section to make them more intuitively interpretable. Contrary to the expectation, novelty did not increase actors' visibility except for business actors, who were named in around ten percent more articles than actors who emerged one period earlier in  $t_2$  and tendentially seven percent more articles in  $t_1$  ( $p = 0.07$ ). The same pattern can be observed for the number of mentions, but novelty did not affect exclusivity for business actors (see Appendix 11.2). Contradicting the conjecture that novelty may be more important for actors from the civil society domain (see *Civil Society Actors* in Chapter 6.1), newer civil society actors were named at similar rates as their more established counterparts across all visibility metrics (see Appendix 11.3).

Although not statistically significant for the number of articles, the point estimates for the political and scientific domains suggest an opposite effect, with political actors receiving around four percent more coverage ( $p = 0.13$  in  $t_1$  and  $0.06$  in  $t_2$ ) and scientific actors around five percent more coverage ( $p = 0.06$  in  $t_1$  and  $t_2$ ) for each additional legislative period in the dictionary. These effects remain positive and gain statistical significance for the number of mentions and the number of exclusive articles (see Appendices 10.1 and 10.4), indicating that more established actors had a slight advantage over newer actors in these domains. This disconfirms the tentative conclusion from the descriptive analysis that contrarian scientists profited from their novelty (see *Scientific Actors* in Chapter 6.1). As for issue ownership, the null effects in the full models likely reflect the opposing influences of novelty for actors from different domains. The significant negative effect for continuous exclusivity in the full model suggests that, like executive authority and prominence, novelty raised rather than decreased the

number of actors mentioned in the same article. Overall, the observed pattern implies that established actors had an advantage over newer actors rather than the other way around, and thus contradicts Hypothesis 2.4 except for the business domain.

**Figure 6.33: The effect of novelty on visibility**



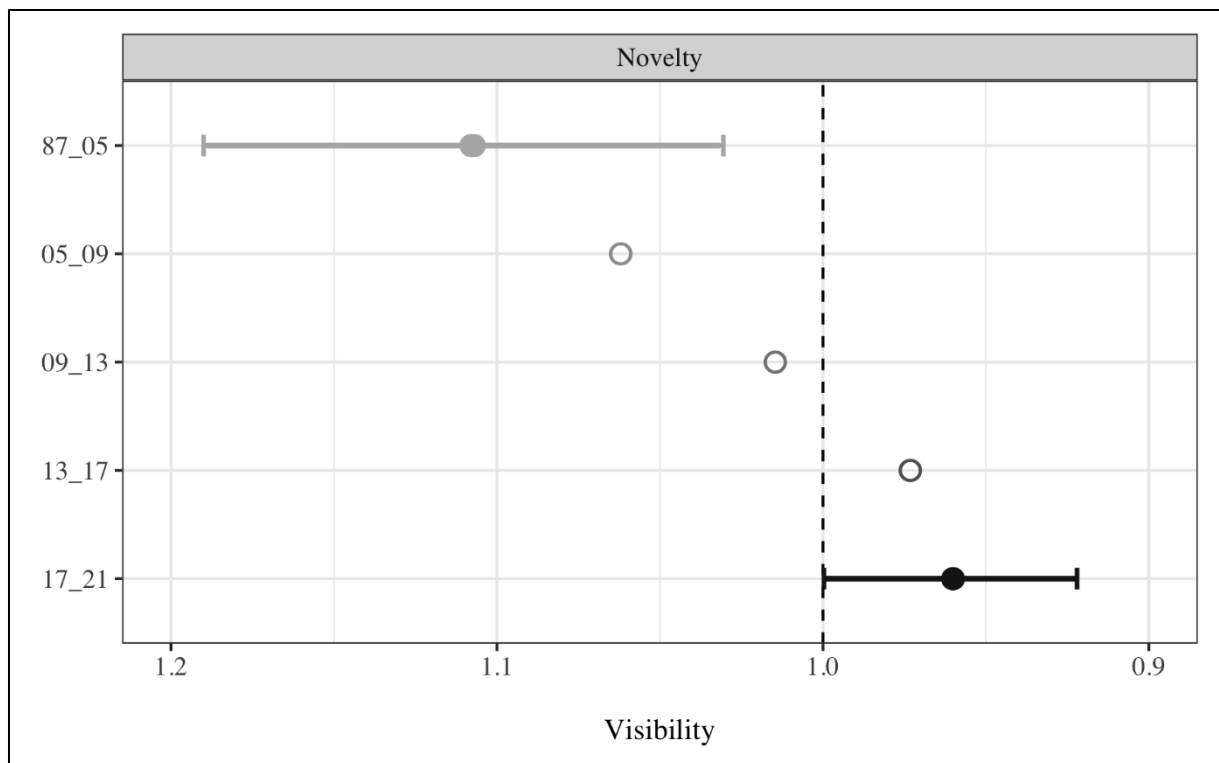
**Notes:** Depicted are IRRs of novelty for the number of articles naming an actor (Articles) and the average number of actors named in the same article as an actor (Cont. Exclusivity) for all domains, as well as the number of articles naming an actor from the political (Politics), business (Business), civil society (Civil Society) or scientific domains (Science). **Legend:** see Figure 6.8.

The null effects for the number of articles in the full models could also conceal changes in the importance of novelty over time, as surprise should be valued more in hybrid media systems (Hypothesis 3.3), in the absence of crises that increase readers' desire for reassuring coverage (Hypothesis 5.2), and when there is broad societal consensus on an issue making readers long for excitement (Hypothesis 6.2). Given that surprise has inherent news value, its importance should not depend on the salience of climate change (Hypothesis 4.1). Figure 6.34 depicts the effect of novelty separately for periods of interest, omitting the period 1976-1987 due to the minimal variation in novelty in the relevant models (see Appendix 12 for the full regression results). Interestingly, the results suggest that the effect of novelty shifted over time, with established actors being favored in earlier periods (average IRR 1.11 in 87\_05), but newer

actors being preferred in more recent periods (average IRR 0.96 in 17\_21). These findings do not support the deduction from the descriptive analysis that surprise was relatively more important in early climate change coverage (see *Political Actors* in Chapter 6.1).

While the tendential increase between 2005 and 2009 is in line with the notion that surprise is valued more in hybrid than in traditional media systems, changes in the media system cannot account for the continued shift toward newer actors in the following periods. Given that the societal consensus on climate change only began to change in the last two periods and that crises are expected to decrease the importance of novelty, neither context condition explains the continued increase in the relevance of novelty over time. On the contrary, the observed pattern disconfirms the expectations that crises and societal conflict should attenuate the importance of novelty. In line with Hypothesis 4.1, there is no indication that issue salience affected the relevance of novelty. In other words, the findings support Hypothesis 3.3, but changes in the considered context conditions cannot explain the almost linear shift in favor of newer actors over time. Furthermore, the direction of the effects contradicts Hypothesis 2.4 for periods before 2013 but supports it for later periods.

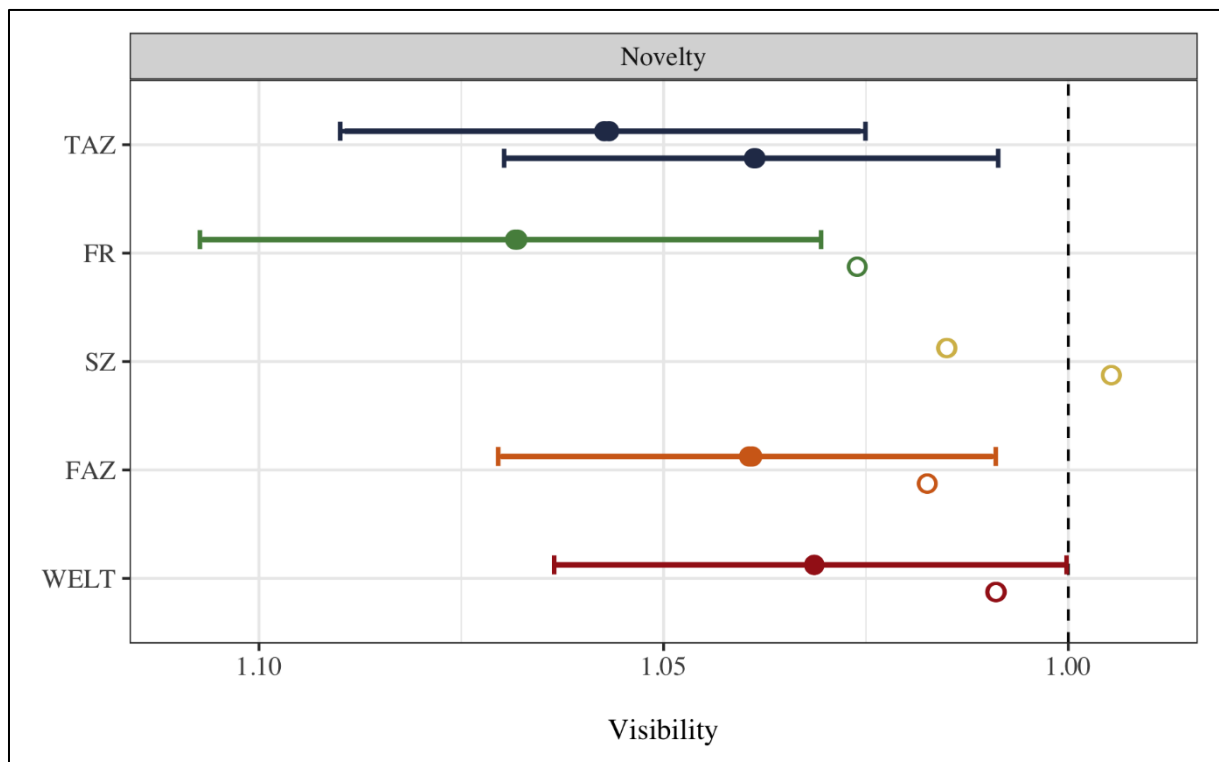
**Figure 6.34: The effect of novelty on visibility over time**



**Notes:** Depicted are IRRs of novelty for the number of articles naming an actor by period of interest. **Legend:** see Figure 6.9.

Considering the impact of novelty for individual newspapers (see Figure 6.35), we see negative effects for all newspapers except the SZ (see Appendix 13 for the full regression results), which may reflect the higher visibility of political and scientific actors compared to business actors across newspapers. These results further disconfirm Hypothesis 2.4, although the tendentially smaller effects for  $t_2$  compared to  $t_1$  are in line with the finding from the period models (see Figure 6.34) that the advantage of established actors decreased over time. There are no statistically significant differences between the newspapers, and the point estimates are very similar across newspapers, even for the SZ.<sup>38</sup> The lack of significance for some estimates is not surprising in light of the opposing effects for actors from different domains and over time. Overall, the findings strengthen the conclusions from the full and period models.

**Figure 6.35: The effect of novelty on visibility across newspapers**



**Notes:** Depicted are IRRs of novelty for the number of articles naming an actor by newspaper. **Legend:** see Figure 6.10.

The descriptive findings indicate that novelty may have been more important for the current section than for other newspaper sections, but the observed pattern is not consistent across

<sup>38</sup> Average IRRs: 1.06 in  $t_1$  and 1.04 in  $t_2$  for the taz, 1.07 in  $t_1$  and 1.03 in  $t_2$  for the FR, 1.02 in  $t_1$  and 0.99 in  $t_2$  for the SZ, 1.04 in  $t_1$  and 1.02 in  $t_2$  for the FAZ, and 1.03 in  $t_1$  and 1.01 in  $t_2$  for the Welt.

domains, possibly reflecting the confounding influence of domain-specific agenda-building factors. Figure 6.36 shows the effect of novelty separately for each newspaper section, controlling for the other agenda-building factors (see Appendix 14 for the full regression results). Mirroring the findings for individual newspapers, the results indicate that established actors had an advantage over newer actors in all sections except the politics section, where newer actors were named at slightly higher rates. Looking at the effect for the current section, in particular, we find a statistically significant advantage for established actors in  $t_1$  (average IRR 1.06), which disappears in  $t_2$ . These findings tentatively support the notion that novelty was more important for coverage in the current section than in most other sections in more recent legislative periods, which would explain the greater visibility of newer associations compared to more established companies in the business domain (see Figure 6.4). Given the negative effect of novelty for scientific actors, they also account for the contradictory pattern for the scientific domain observed in the current section (see *Scientific Actors* in Chapter 6.1). Since novelty does not affect the visibility of civil society actors (see Figure 6.33), the higher article shares for recently emerged climate protection activists compared to more established organizations (see Figure 6.5) cannot be traced to this factor, unless the null effect in the domain models mask variation over time.<sup>39</sup>

Curiously, newer actors tended to be named in more articles than established actors in the politics section (average IRRs 0.99 in  $t_1$  and 0.97 in  $t_2$ ), despite the generally negative effect of novelty for political actors, who were especially visible in this section (see Figure 6.2). This suggests that novelty was relatively more important in the politics section than in other sections. Other differences across newspaper sections are mostly insignificant,<sup>40</sup> but the point estimates suggest that the advantage for established actors was slightly larger in the society section (average IRRs 1.16 in  $t_1$  and 1.14 in  $t_2$ ) than in the feature and science sections (average IRRs 1.13 in  $t_1$  and 1.10 in  $t_2$ ), followed by the opinion section (average IRRs 1.10 in  $t_1$  and 1.06 in  $t_2$ ), and the economy section (average IRRs 1.05 in  $t_1$  and 1.04 in  $t_2$ ). The comparatively small advantage for established actors in the economy section and the somewhat larger advantage in the feature and science sections likely reflects their focus on actors from different domains, for whom novelty had different effects (see Figure 6.2). However, the visibility of actors from different domains cannot account for the larger effect observed for the society section, unless

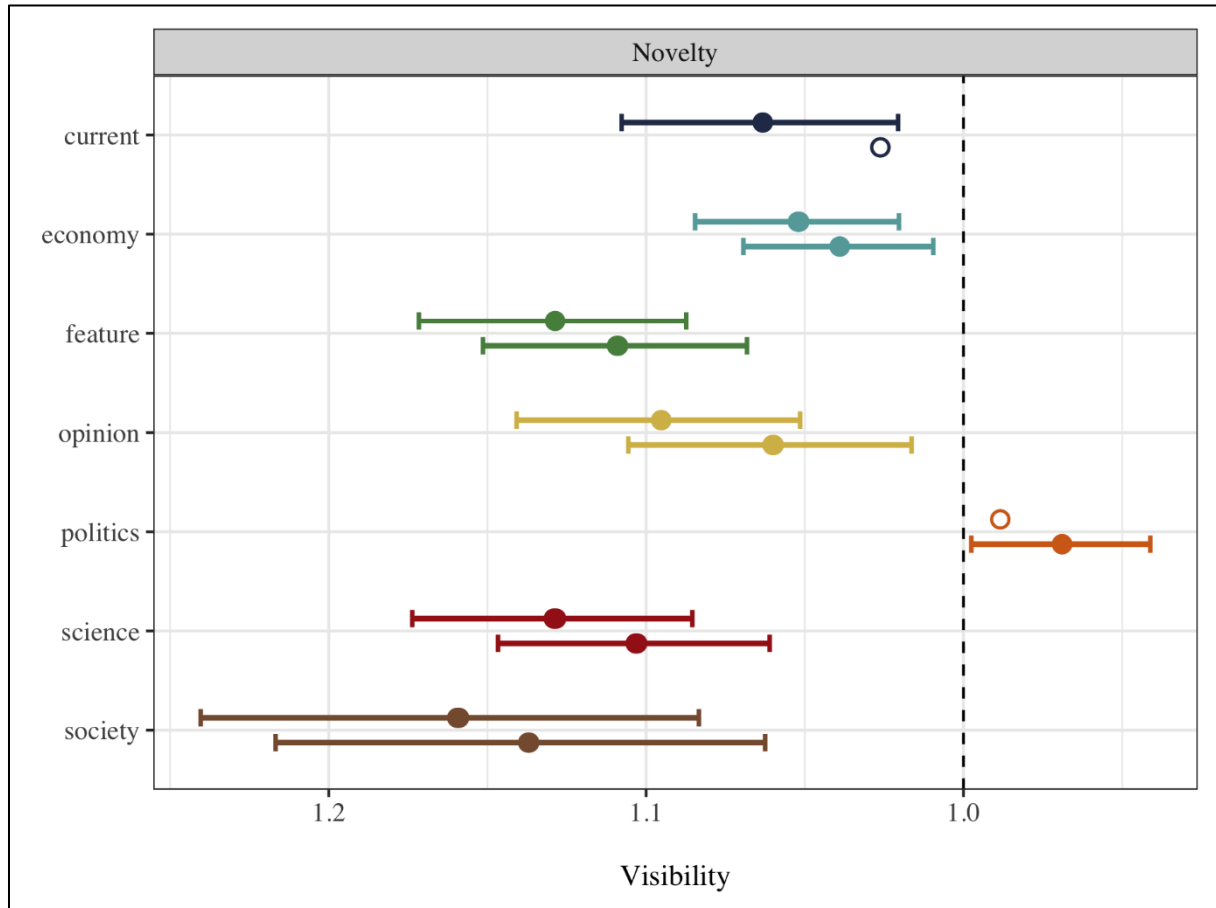
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<sup>39</sup> The sample sizes do not allow me to estimate effects for individual domains by period of interest.

<sup>40</sup> Except the difference in effects between the economy and the feature, science, and opinion sections.

newer civil society actors indeed had an advantage over their more established counterparts in more recent legislative periods, as suggested by the pattern for the current section. Overall, the effects disconfirm Hypothesis 2.4 except for the politics section.

**Figure 6.36: The effect of novelty on visibility across sections**



**Notes:** Depicted are IRRs of novelty for the number of articles naming an actor by newspaper section. **Legend:** see Figure 6.11.

Taken together, the results show that established actors are generally named at higher rates than newer actors, though the effect is reversed for business actors, in the periods after 2013, and in the politics section. The null effects for the number of articles observed in the full models likely reflect these opposing influences. Like executive authority and prominence, novelty increased rather than reduced the number of other actors named in the same article, adding to the evidence that continuous exclusivity reflects different determinants than the other visibility metrics. Contrary to the preliminary conclusion from the descriptive analysis that novelty was more important in earlier legislative periods, the over-time pattern suggests that established actors tended to have an advantage over newer actors before 2013. The observed shift over time

tentatively supports the notion that novelty is more important in hybrid media systems (Hypothesis 3.3) and does not reflect changes in issue salience (Hypothesis 4.1) but clearly contradicts the expectations regarding the decreased relevance of surprise in times of crisis and societal conflict about issues (Hypotheses 5.2 and 6.2). Novelty decreased actors' visibility in all newspapers except the SZ and most newspaper sections. However, newer actors had an advantage over more established actors in the politics section, as well as the current section in later legislative periods. Hence, the findings offer mixed evidence for Hypothesis 2.4, indicating that the effect of novelty differed across domains, as well as over time and across newspaper sections.

### *Mainstream or Challenger Status*

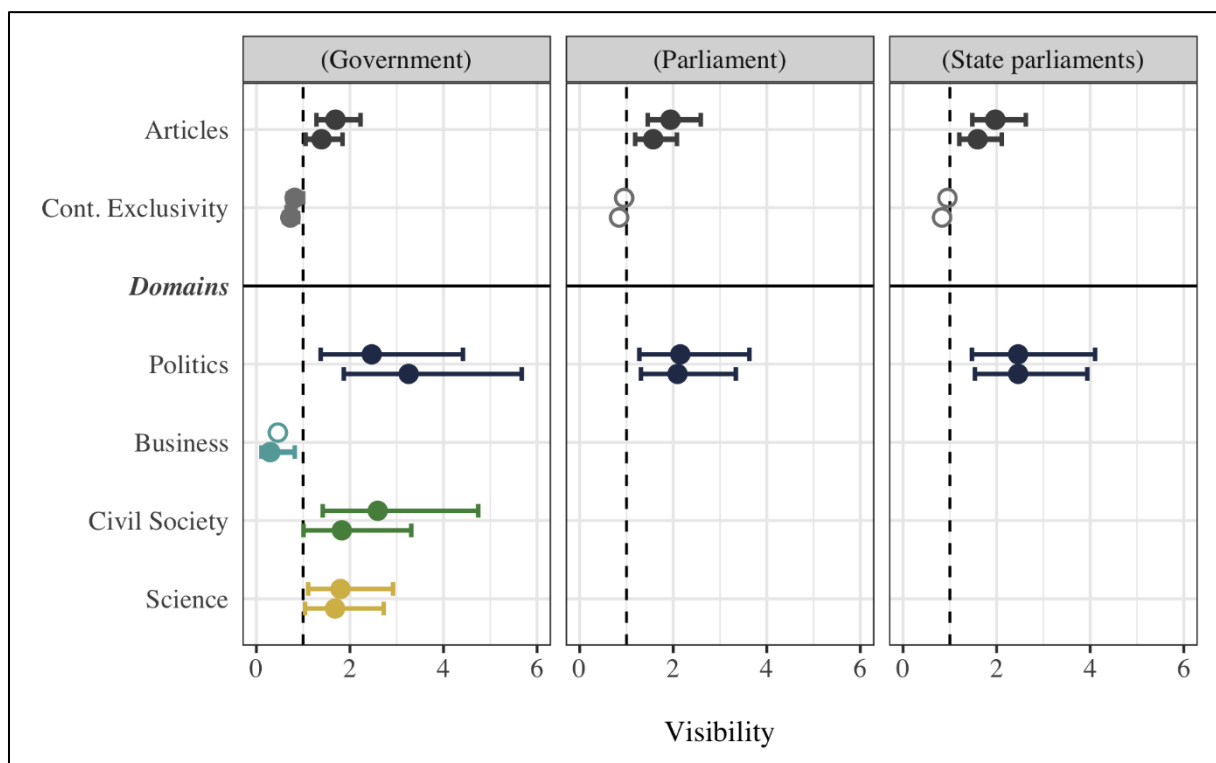
The perspectives of mainstream and challenger actors can be expected to cater to different news values, raising the question whether newspapers attach greater importance to the consonance provided by mainstream actors (Hypothesis 2.6), or to the surprise and controversy offered by challenger actors (Hypothesis 2.5). Figure 6.37 shows the effect of actors' positions on a continuum between challenger (0) and mainstream (1) on the number of articles naming an actor from all domains (Articles), the political domain (Politics), the business domain (Business), the civil society domain (Civil Society), or the scientific domain (Science), as well as on the number of actors mentioned in the same article as an actor (Cont. Exclusivity), controlling for the other agenda-building factors (see Appendices 10 and 11 for the full regression results). Note that political actors' mainstream status was alternatively measured based on their inclusion in the government, the national parliament, or state parliaments and that all business actors are expected to have incentives to promote consonant perspectives and are thus coded as mainstream actors in all legislative periods. In consequence, differences in business actors' positions on the challenger-mainstream continuum reflect the discounted length of their establishment and the effects should largely mirror the findings for novelty.

The effects for the full models as well as for the political, civil society, and scientific domains indicate that mainstream actors were generally named at higher rates than challenger actors, pointing to the greater relevance of consonance compared to surprise and controversy in newspaper coverage of climate change. This finding is consistent across the alternative operationalizations of political actors' mainstream status and is mirrored by the effects for the number of mentions and exclusive articles, though the latter are not statistically significant for



the civil society domain and in  $t_1$  for the scientific domain (see Appendix 10.2-3 for the full models and Appendix 11 for the domain models). The advantage of mainstream actors over challenger actors from the political, civil society, and scientific domains is comparable in  $t_1$  and  $t_2$  (average IRRs 2.36 and 2.60 in the political domain, 2.60 and 1.83 in the civil society domain, and 1.80 and 1.68 in the scientific domain), disconfirming that surprise and controversy were more important in earlier legislative periods and reconfirming the importance of issue ownership for the visibility of Green actors (see *Political Actors* in Chapter 6.1). The tendentially negative effect for the business domain (average IRRs 0.46 in  $t_1$  and 0.30 in  $t_2$ ), as well as the null effects for (continuous) exclusivity (see Appendix 11.2) are in line with the finding that newer business actors were named at higher rates than established business actors, at least in more recent legislative periods (see Figure 6.33).

**Figure 6.37: The effect of mainstream status on visibility**



**Notes:** Depicted are IRRs of actors' mainstream status for the number of articles naming an actor (Articles) and the average number of actors named in the same article as an actor (Cont. Exclusivity) for all domains, as well as the number of articles naming an actor from the political (Politics), business (Business), civil society (Civil Society) or scientific domains (Science). **Legend:** see Figure 6.8.

The advantage for mainstream actors is also visible in the tendentially negative effect for continuous exclusivity in the full model, which indicates that fewer other actors were named

alongside mainstream actors than challenger actors. However, this effect is not statistically significant when political actors' mainstream status is determined based on their inclusion in the national parliament or state parliaments, or in the models for the political and civil society domains, and is reversed for scientific actors (see Appendix 11). Hence, scientific actors affiliated with traditional academic institutions were mentioned alongside more rather than fewer other actors compared to challenger actors from the scientific domain. Given that contrarian scientists tended to be challenger actors, this finding indicates that perspectives challenging the IPCC consensus were contrasted with fewer other positions than perspectives in line with the IPCC consensus. However, at least in more recent legislative periods, contrarian actors were less likely to be mentioned without any other actors being named in the same article, suggesting that contrarian perspectives were not simply replicated without reference to the IPCC consensus. Taken together, the results support Hypothesis 2.6 and thus disconfirm Hypothesis 2.5 except for the business domain.

Yet, journalists may have based their expectations of consonance and controversy on actors' presumed agreement with the long-standing societal consensus that climate change exists and requires action to prevent serious harm, rather than on actors' general mainstream or challenger status. To test this, I re-estimated the domain models for actors from the business, civil society, and scientific domains, replacing the measure for actors' mainstream status with a dummy variable indicating whether actors' perspectives were expected to challenge (0) or match the societal consensus (1). Since political actors' positions on the societal consensus are hard to capture with a dummy variable and likely changed over time, I refrained from re-estimating the model for the political domain. The models for the business domain and the  $t_1$ -model for the civil society domain did not converge, but the estimates for civil society actors in  $t_2$  (IRR 2.42) and scientific actors in  $t_1$  (IRR 2.56) and  $t_2$  (IRR 1.56 with  $p = 0.06$ ) support the notion that journalists favored civil society and scientific actors whose positions match the societal consensus on climate change (see Appendix 20). Given the statistically significant effects for the more general mainstream-challenger indicator for actors from these domains (see Figure 6.37), actors' positions relative to the societal consensus seem to point to the existence of an additional dimension in actors' mainstream or challenger status, rather than to the validity of one operationalization over the other. This additional dimension can explain the observed advantage of climate protection activists over their climate change skeptic counterparts (see *Civil Society Actors* in Chapter 6.1).

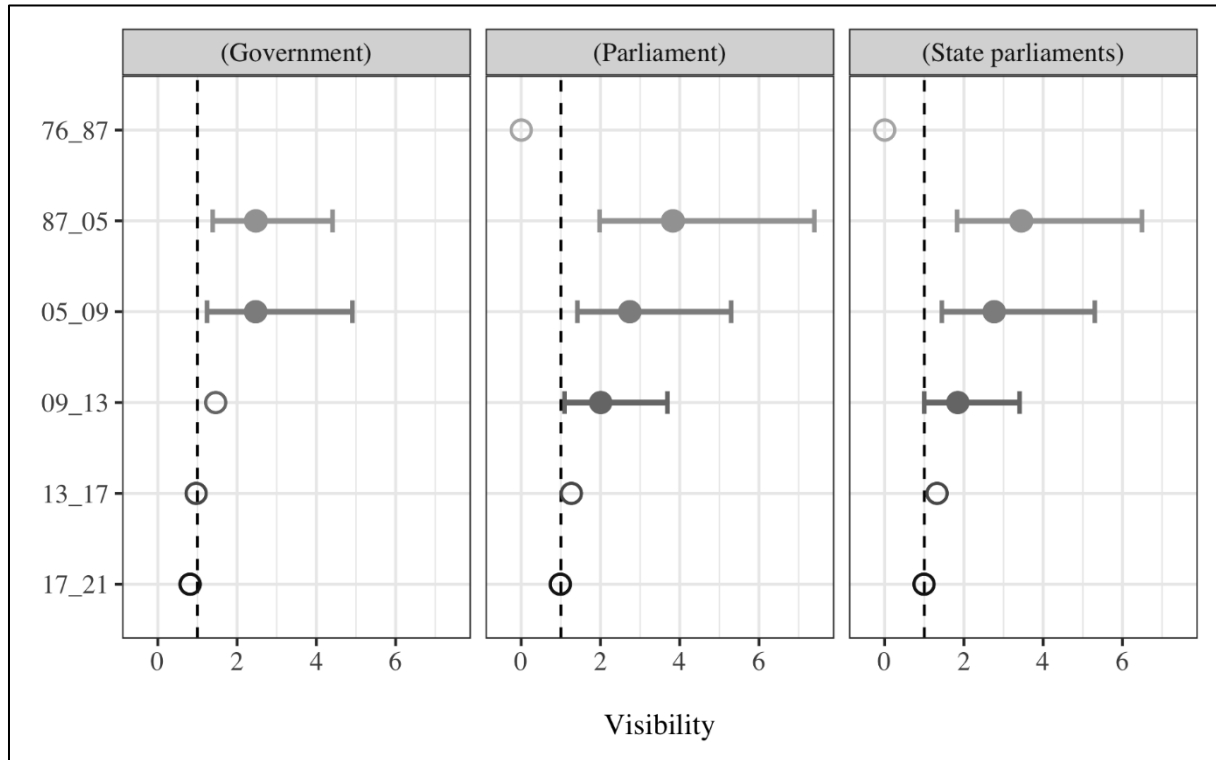
The effect of actors' mainstream or challenger status likely differed over time, as audiences should prefer consonance over controversy and surprise during crises (Hypotheses 5.1 and 5.2), and when the societal consensus on an issue is contested (Hypotheses 6.1 and 6.2). The transition from traditional to hybrid in the media system could have added to the advantage of both mainstream and challenger actors (Hypotheses 3.3 and 3.4), whereas issue salience should not matter for the relative importance of controversy and surprise (Hypothesis 4.1) but could increase the importance of consonance (Hypothesis 4.3). Figure 6.38 illustrates the effects of actors' positions on the challenger-mainstream continuum separately for periods of interest (see Appendix 12 for the full regression results).

The results indicate that the general advantage of mainstream actors observed in the full models (see Figure 6.37) tendentially decreased over time, disappearing in the two most recent legislative periods. This finding contradicts the expectations that mainstream actors have a greater advantage during crises and societal conflict, whereas challenger actors are named at higher rates in the absence of these conditions, disconfirming Hypotheses 5.1-2 and 6.1-2. The regression results thus corroborate the impression from the descriptive analysis that newspapers did not name mainstream actors at higher rates in times of crisis and societal conflict. The findings also strengthen the tentative conclusion from the domain models that controversy and surprise were not more important during earlier legislative periods. Lastly, the effects indicate that contrarian scientists' challenger status did not add to their prominence in increasing their visibility between the late 1990s and the mid-2000s (see *Scientific Actors* in Chapter 6.1).

While the observed pattern does not preclude that controversy and surprise are more important in hybrid than in traditional media systems, there is only a small tendential decrease in the period between 2005 and 2009. This decrease discounts the notion that consonance is more relevant in hybrid than in traditional media systems (Hypothesis 3.4), but does not lend strong support to the higher importance of controversy and surprise in hybrid media systems (Hypothesis 3.3). Instead, the decreasing importance of consonance, or increasing importance of controversy and surprise, match the rising dramatization in climate change coverage documented elsewhere (Heinrichs & Grunenberg, 2009; Peters & Heinrichs, 2005, 2008). In line with the expectation that issue salience does not affect the importance of controversy and surprise (Hypothesis 4.1), but contradicting the notion that consonance is more relevant for salient issues (Hypothesis 4.3), the monotonically decreasing tendency in the point estimates over time does not reflect shifts in the salience of climate change. Overall, the observed pattern supports Hypothesis 2.6 before 2013, but does not corroborate Hypothesis 2.5 for more recent

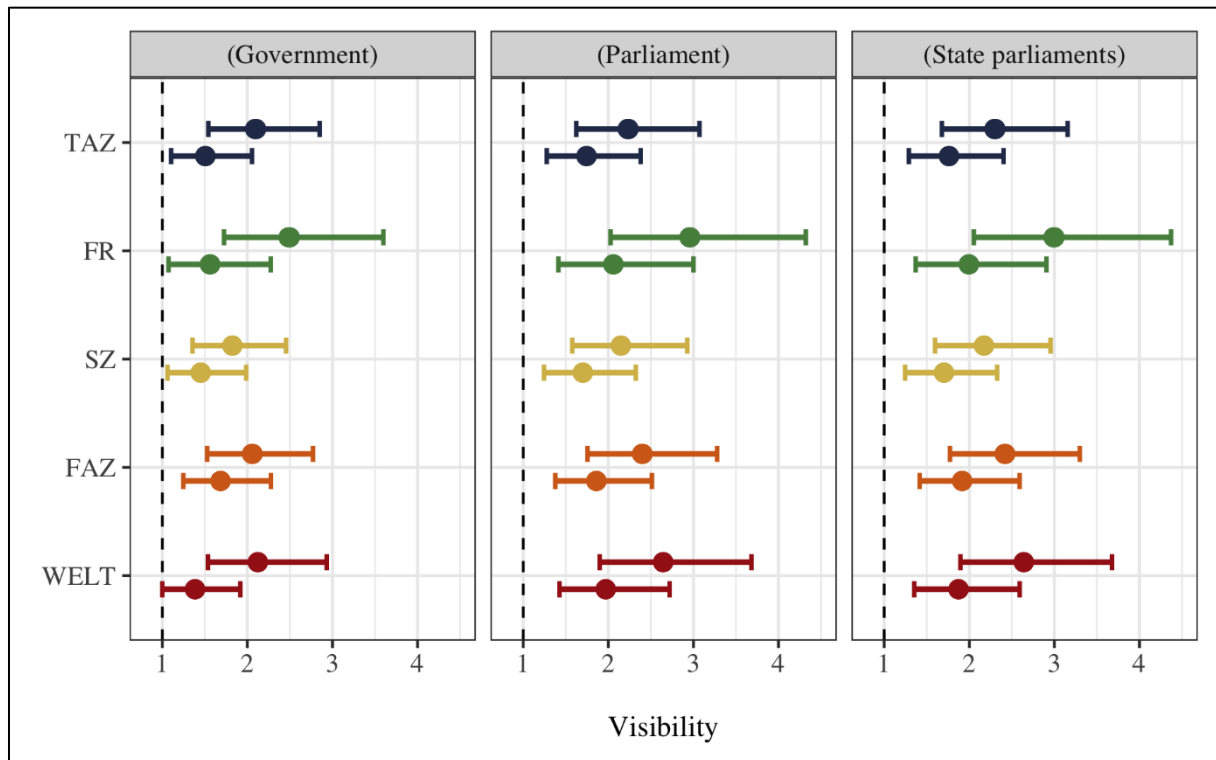
legislative periods. The influence of actors' mainstream or challenger status moreover seems to be independent of the considered contextual changes, contradicting Hypotheses 3.4, 4.3, 5.1-2, and 6.1-2, and not conclusively supporting Hypothesis 3.3.

**Figure 6.38: The effect of mainstream status on visibility over time**



**Notes:** Depicted are IRRs of actors' mainstream status for the number of articles naming an actor by period of interest. **Legend:** see Figure 6.9.

Neither the theoretical discussion nor the descriptive analysis suggests that the influence of actors' mainstream or challenger status should differ across newspapers with different ideological leanings. In line with Hypothesis 2.6, the results in Figure 6.39 show that all newspapers named mainstream actors at higher rates than challenger actors, confirming that there are no statistically significant differences in the effects across newspapers (see Appendix 13 for the full regression results). However, mainstream actors' advantage over challenger actors was tendentially larger in  $t_1$  than in  $t_2$ , mirroring the finding from the period models that mainstream actors' advantage decreased over time. Furthermore, there is no consistent pattern in the point estimates that would suggest systematic differences between left-leaning and right-leaning newspapers for either  $t_1$  or  $t_2$ . Hence, the results only offer more evidence supporting Hypothesis 2.6 and contradicting Hypothesis 2.5.

**Figure 6.39: The effect of mainstream status on visibility across newspapers**

**Notes:** Depicted are IRRs of actors' mainstream status for the number of articles naming an actor by newspaper.  
**Legend:** see Figure 6.10.

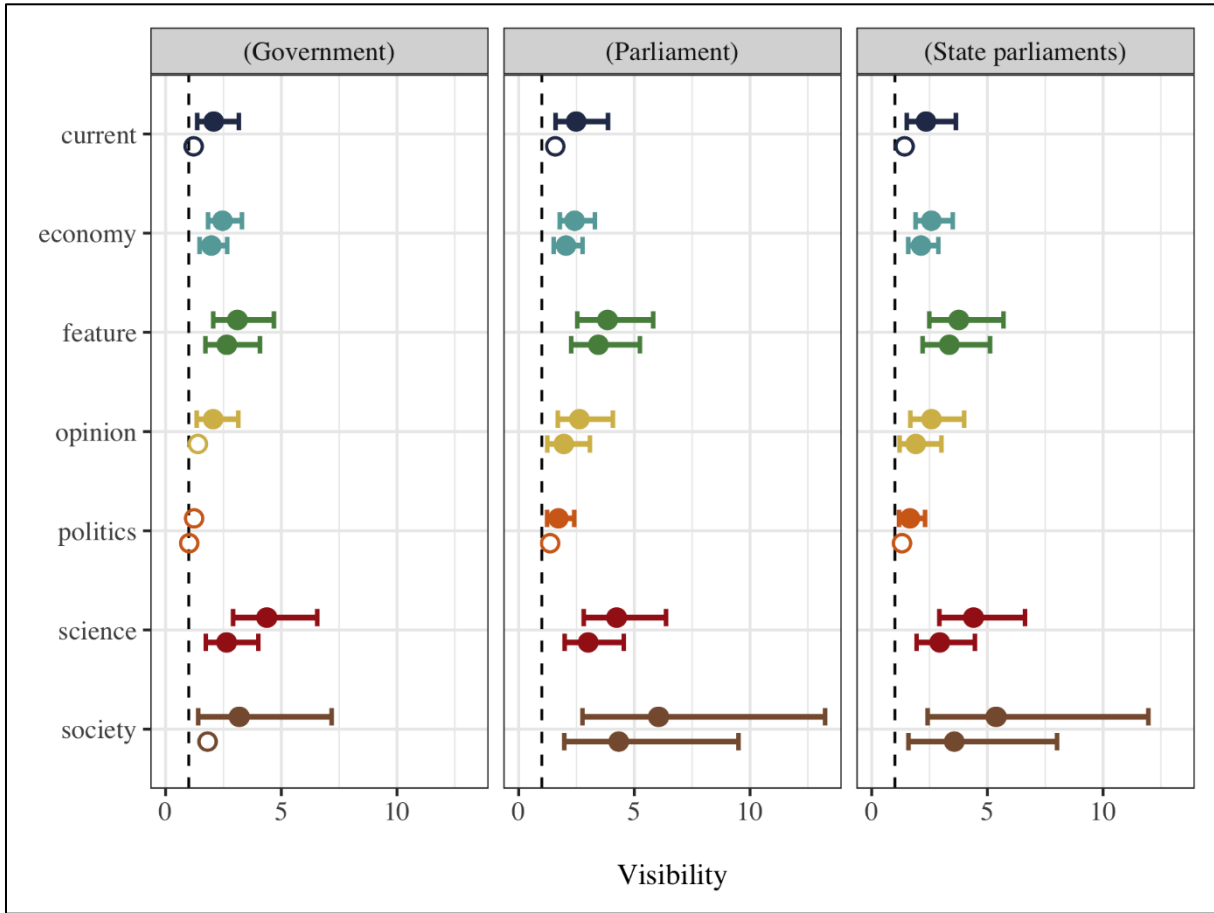
The visibility of different actor groups across newspaper sections points to diverging conclusions regarding the importance of actors' mainstream or challenger status in individual sections, as some challenger actors from the political, civil society, and scientific domains received disproportionate attention in the feature section, whereas others did not (see Figures 6.3, 6.5, and 6.6). Moreover, challenger actors from the political domain, but not from the other domains, were more visible in the society section. Figure 6.40 displays the effects of actors' mainstream status separately for each newspaper section (see Appendix 14 for the full regression results), showing that the advantage for mainstream actors found in the full models is somewhat more pronounced in the science (average IRRs 4.37 in  $t_1$  and 2.64 in  $t_2$ ), feature (average IRRs 3.10 in  $t_1$  and 2.65 in  $t_2$ ), and society sections (average IRRs 3.18 in  $t_1$  and 1.81 in  $t_2$ )<sup>41</sup> than in most other sections.

Hence, the higher visibility of Left party actors, climate protection activists, and contrarian scientists in the feature section, and of Left party and AfD actors in the society

<sup>41</sup> The lack of statistical significance for the  $t_2$ -effect (Government) is likely due to the very small sample for the society section ( $N = 235$ ), which finds expression in the comparatively large confidence intervals for this section.

section, cannot be explained by the greater relevance of controversy and surprise. On the other hand, conformist scientists' mainstream status should add to their issue ownership in the science section, explaining their advantage over contrarian scientists. The observed effects largely mirror the advantage for mainstream actors found in the full model and the differences in the point estimates for  $t_1$  and  $t_2$  tendentially support the conclusion from the period models that this advantage decreased over time. Overall, the findings further support Hypothesis 2.6 and discount Hypothesis 2.5.

Figure 6.40: The effect of mainstream status on visibility across sections



**Notes:** Depicted are IRRs of actors' mainstream status for the number of articles naming an actor by newspaper section. **Legend:** see Figure 6.11.

In summary, the results indicate that mainstream actors generally had an advantage over challenger actors, though this advantage decreased over time. Hence, the findings support Hypothesis 2.6 that newspapers valued consonance over controversy and surprise, and contradict the reversed Hypothesis 2.5. The advantage for mainstream actors is consistent across domains except the business domain, reflecting the different meaning of the indicator

for the latter domain. In line with the expectations for continuous exclusivity, mainstream actors tended to be named alongside fewer other actors than challenger actors, but this effect is reversed for the scientific domain, underscoring the notion that continuous exclusivity works differently than the other three visibility metrics.

The decrease in the advantage of mainstream actors over time contradicts the expectation that consonance is relatively more important, and surprise and controversy relatively less important, in times of crisis and societal conflict (Hypotheses 5.1-2 and 6.1-2). Furthermore, the pattern does not seem to reflect changes in the media system (Hypotheses 3.3-4) or the salience of climate change (Hypotheses 4.1 and 4.3). Instead, the decreasing advantage for mainstream actors could be explained by the increasing relevance of novelty or an omitted context variable such as the rising dramatization in newspaper coverage over time.

The advantage for mainstream actors was largely comparable across newspapers and newspaper sections, though the somewhat larger positive effects for the feature and society sections contradict the conjecture that challenger actors are covered at higher rates in these sections. On the other hand, the equally large effects for the science section are in line with the greater focus on conformist scientific actors observed in the descriptive analysis. Mirroring the decreased advantage for mainstream actors over time, effects tend to be larger in  $t_1$  than in  $t_2$  across newspapers and newspaper sections. Altogether, the findings support Hypothesis 2.6 for periods before 2013 except for business actors, and thus disconfirm Hypothesis 2.5.

Since the descriptive analysis indicated that civil society and scientific actors whose positions are in line with the societal consensus on climate change were more visible, I estimated additional domain models for business, civil society, and scientific actors testing the impact of actors' position vis-à-vis the societal consensus on their visibility in climate change coverage. These models did not converge for the business domain and the civil society domain in  $t_1$ , but the statistically significant effects for the remaining models indicate that civil society and scientific actors promoting climate protection had an advantage over their climate skeptic counterparts. These findings suggest that journalists' expectations of consonance or controversy may be based on additional dimensions of actors' mainstream or challenger status not captured by the general operationalization used in the analysis. However, the effects of the alternative indicator likewise point to an advantage of mainstream over challenger actors, further supporting Hypothesis 2.6.

### *Comparing the Relative Importance of the Agenda-Building Factors*

To understand the relative importance of the individual agenda-building factors for actors' visibility, Figure 6.41 shows the effects of all examined agenda-building factors on the number of articles naming an actor on the same scale. The depicted estimates are based on the full model, including one lag of the dependent variable and fixed effects at the legislative period level (see Appendix 10). Since the size of the effects, and particularly the confidence intervals, varies considerably across the different agenda-building factors, the upper panel shows the full range for all effects, whereas the lower panel zooms in on the smaller effects ranging between 0.9 and 2.0. At the first glance, issue-specific relevance at the national level and executive authority seem to affect actors' visibility the most. However, since the agenda-building factors are measured on different scales and the estimates for executive authority and issue-specific relevance are relatively uncertain due to the low number of actors in the respective categories, some further considerations are required to understand the relative importance of the individual factors. Compared to other actors, federal environment ministers were named in about 13.9 times as many newspaper articles on climate change in  $t_1$  and in about 15.9 times as many articles in  $t_2$ . They thus had a larger advantage than chancellors (average IRRs 10.9 in  $t_1$  and 12.4 in  $t_2$ ), ministers (average IRRs 4.1 in  $t_1$  and 8.9 in  $t_2$ ), and party chairs (average IRRs 6.5 in  $t_1$  and 8.0 in  $t_2$ ), though the differences between these estimates are not statistically significant and holding these offices may therefore be equally important for actors' visibility.

Considering actors' economic weight, actors who contributed one percentage point more to the value added to the national economy received around 20 percent more coverage, and actors who represent an additional percentage point of the national workforce were named in 28 percent more articles in the period between 2002 and 2020. Since the value added to the national economy ranged between 0 and 7.6 percentage points for the actors in the dictionary, the actors adding the most value to the national economy were named in around 4.0 times as many articles as actors without economic weight. Similarly, the number of employees varied between 0 and 6.9 percentage points, indicating that the actors with the largest workforces were named in around 5.5 times as many articles as actors without economic weight. Hence, the advantage for economic heavyweights was tendentially smaller than the advantage for actors holding political offices. However, the difference between the predicted visibility of actors with high economic weight and actors holding political offices is not statistically significant,



suggesting that economic weight could have been as important for actors' visibility as issue-specific relevance and executive authority after the turn of the millennium.

Prominence increased the number of articles naming an actor by around 47 percent for every additional percentage point in their Google Trends score relative to the benchmark. The Google Trends scores for actors in the dictionary range between 0 and 16.0, indicating that very prominent actors were covered in 475.4 times as many articles as actors whose names were not searched on Google in the relevant timeframe. The predicted visibility of actors with Google Trends scores above 10 (average IRR 47.1) is significantly larger than the predicted visibility of economic heavyweights, party chairs, and ministers. For Google Trends scores above 14 (average IRR 220.0), the difference to the predicted visibility for chancellors is also statistically significant. Prominence thus has the largest effect on actors' visibility so far, although the results cannot preclude that issue-specific relevance was equally important. Since Google Trends scores are unavailable for legislative periods before 2002, the results do not support conclusions about the relative importance of prominence in earlier legislative periods.

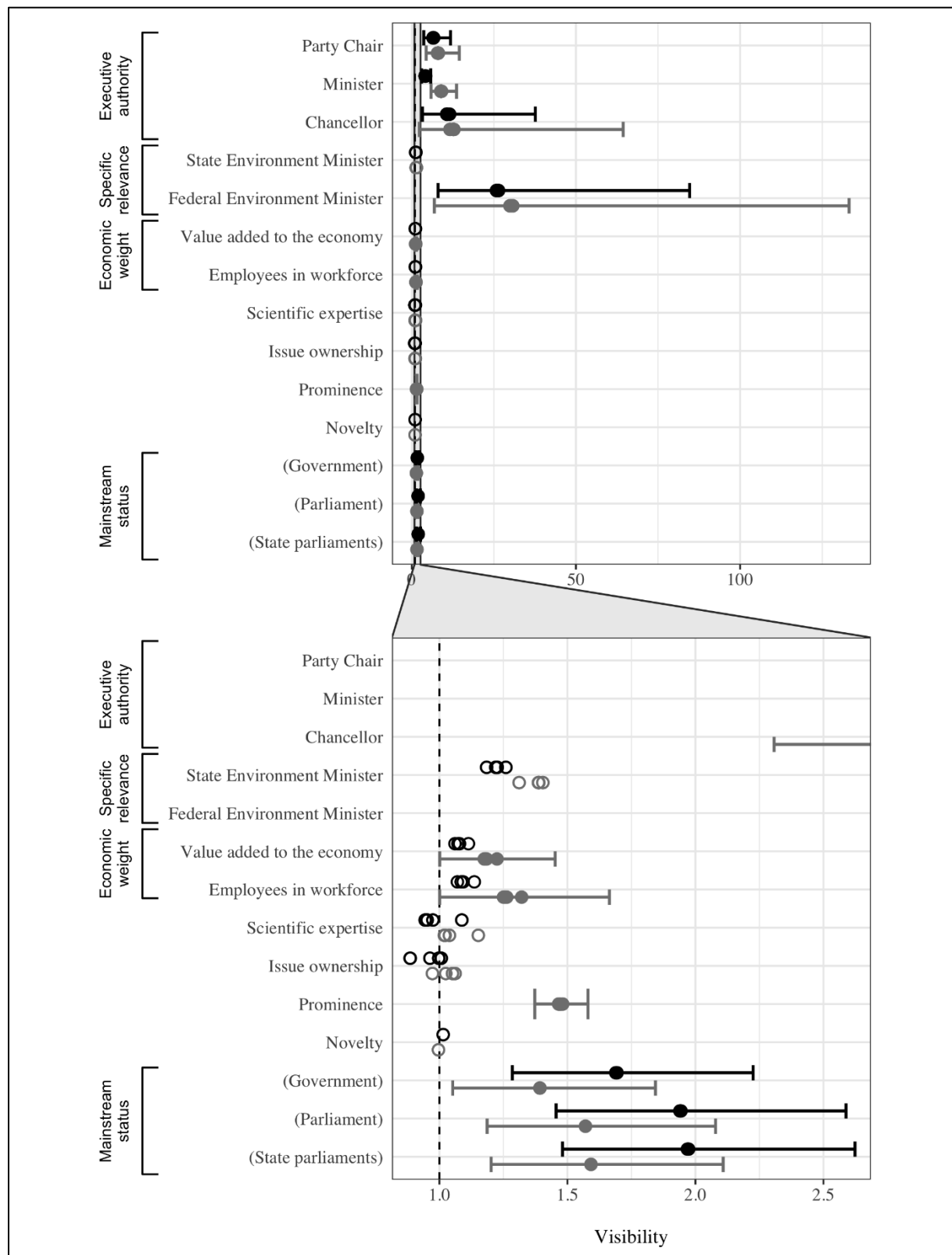
For issue ownership, novelty, and actors' mainstream or challenger status, comparisons with the other agenda-building factors are complicated by the opposing effects observed for actors from different domains. Overall, mainstream actors have a statistically significant advantage over challenger actors, but this advantage is comparatively small in the full model (average IRRs across indicators 1.87 in  $t_1$  and 1.52 in  $t_2$ ). The advantage for mainstream actors from the political domain (average IRRs across indicators 2.36 in  $t_1$  and 2.60 in  $t_2$ ), the civil society domain (average IRRs across indicators 2.59 in  $t_1$  and 1.83 in  $t_2$ ), and the scientific domain (average IRRs across indicators 1.80 in  $t_1$  and 1.68 in  $t_2$ ) is somewhat higher. Since the effect sizes for executive authority, issue-specific relevance, economic weight, and prominence do not significantly differ for actors from different domains and are comparable to the effects observed in the full model, we can conclude that actors' mainstream or challenger status is less important than their economic weight, executive authority, issue-specific relevance, and prominence for political, civil society, and scientific actors.

Considering the effects of actors' novelty, captured in discounted form in the mainstream-challenger indicator for business actors, we find an advantage for newer business actors over their more established counterparts. For the novelty indicator, the ten percent decrease for every additional legislative period suggests that business actors who emerged in the current legislative period received around 72 percent more coverage than actors who were present in all twelve legislative periods. In comparison, the negative effects for mainstream business actors indicate

that established actors were named in around 54 percent fewer articles than newly emerged actors in  $t_1$  and around 70 percent fewer articles in  $t_2$ . The importance of novelty for business actors is thus comparable to the importance of mainstream status for civil society and scientific actors in later legislative periods. Hence, actors' novelty is considerably less relevant for their ability to build the agenda than their economic weight, executive authority, issue-specific relevance, and prominence.

The effect of issue ownership is particularly difficult to compare because effects for the dichotomous indicator can only be estimated for political and business actors, whereas effects for the continuous indicators can only be estimated in bivariate models for civil society and scientific actors. Issue owners from the political domain were mentioned in around twice as many articles as non-issue owners (average IRRs 2.1 in  $t_1$  and 2.2 in  $t_2$ ), whereas issue owners from the business domain received around 82 percent less coverage in  $t_1$  and around 72 percent less coverage in  $t_2$ . For political actors, issue ownership was thus somewhat less relevant than mainstream status, though the difference between the predicted visibility for issue owners and mainstream actors is not statistically significant. In the business domain, the advantage for non-specialized actors (or the disadvantage for issue owners) is comparable to the advantage for newly established actors in later legislative periods, suggesting that these two factors were equally important for business actors' ability to build the agenda. While the point estimates for the continuous issue ownership measures indicate that issue owners from both the civil society and the scientific domain were named in around 1.5 times as many articles as non-issue owners, these estimates are only statistically significantly different from zero for the scientific domain and are based on bivariate models not controlling for the other agenda-building factors. Hence, continuous issue ownership seems to be least relevant for actors' ability to build the agenda but further research is needed to support this conclusion.

Overall, the effects of the individual agenda-building factors suggest that prominence was most important for actors' visibility in newspaper articles on climate change, followed by issue-specific relevance on the national level, executive authority, economic weight, mainstream status, and (tentatively) issue ownership. For business actors, novelty was similarly relevant as mainstream status for actors from other domains. Despite changes in the relative importance of individual agenda-building factors over time, this ranking remained largely stable, though some differences tendentially increased or decreased over time. The exception is actors' economic weight, which was tendentially less relevant than mainstream status in the period 2005-2009, but as important as being a party chair in the most recent legislative period.

**Figure 6.41: The relevance of the agenda-building factors for visibility**

**Notes:** Depicted are IRRs of all agenda-building factors for the number of articles naming an actor. The reference category for executive authority and issue-specific relevance are other actors; the reference category for scientific expertise are actors without scientific qualifications; the reference category for issue ownership are non-issue owners. **Legend:** see Figure 6.8 (full models only).

Differences in the importance of the agenda-building factors across newspapers are small and can generally be traced to the visibility of actors from different domains or the distribution of articles across newspaper sections. Accordingly, there is no indication that the relative importance of the agenda-building factors differed across newspapers. In contrast, individual agenda-building factors were clearly more important in some newspaper sections than in others. In line with the expectations, economic weight is more important in the economy section and scientific expertise in the science section, and both of these factors even tend to decrease actors' visibility in other sections. Executive authority and issue-specific relevance are not more relevant in the politics section, where newer actors surprisingly receive more rather than less attention. These variations suggest that the relative importance that these newspaper sections attach to the agenda-building factors diverges from the order observed for the full model.

In the economy section, actors adding the most value to the national economy were named in around 8.7 times and large employers in around 14.3 times as many articles as their counterparts without economic weight. Economic weight is thus equally important as executive authority in this section,<sup>42</sup> whereas it is irrelevant in other sections. Although scientific actors only received around 2.7 times as much coverage as other actors in the science section, scientific expertise is more relevant than economic weight (not significant), establishment (average IRR 1.12), and tendentially issue ownership (average IRR 1.46) in this section. It remains tendentially less important than actors' mainstream status, their executive authority, and their issue-specific relevance, and significantly less important than prominence. However, the results cannot preclude that scientific expertise is as relevant as holding the department of the environment for coverage in the science section. For the politics section, the surprising disadvantage for established actors is comparable to the disadvantage for scientific actors. Accordingly, prominence was relatively most important for actors' visibility in all newspaper sections, but the relevance of the other factors varied across the individual sections.

### ***Summary***

Actors' executive authority, their economic weight, their prominence, and their mainstream status consistently increased their visibility in newspaper articles on climate change, supporting

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<sup>42</sup> Chancellors were named in around 11.8 times, ministers in around 9.3 times, and party chairs in around 6.0 times as many articles as other actors in the economy section.

Hypotheses 1.1, 1.3, 2.3, and 2.6, respectively. Mainstream actors generally had an advantage over challenger actors, contradicting the competing expectation that newspapers prefer the surprising and controversial views of challenger actors over the consonant perspectives of mainstream actors (Hypothesis 2.5). Issue-specific relevance increased the visibility of federal but not state environment ministers, partially confirming Hypothesis 1.2. Issue ownership and establishment enhanced the visibility of political, civil society, and scientific actors, but had the opposite effect for business actors. These results corroborate the expected influence of issue ownership (Hypothesis 2.2) but disconfirm the hypothesis that newer actors should be better able to build the agenda (Hypothesis 2.4) except for business actors. Lastly, actors with scientific qualifications were not generally more visible than other actors, contradicting Hypothesis 1.4.

The effects observed for the number of articles naming an actor were remarkably consistent with the effects for the number of mentions and exclusive articles. However, the pattern observed for the average number of actors named in the same article tended to diverge from the results for the other visibility metrics. The expected negative effects for this indicator were only observed for issue ownership and mainstream status, and were inconsistent across specifications and subsamples even for these factors. Issue-specific relevance and economic weight had no significant effects on continuous exclusivity, whereas executive authority, prominence, and novelty increased rather than reduced the number of actors named in the same article. Given that the direction of the correlation between continuous exclusivity and the three other visibility indicators varies across the examined agenda-building factors, the substantive meaning of continuous exclusivity seems to differ from the other indicators, pointing to flaws in the theoretical assumption that actors strive to be named alongside fewer other actors (see the discussion in Chapter 8).

With regard to the relative importance of individual agenda-building factors, prominence tended to be most important for actors' visibility, followed by issue-specific relevance on the national level, executive authority, economic weight, mainstream status, and issue ownership for political, civil society, and scientific actors. For business actors, the relative importance of novelty was comparable to the relevance of mainstream status for actors from the other domains. Considering the different levels of executive authority, chancellors tended to receive more coverage than ministers and party chairs, who were more visible than other political actors. In addition, political actors had an inherent advantage over actors from other domains. Regarding the impact of actors' economic weight, the number of employees was tendentially

more decisive for their visibility than the value added to the national economy, but these differences were statistically insignificant.

Considering changes in the relevance of individual agenda-building factors across periods of interest, none of the discussed context conditions consistently influenced the relative importance of the agenda-building factors. Executive authority, scientific expertise, and issue ownership were largely stable over time, whereas the importance of issue-specific relevance and economic weight decreased between 2005 and 2009 before increasing in the following legislative periods, and the relevance of prominence, establishment, and mainstream status (tendentially) declined over time. The observed changes tentatively support the expectations that the relative importance of issue-specific relevance and economic weight decreased when the media system transitioned from traditional to hybrid (Hypothesis 3.1) and increased in the face of the crises experienced in the following legislative periods (Hypothesis 5.1). Novelty also tended to be more relevant after the transition to the hybrid media system (Hypothesis 3.3). In addition, the results support the expectations that the relative importance of prominence, controversy, and surprise should be unaffected by issue salience (Hypothesis 4.1), and that the relevance of prominence, economic weight, expertise, and issue ownership should be independent of the societal consensus on an issue (Hypothesis 6.3).

The findings from the period models do not support, and in some cases clearly refute, the remaining expectations for the influence of contextual changes. Regarding the transition of the media system, the tendential decline in the importance of prominence over time contradicts the notion that this factor is valued more in hybrid media systems (Hypothesis 3.2). There is also no indication that either controversy (Hypothesis 3.3) or consonance (Hypothesis 3.4) were relatively more important before or after the transformation of the media system. Contrary to the expectations, the relevance of the discussed second-level agenda-building factors issue-specific relevance, scientific expertise, and issue ownership did not increase with the salience of the issue (Hypothesis 4.2). The relative importance of executive authority, executive authority, and mainstream status was equally unaffected by the salience of climate change (Hypothesis 4.3), leading to the conclusion that the relevance of the agenda-building factors was generally independent of issue salience. Crises did not decrease the value attached to surprise, controversy, or prominence (Hypothesis 5.2), increase the relevance of executive authority or consonance (Hypothesis 5.1), or affect the importance of scientific expertise or issue ownership. Corroborating the descriptive findings, there is no indication that executive authority or consonance were less important (Hypothesis 6.1), or that surprise and controversy

were more important in times of broad societal consensus (Hypothesis 6.2), suggesting that this context condition did not impact the relative importance of the agenda-building factors.

The observed effects were remarkably similar across newspapers and even tendential differences in the point estimates seem to capture variations in the distribution of climate change coverage across newspaper sections rather than ideologically motivated patterns. In contrast, the relevance of individual agenda-building factors varied considerably across newspaper sections. Mirroring the expectation that newspaper sections attach greater value to domain-specific factors associated with their focus, higher economic weight enhanced actors' visibility only in the economy section, whereas scientific expertise increased coverage in the science section, but both tended to decrease actors' visibility in other sections. The same is not true for executive authority and issue-specific relevance in the politics section, despite the higher visibility of political actors in this section. This suggests that actors with some executive authority were preferred over non-political actors, though higher degrees of executive authority were not more relevant than in other sections. Surprisingly, newer actors were also more visible in the politics section, although established actors had an advantage in the other sections. Since these sections value individual agenda-building factors differently, the relative importance of the factors varies across sections.

Overall, the findings corroborate the conclusion from the descriptive analysis that newspapers include different sets of actors, and presumably perspectives, in different thematic sections. There is no indication that newspapers with different ideological leanings attached more or less weight to individual agenda-building factors. While newspapers could have emphasized specific interpretations by covering climate change in one section rather than another, differences in the percentage of climate change articles published in individual sections likewise follow no apparent ideological pattern. In conclusion, newspapers named a diverse set of actors in their climate change coverage, suggesting that the media presented audiences with different interpretations of the issue, though the latter conclusion still requires empirical confirmation in the following chapter.





## **Chapter 7: Actors' Perspectives in Climate Change Coverage**

The analysis of actors' visibility in newspaper articles on climate change in the previous chapter has shown that actors with higher executive authority, issue-specific relevance at the national level, economic weight, issue ownership, and mainstream status were generally more visible than actors not possessing these factors. In consequence, people were likely more aware of these actors' association with climate change and perceived their views as worth considering. While being named in association with an issue can advance actors' agendas, media coverage that additionally presents their issue interpretations should be better suited to shape public perceptions in their favor. Actors' perspectives will be most persuasive when presented in their entirety, without contrasting views, and with a journalistic endorsement. Therefore, this chapter explores the similarity between press releases and statements from visible actors and newspaper articles and additionally considers the exclusivity and tonality of the received coverage to understand which actors are best equipped to build the media agenda.

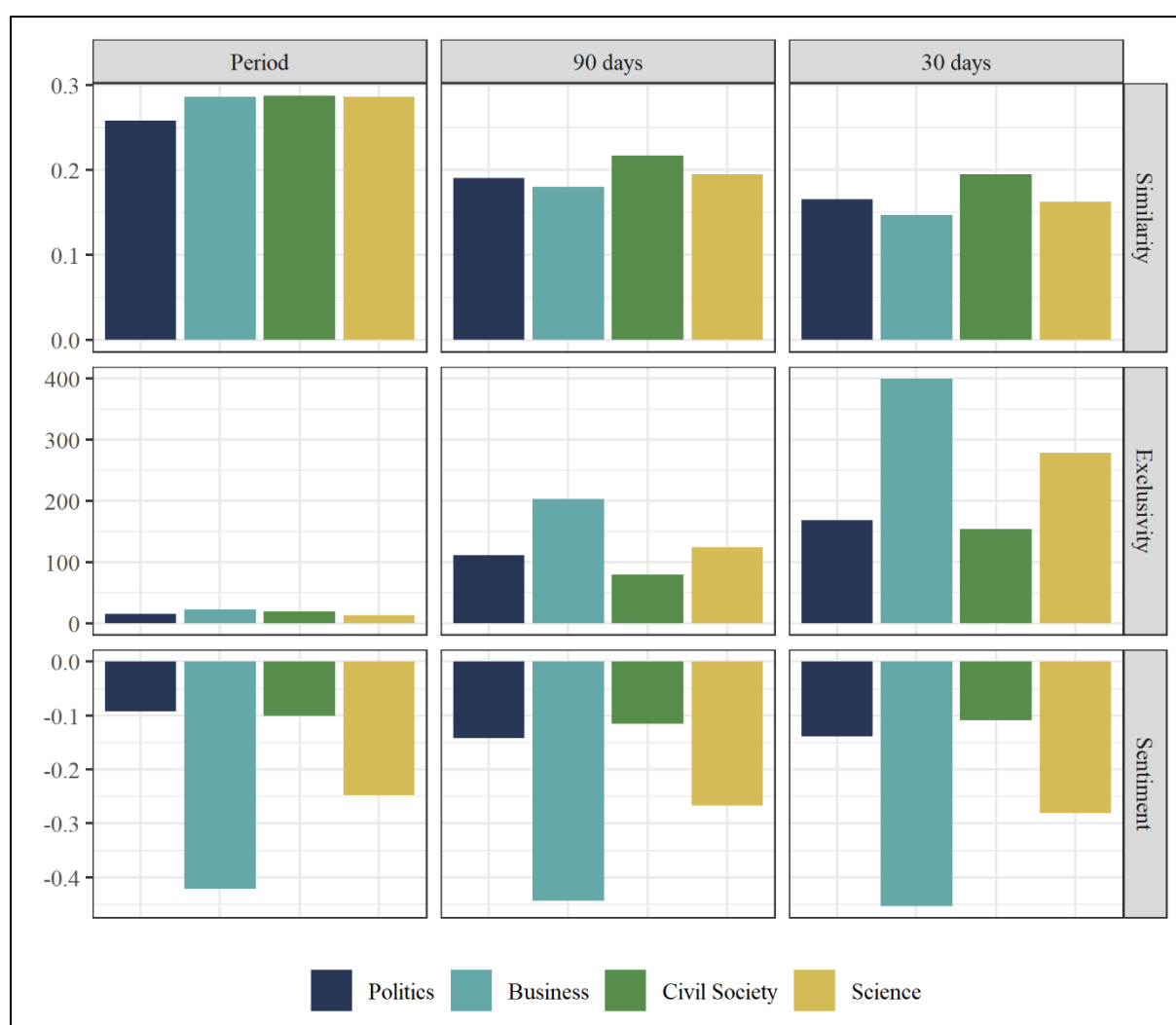
The first subchapter examines how closely newspaper articles on climate change published in the most recent legislative period reproduced the press materials of actors from the four domains, differentiating between coverage in the full sample, in individual newspapers, and in different newspaper sections. In addition, this subchapter explores the average similarity, exclusivity, and journalistic evaluation for press materials from actors representing different climate change positions within domains. The second subchapter analyzes the influence of the agenda-building factors on the reception of actors' press materials in climate change coverage, focusing on newspaper articles published within 30 days of the respective press material. To detect potential differences in the effects of individual agenda-building factors, I estimated separate regression models for the collected newspapers and newspaper sections. Lastly, I compare the impact of the individual agenda-building factors to learn about the importance of each factor for actors' ability to push their issue interpretations onto the media agenda.

### **7.1 Descriptive Results for the Reception of Actors' Press Materials**

The patterns in the reception of actors' press materials in newspaper coverage tend to be more distinctive when considering newspaper articles published within 30 or even 90 days of the press material. Figure 7.1 depicts the average similarity, exclusivity, and journalistic sentiment

of press materials from the four domains based on the non-lemmatized corpus for the three timeframes.<sup>43</sup> The coverage in the whole legislative period reflected the perspectives of visible business, civil society, and scientific actors equally closely, with a slight disadvantage for political actors. In contrast, the pattern for the 30-day frame suggests that visible civil society actors were somewhat more successful at pushing their perspectives onto the media agenda, followed by scientific, political, and business actors.

**Figure 7.1: The reception of actors' press materials by domain**



**Notes:** Depicted are domain averages for the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) based on the sample of newspaper articles published in the entire legislative period (Period), within 90 days of the press material (90 days), or within 30 days of the press material (30 days). The number of relevant newspaper articles varies depending on the release date of the press material. The depicted averages are based on the non-lemmatized version of the corpus (see Appendix 21 for average reception metrics based on the lemmatized version of the corpus).

<sup>43</sup> The results for the lemmatized corpus are very similar, but substantive differences are discussed.

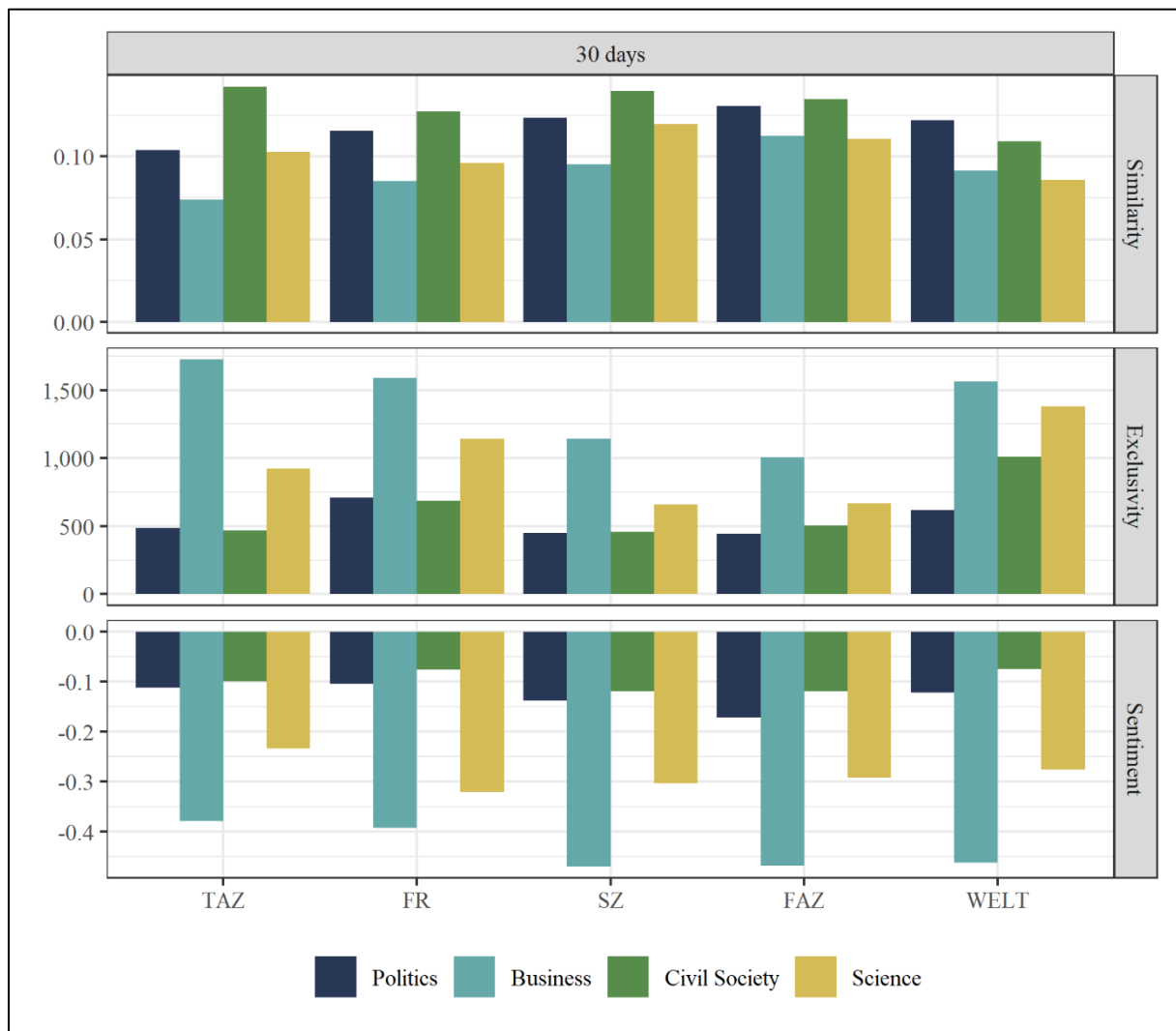
The same advantage for civil society actors can be observed for the exclusivity of the received coverage, though political actors' perspectives were covered almost as exclusively. Even in the longer timeframes, business actors' perspectives received the least exclusive coverage. Somewhat surprisingly, the average journalistic sentiment score for all domains is negative. Nonetheless, the advantage for civil society actors persists as their perspectives were covered least negatively, followed by political actors. In contrast, scientific and especially business actors' interpretations were evaluated more negatively. Unlike the findings for visibility, these results offer no indication that visible actors' economic weight, their executive authority, or their issue-specific relevance decisively influenced the reproduction of their materials in newspaper articles.

Since the reception metrics based on the 30-day frame are more likely to reflect actors' ability to build the agenda, I focus on this timeframe to investigate potential differences between the collected newspapers and newspaper sections.<sup>44</sup> Figure 7.2 depicts domain averages for similarity, exclusivity, and journalistic sentiment for each newspaper. The press materials of civil society actors were covered most closely in all newspapers except the *Welt*, where materials from political actors were reproduced more closely. However, the advantage for civil society actors over political actors was generally larger in left-leaning than in right-leaning newspapers. Moreover, coverage in left-leaning newspapers was more similar to scientific than to business actors' press materials, whereas the reverse holds for right-leaning newspapers. These tendencies can also be observed for the exclusivity of the received coverage, as the perspectives of civil society actors were covered slightly more exclusively than the issue interpretations of political actors in more left-leaning newspapers, but the opposite applies in more right-leaning newspapers. Though scientific actors' press materials were covered more exclusively than business actors' perspectives in all newspapers, the advantage for scientific actors also tended to be smaller in right-leaning newspapers. Journalistic sentiment was consistently least negative for civil society actors, followed by political, scientific, and business actors. The differences in the journalistic evaluation of perspectives from different domains vary slightly across newspapers, but do not follow an obvious ideological pattern.

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<sup>44</sup> The patterns observed for the whole legislative period and the 90-day frame are generally similar, though less pronounced than the pattern for the 30-day frame (see Appendix 22). Substantive differences are discussed throughout the section.

**Figure 7.2: The reception of actors' press materials across newspapers**



**Notes:** see Figure 7.1 (30-day frame only).

The greater focus on civil society actors in left-leaning newspapers is in line with the findings from the visibility analyses, as civil society actors tended to be named more often in left- than in right-leaning newspapers (see Figure 6.2). Likewise, political actors were most visible and their perspectives tended to be covered most closely in moderate newspapers. However, political actors were also named most frequently in all newspapers except the taz, and scientific actors were named more often in right-leaning newspapers where their issue interpretations were reproduced less closely. These differences could suggest that the relevance of individual agenda-building factors differs for visibility and similarity. Considering that the reproduction of actors' perspectives in newspaper articles relates to the provided content as much as its source, contentual factors such as surprise, controversy, and consonance could be relatively more important for actors' ability to push their perspectives onto the media agenda.

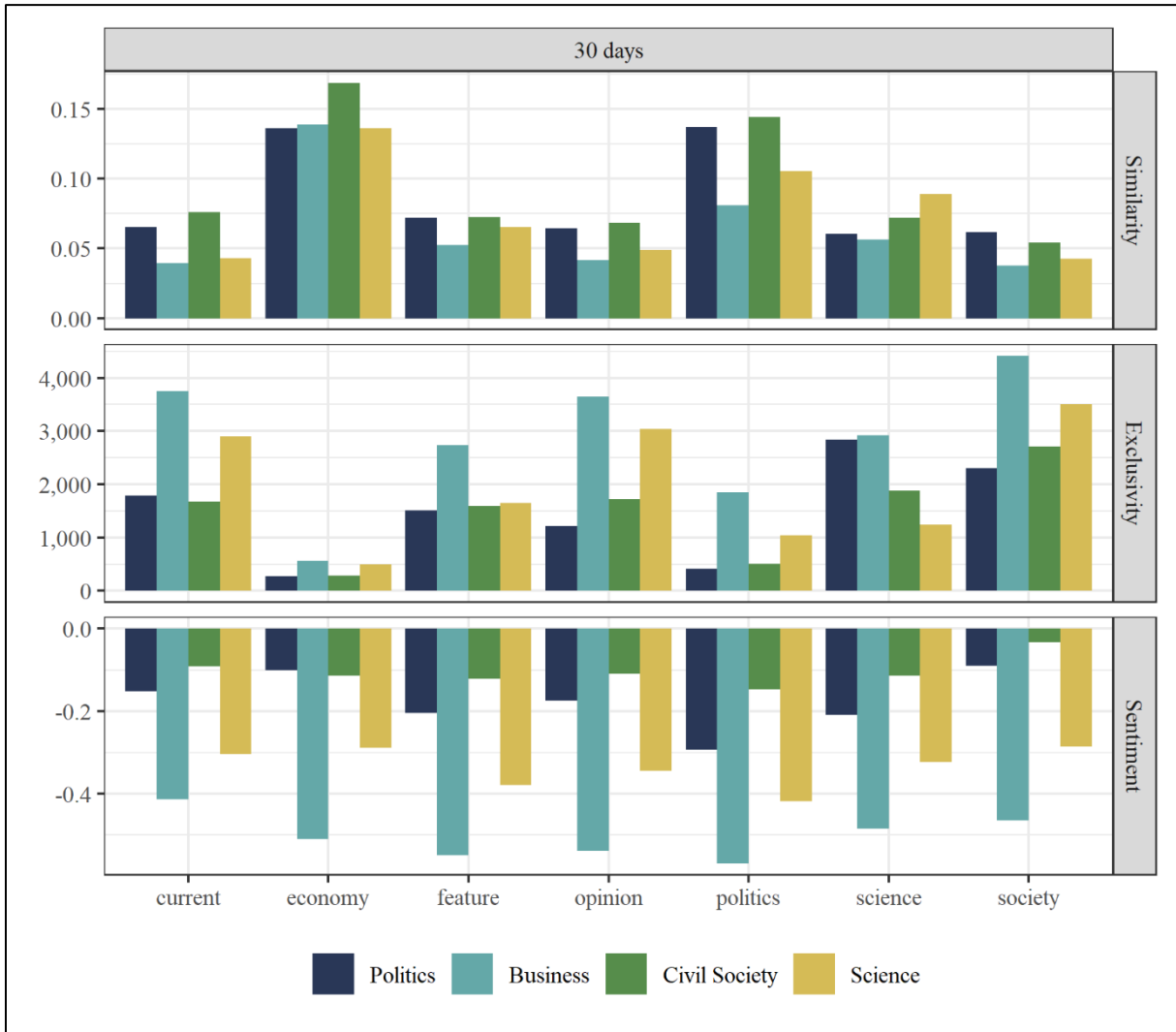
The reception of perspectives from different domains also varied across newspaper sections (see Figure 7.3). In line with their thematic emphases, the economy section reproduced business actors' perspectives relatively more closely than other sections, and coverage in the science section was most similar to scientific actors' press materials. Surprisingly, political actors' issue interpretations were not reproduced more closely in the politics section compared to other sections, despite their higher visibility in this section (see Figure 6.2). On the other hand, coverage in the society section was most similar to political actors' press materials, though this divergence from the general pattern could be due to the small number of articles addressing climate change in this section ( $N = 235$ ). Overall, all sections except the economy, science, and society sections reproduced civil society actors' press materials most closely, followed by the perspectives of political, scientific, and business actors. This advantage for civil society actors holds in the economy section, which reproduced business actors' perspectives slightly more closely than political and scientific actors' materials. The minimal advantage of scientific actors over political actors in the full sample (see Figure 7.1) thus seems to reflect coverage in the science section, concealing the somewhat higher similarity between the press materials of political actors and newspaper articles in most other sections.

Regarding the exclusivity of the received coverage, political actors tended to have an advantage over civil society actors except in the current and science sections. While the advantage of scientific actors in the science section is mirrored for exclusivity, the perspectives of business actors were covered least exclusively in all sections including the economy section. The thematic focus of the economy section was thus not decisive for the exclusivity of the coverage, although the disadvantage for business actors was somewhat smaller in the economy section than in the other sections. Given that political actors' perspectives generally received the most exclusive coverage, followed by the interpretations of civil society, scientific, and business actors, the high exclusivity for political actors' press materials in the politics section cannot be assumed to point to a domain-specific advantage in this section. The diverging patterns for similarity and exclusivity could suggest that the relevance of individual agenda-building factors differs between the reception metrics as well as for actors' visibility.

The average journalistic sentiment scores mirror the similarity scores somewhat more closely, as the issue interpretations of civil society actors were evaluated least negatively except in the economy section, where political actors' perspectives received the least negative coverage. The press materials of business actors were covered most negatively in all sections, followed by the views of scientific actors. This pattern reflects the average journalistic

sentiment for perspectives from different domains observed in the full sample as well as individual newspapers, suggesting that the determinants for this indicator were largely consistent across newspapers and newspaper sections. Unlike for similarity and exclusivity, newspaper sections’ thematic focus seems irrelevant for the journalistic evaluation of actors’ press materials, indicating that the journalistic sentiment associated with visible actors’ perspectives is not determined by the same factors as visibility or the other reception metrics.

Figure 7.3: The reception of actors’ press materials across sections



Notes: see Figure 7.1 (30-day frame only).

Political Actors

To learn which substantial positions were covered most closely, exclusively, and positively, Figure 7.4 shows the average reception metrics for different party actors. Considering the

coverage for the entire legislative period, we see that newspaper articles on climate change were generally most similar to FDP actors' press materials, followed by the perspectives of CDU/CSU, SPD, AfD, Green, and Left party actors. This pattern is surprising for several reasons. First, given the opposition status of the FDP during the relevant legislative period, as well as its lack of issue ownership, novelty, or notable mainstream status, there is no obvious reason for the greater similarity between FDP actors' press materials and newspaper articles. This is especially striking since FDP actors were considerably less visible in this legislative period than actors affiliated with government parties and the Green party (see Figure 6.3). Although the average similarity score could be influenced by outliers such as an interview published with very similar phrasing by the FDP and the FAZ (IDs: mat\_5232, art\_11648; see Chapter 4.3), the sample of press materials from FDP actors is sufficiently large not to be dominated by individual press releases or statements ( $N = 96$ ).

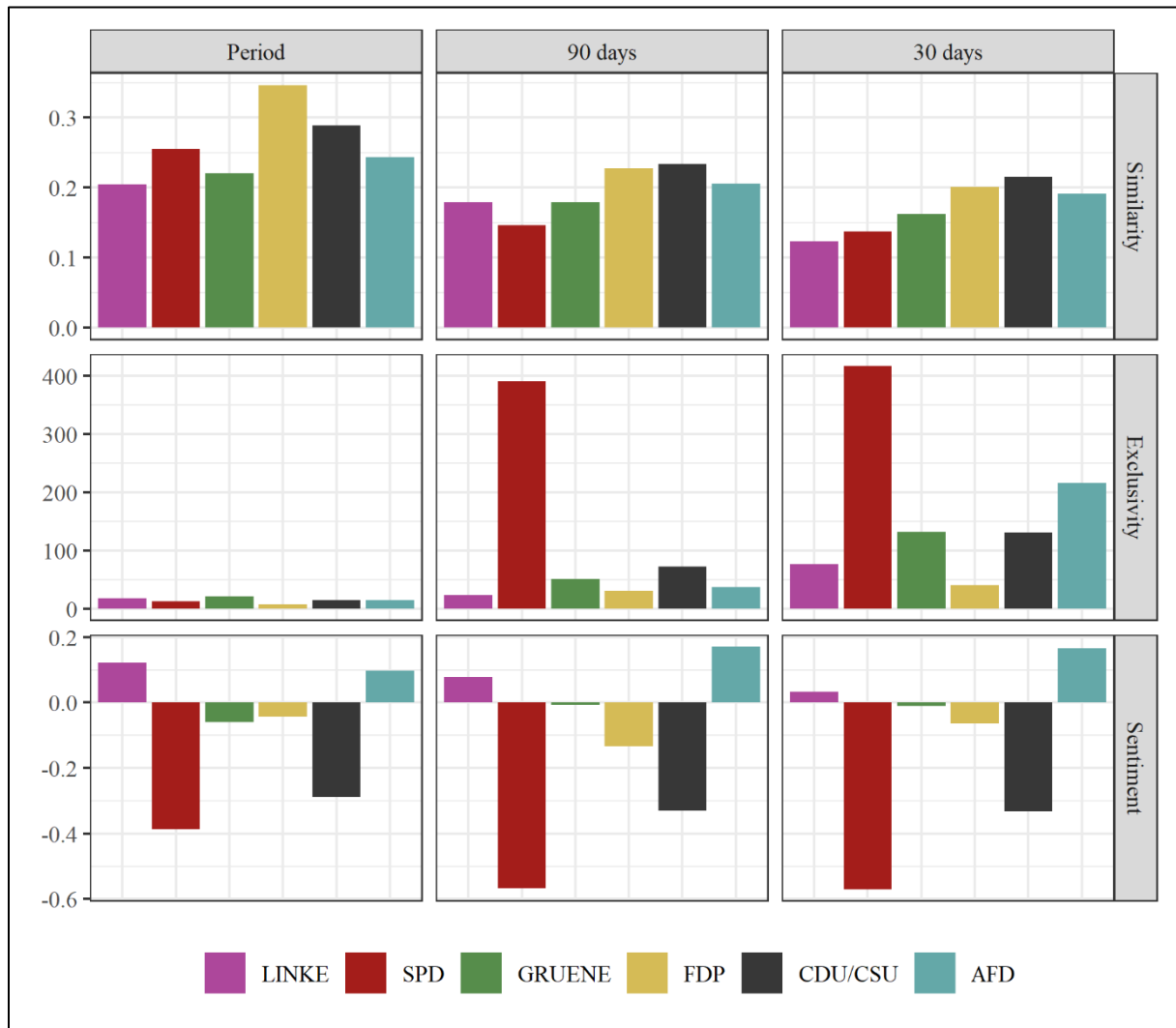
While it is not surprising that the newspaper coverage for the entire legislative period does not reflect the influence of the discussed agenda-building factors, the FDP also received the second-closest coverage in the shorter timeframes, suggesting that the ability of FDP actors to push their issue interpretations onto the media agenda may not be well predicted by the discussed agenda-building factors. FDP actors also had an advantage regarding the exclusivity of the received coverage, as their press materials were covered most exclusively except in the 90-day frame, where Left party actors had a minimal advantage. The exclusivity of the received coverage thus strengthens the notion that the discussed agenda-building factors may insufficiently explain the reception of actors' press materials in the media. On the other hand, the positions of FDP actors were not evaluated more positively than other actors' views, again pointing to the differences between journalistic sentiment and the other two indicators.

Second, the perspectives of CDU/CSU actors were covered most closely in the shorter timeframes, whereas the press materials of the SPD were covered least closely in the 90-day frame, and only slightly more closely than the issue interpretations of Left party actors in the 30-day frame. SPD actors' perspectives also received considerably less exclusive coverage than press materials from all other party actors in the shorter timeframes, whereas the exclusivity of the covered CDU/CSU actors' issue interpretations was more comparable to the opposition actors. These discrepancies in the reception of press materials from the two government coalition actors seem to discount the influence of executive authority, excepting the chancellorship. The SPD moreover held the environment department, suggesting that issue-specific relevance was equally inconsequential for the reception of actors' press materials.

## Chapter 7: Actors' Perspectives in Climate Change Coverage

Although the perspectives of SPD and CDU/CSU actors were consistently accompanied by the most negative journalistic evaluations, this pattern indicates that actors with higher executive authority wielded less rather than more influence over the media agenda.

**Figure 7.4: The reception of political actors' press materials**



**Notes:** see Figure 7.1.

Third, the newspaper coverage was surprisingly similar to opposition actors' press materials, and there is no discernible advantage for Green party actors, who owned the issue of climate change. Although AfD actors were least visible in the collected climate change coverage, the content of the newspaper articles was more similar to AfD actors' press materials than to the perspectives of Green party actors, possibly pointing to an advantage for challenger actors. While Left party actors' press materials were covered least closely in the 30-day frame, the distance to the SPD is rather small and the received coverage was relatively exclusive. AfD and



Left party actors' perspectives were also the only ones accompanied by more positive journalistic comments, raising the possibility that the sentiment scores capture the softening of press materials with extremely negative formulations instead of journalistic evaluations.

This interpretation is strengthened by the negative average sentiment score for AfD actors' press materials, and the comparatively small positive sentiment score for Left party actors' press materials. Yet, the average journalistic sentiment for press materials from the other parties does not match the order suggested by the sentiment scores for their press materials, indicating that the former (also) captures differences unrelated to the tonality of the covered press materials. Interestingly, the sentiment of Green party actors' press materials was very closely reproduced in the respective newspaper articles, which may point to the relevance of actors' challenger status or issue ownership for the evaluation of their perspectives. Overall, the distinct patterns observed for visibility, similarity, exclusivity, and journalistic sentiment strengthen the conclusion that different dimensions of the media agenda may be determined by different sets of agenda-building factors.

In light of the differences between actors' visibility and the reception of their press materials in newspaper articles on climate change, the portrayal of actors' issue interpretations may exhibit the ideological pattern that could not be discerned for visibility. Figure 7.5 depicts average reception metrics for party actors based on the 30-day frame separately for each newspaper. Despite some deviations from the pattern observed in the full sample, the only systematic difference that points to an ideological motivation is that AfD actors' perspectives were covered more closely than Green party actors' issue interpretations in more right-leaning newspapers, and vice versa. Although the coverage in the taz, the SZ, and the FAZ was most similar to press materials from CDU/CSU actors, whereas articles in the FR and the Welt were most similar to FDP actors' issue interpretations, there is no discernible ideological pattern. This is accentuated by the comparatively high similarity score for Left party actors' materials in the Welt, the rightmost newspaper in the sample. The exclusivity of the received coverage is largely in line with the patterns observed for the full sample, though the exclusivity for Left party actors' perspectives tends to fluctuate (compare the averages based on the lemmatized corpus in Appendix 21.2), and the perspectives of SPD actors were covered relatively more exclusively in the FAZ than in the other newspapers. The journalistic sentiment associated with the perspectives of different party actors likewise reflects the pattern in the full sample.

**Figure 7.5: The reception of political actors' press materials across newspapers**

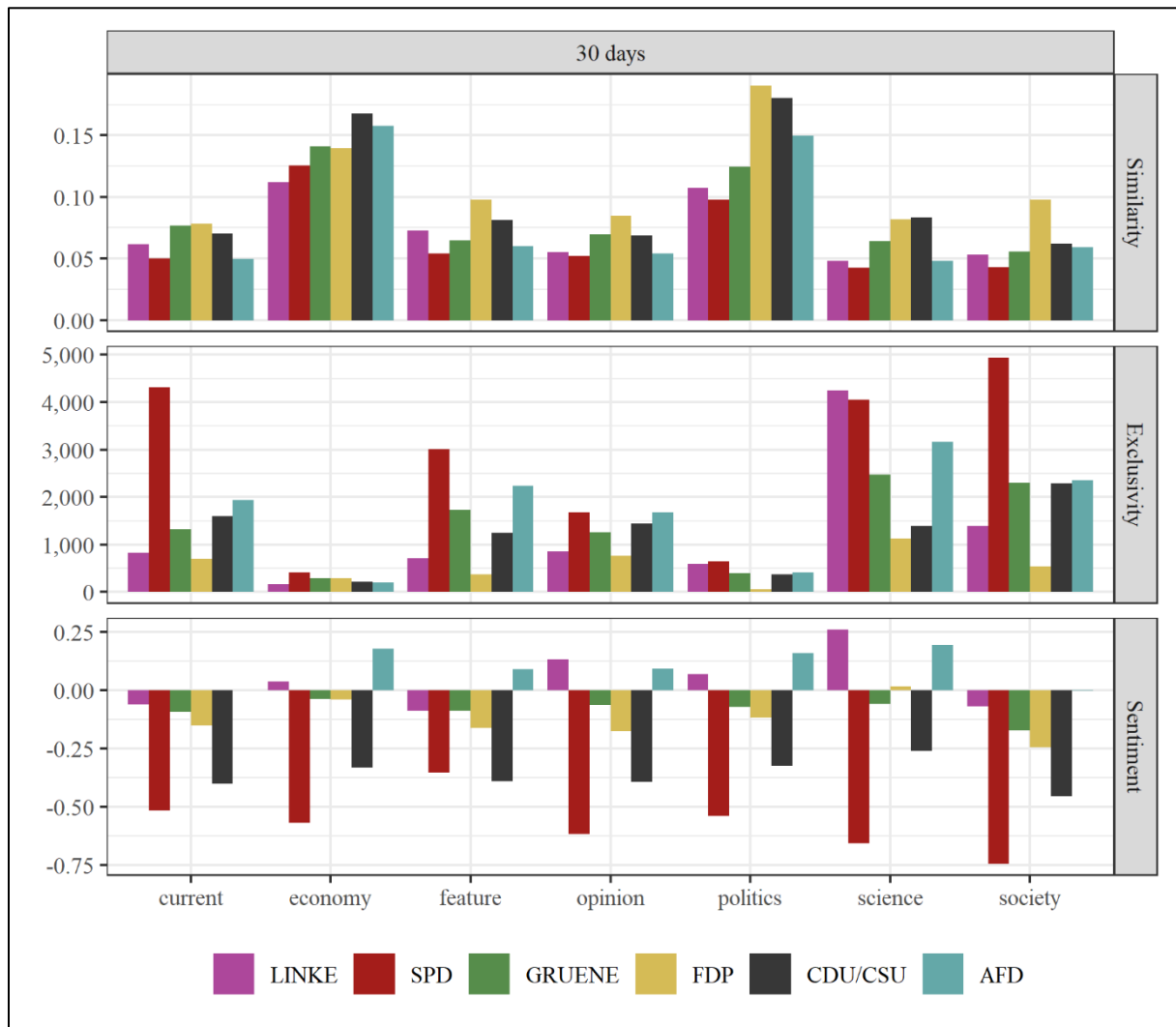


**Notes:** see Figure 7.1 (30-day frame only).

Considering the reception of party actors' press materials in different newspaper sections, we see that FDP actors tended to have an edge over other party actors regarding the similarity and exclusivity of the received coverage (see Figure 7.6). In line with the finding that the current section gave relatively more attention to actors promoting more ambitious climate protection, this section covered Green party actors' perspectives almost as closely as FDP actors' issue interpretations. In contrast, the economy and politics sections reproduced AfD actors' materials relatively more closely and coverage in these sections was generally more similar to party actors' press materials. The economy section moreover differs from the other sections as it covered SPD actors' press materials more closely than Left party actors' perspectives, and CDU/CSU, AfD, and Green party actors all had an advantage over FDP actors. The economy section thus maintains the focus on the CDU/CSU observed in the descriptive analyses of

actors' visibility (see Figure 6.3), but not on the FDP, discounting the relevance of parties' ownership of economic issues for the reception of actors' perspectives in this section.

**Figure 7.6: The reception of political actors' press materials across sections**



**Notes:** see Figure 7.1 (30-day frame only).

Given the comparatively high similarity between newspaper articles published in all sections and the press materials of Left party and AfD actors, actors' challenger status may generally be an important predictor of closer coverage. Despite some fluctuations in the average exclusivity for Left party actors' press materials (compare the averages based on the lemmatized corpus in Appendix 21.2), the pattern observed for exclusivity largely reflects the average similarity scores for actors from different parties. In contrast, the journalistic sentiment scores conform to the pattern found in the full and newspaper samples, though AfD actors' perspectives received less positive coverage than Left party actors' materials in the opinion and science sections.

Overall, the average similarity, exclusivity, and journalistic sentiment for press materials from different party actors show that newspapers reproduced the whole range of perspectives, though conservative interpretations of the issue tended to be covered more closely, especially in right-leaning newspapers. Surprisingly, the perspectives of challenger actors were evaluated most positively, which could partly reflect the tonality of the supplied press materials. Unlike actors' visibility, the similarity between their press materials and newspaper articles does not seem to reflect the influence of their executive authority or issue ownership. Although the patterns for similarity and exclusivity resemble each other for the different newspaper sections, the three reception metrics seem to reflect different sets of agenda-building factors. In short, the patterns observed for the reception of party actors' press materials cannot be conclusively linked to the discussed agenda-building factors, excepting an advantage for challenger actors regarding the journalistic evaluation of their materials.

### ***Business Actors***

The findings for actors' visibility indicate that business actors were the main source of perspectives aimed at decelerating climate change mitigation (see Chapter 6.1). To understand how the issue interpretations of visible business actors were portrayed in climate change coverage, Figure 7.7 depicts the average similarity, exclusivity, and journalistic sentiment for associations and companies with incentives to understate (con actors) or emphasize (pro actors) the severity of climate change to advance their business interests. The first group includes actors from energy-intensive industries that contribute substantially to the national carbon dioxide emissions, whereas the latter group largely consists of actors who sell solutions to mitigate or adapt to climate change. While press materials released by associations opposing ambitious climate change policies were covered slightly more closely than the issue interpretations of associations and companies promoting climate protection, the difference is considerably less pronounced than for visibility (see Figure 6.4). Moreover, the coverage was least similar to the perspectives of companies with incentives to oppose climate action, which were markedly more visible than the other actor groups.

The exclusivity of the received coverage mirrors this pattern, suggesting that actors' economic weight was less relevant for the reception of their press materials in the media than for their visibility. Instead, the observed pattern could point to the relevance of novelty or issue

ownership<sup>45</sup>. In line with the findings for the other indicators, the average journalistic sentiment for the different actor groups shows that the perspectives of companies opposing climate protection were evaluated most negatively. The slight advantage for associations opposing climate action observed for similarity and exclusivity is not reflected in the journalistic sentiment scores, as the perspectives of associations and especially companies advocating more ambitious climate protection were covered less negatively.

**Figure 7.7: The reception of business actors' press materials**

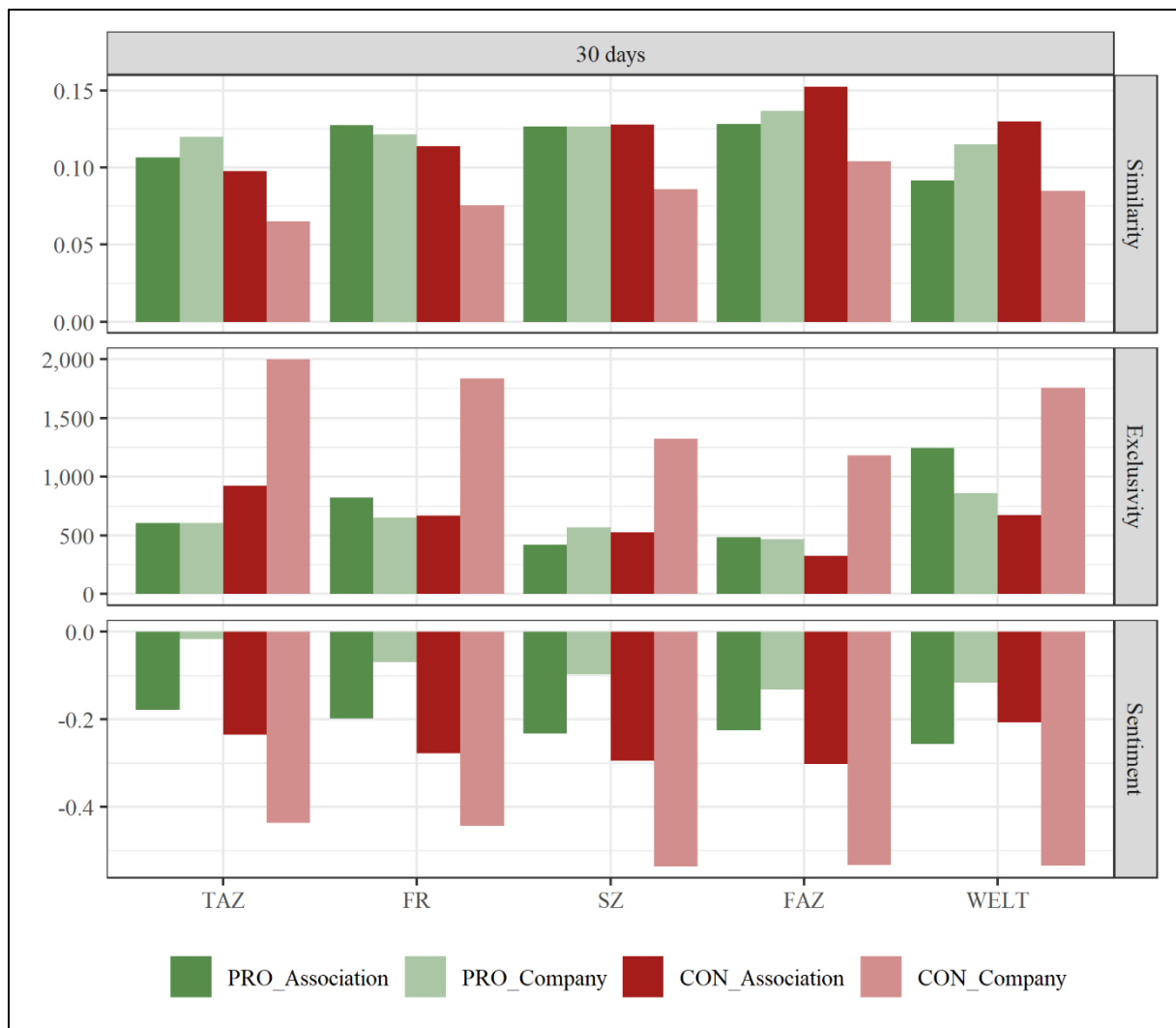


**Notes:** see Figure 7.1.

<sup>45</sup> This effect may be difficult to test in the regression models, as the results from the visibility analyses suggest that the issue ownership indicator does not capture the same concept for business actors as for actors from the other domains.

Looking at the average reception metrics for business actors with different incentives across newspapers (see Figure 7.8), we find that left-leaning newspapers covered the perspectives of business actors promoting climate protection more closely, more exclusively, and even slightly less negatively than right-leaning newspapers. In turn, right-leaning newspapers tended to favor press materials from associations opposing extensive climate action, though this pattern does not hold for companies. Interestingly, the exclusivity of the coverage in individual newspapers mirrors the similarity indicator for business actors, whereas it followed the pattern observed in the full sample for political actors (compare Figure 7.4 and Figure 7.5). Hence, the descriptive findings do not offer conclusive evidence to confirm or refute that the same agenda-building factors determine similarity and exclusivity.

**Figure 7.8: The reception of business actors' press materials across newspapers**



**Notes:** see Figure 7.1 (30-day frame only).

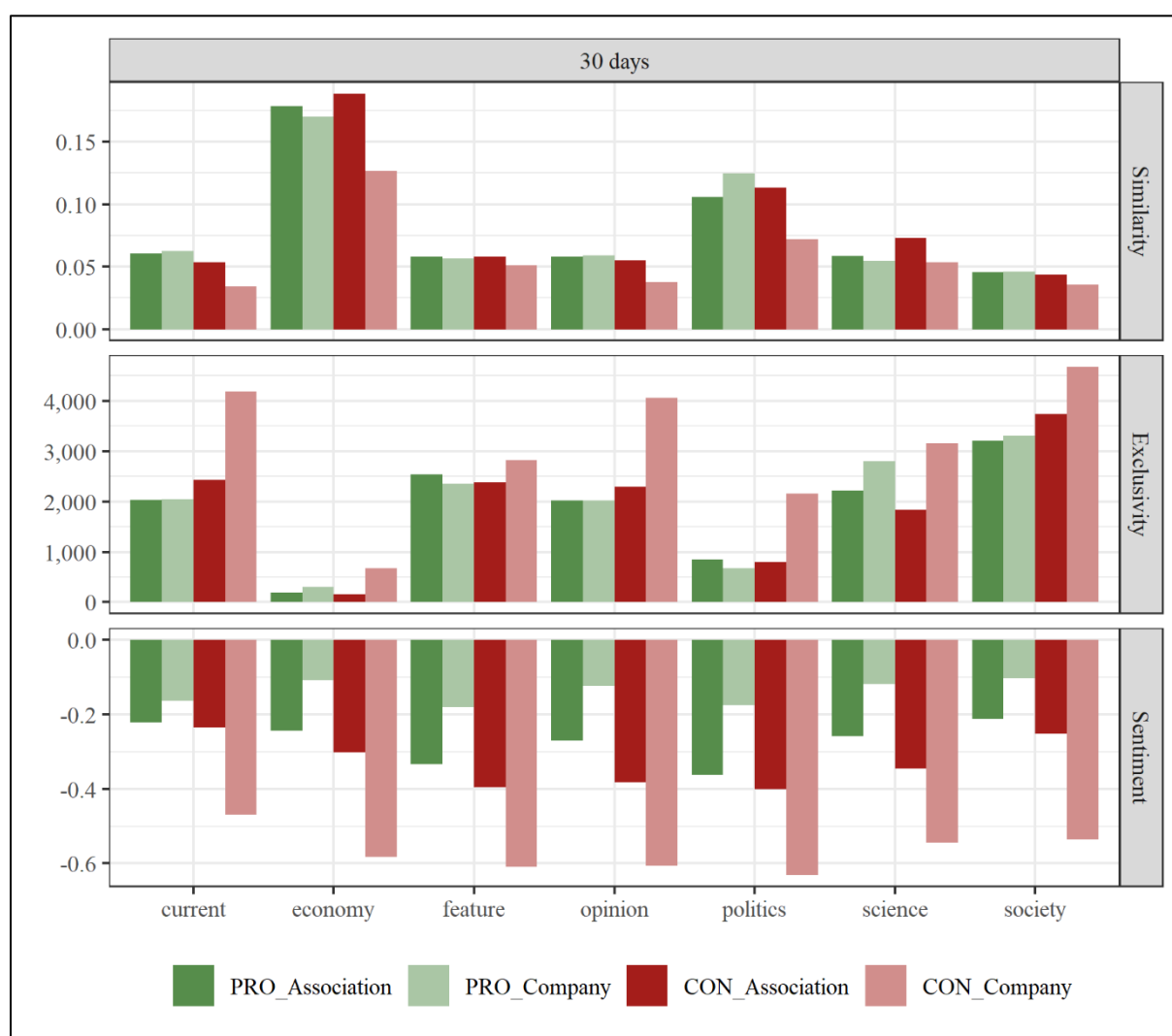
In contrast, the journalistic sentiment scores do not reflect the tendencies for left- and right-leaning newspapers as closely, since the issue interpretations of companies promoting climate protection received the least negative coverage in all collected newspapers. This result reconfirms that journalistic sentiment may be determined by different factors than the other two reception metrics. Overall, the findings for the individual newspapers lend additional support to the conclusion that left-leaning newspapers tend to cover the materials of actors promoting climate protection more closely, more exclusively, and more positively than their right-leaning counterparts, and vice versa.

The findings from the visibility analyses show that economic weight was especially important for coverage in the economy section, but not in other sections (see Figure 6.19). To get an impression whether economic weight was particularly important for the reception of actors' press materials in this section, Figure 7.9 depicts average similarity, exclusivity, and journalistic sentiment scores for business actors with different climate change positions for each newspaper section. While business actors' perspectives were generally covered more closely in the economy section, as suggested by the relative advantage for actors from this domain in the full sample (see Figure 7.7), the coverage was not systematically more similar to press materials from business actors with greater economic weight. Instead, the economy section covered the issue interpretations of business actors promoting climate protection almost as closely as the perspectives of associations opposing more ambitious climate protection, and more closely than the press materials of companies with the same position, although the latter actor groups had considerably more economic weight. The same pattern can be observed for the exclusivity of the received coverage, and the perspectives of business actors promoting more climate protection were generally associated with less negative journalistic evaluations. In short, there is no indication that actors' economic weight influenced the reception of their press materials in the economy section.

The average metrics for the other newspaper sections show that business actors' perspectives were also covered more closely in the politics section, where coverage was most similar to press materials from companies promoting more ambitious climate protection. Coverage in the feature, opinion, and society sections was equally similar to press materials from associations and companies promoting climate protection and from associations with the opposite position. Pro actors had a slight advantage in the current section, further supporting the notion that this section not only named actors promoting climate protection more often but also covered their perspectives more closely. In contrast, the science section covered the

materials of con associations somewhat more closely, offering no indication that the perspectives of actors with issue-specific expertise were covered more closely in addition to being more visible in this section. Moreover, all sections covered press materials from companies opposing more ambitious climate protection least closely, despite the striking visibility of this group except in the current section (see Figure 6.4). As for individual newspapers, the exclusivity of the received coverage largely follows the pattern observed for similarity, whereas the journalistic sentiment only varies marginally across newspaper sections.

**Figure 7.9: The reception of business actors' press materials across sections**



**Notes:** see Figure 7.1 (30-day frame only).

Taken together, the findings for business actors with different interests suggest that novelty or issue ownership may be more important than economic weight for the reception of business actors' press materials. The results lend further support to the conclusion that press materials

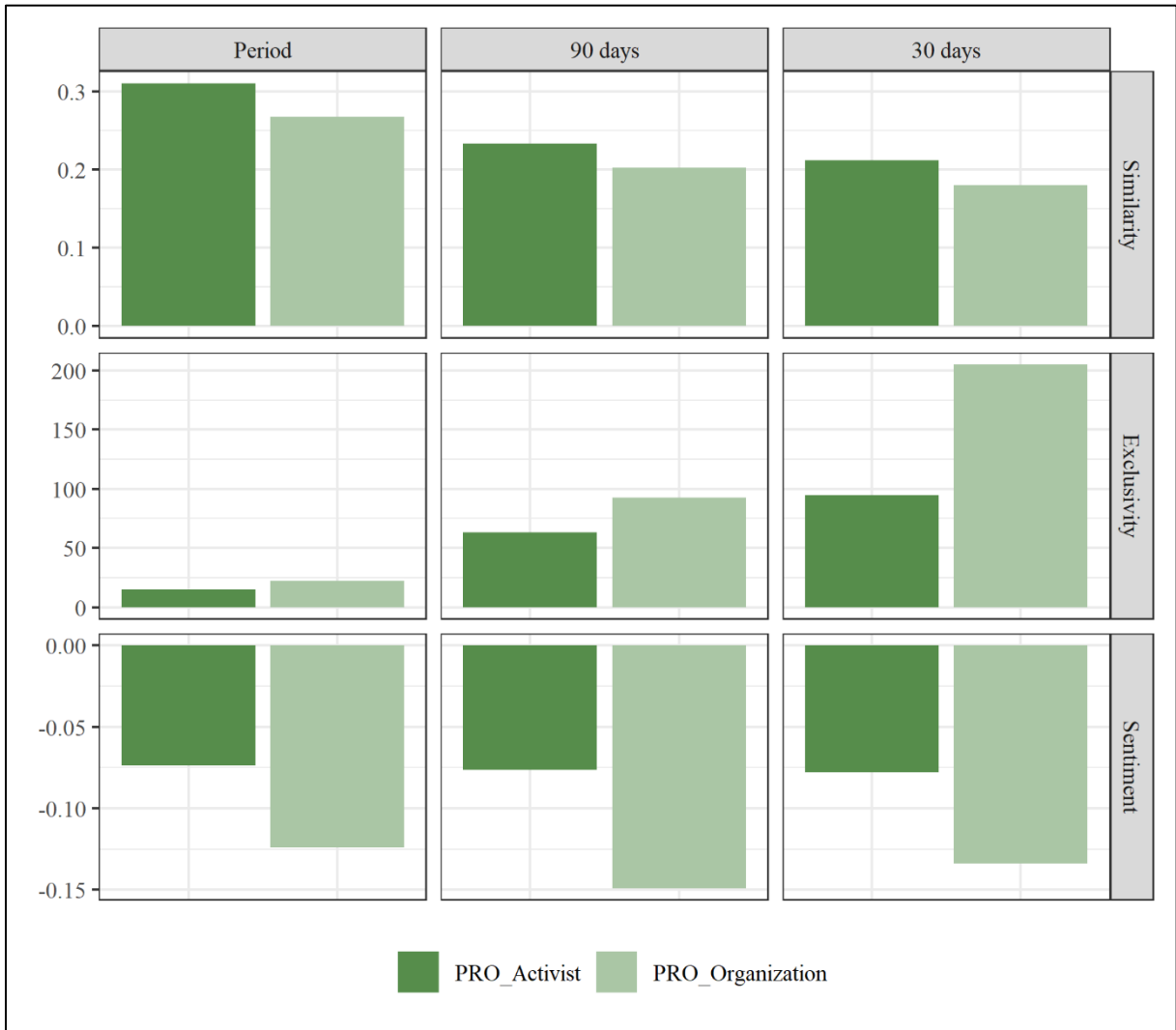


promoting climate protection had an advantage in left-leaning newspapers, whereas right-leaning newspapers tended to favor the opposite position. The largely matching patterns for similarity and exclusivity for business actors' press materials suggest that a similar set of agenda-building factors determines these metrics, although no obvious correspondence could be observed for the political domain. In contrast, journalistic sentiment tends to follow the same pattern across subsamples, pointing to a different set of relevant agenda-building factors.

### ***Civil Society Actors***

Since civil society actors promoting more ambitious climate protection were vastly more visible than their climate change skeptic counterparts and press materials were only collected (and oftentimes available) for the most visible actors from each domain, the sample of civil society actors for the similarity analyses is limited to activists and organizations demanding immediate action to mitigate climate change. Figure 7.10 displays the average similarity, exclusivity, and journalistic sentiment for press materials from activist and organizational actors, showing an advantage for activist actors that persists across timeframes and indicators. While this advantage is in line with the greater visibility of activist actors in climate change coverage, the small differences in the sentiment scores and even the somewhat larger differences in the exclusivity of the received coverage and the associated journalistic sentiment are considerably less pronounced than the differences observed for visibility (see Figure 6.5). Since the reception of actors' press materials in newspaper articles on climate change seems to be determined by different factors than their visibility, the advantage for activist actors could reflect the greater surprise and controversy associated with challenger actors' perspectives. The differences may also indicate different degrees of prominence or issue ownership, though the latter alternative cannot be tested empirically due to the lack of data regarding membership figures and donations for activist civil society actors.

Figure 7.10: The reception of civil society actors' press materials

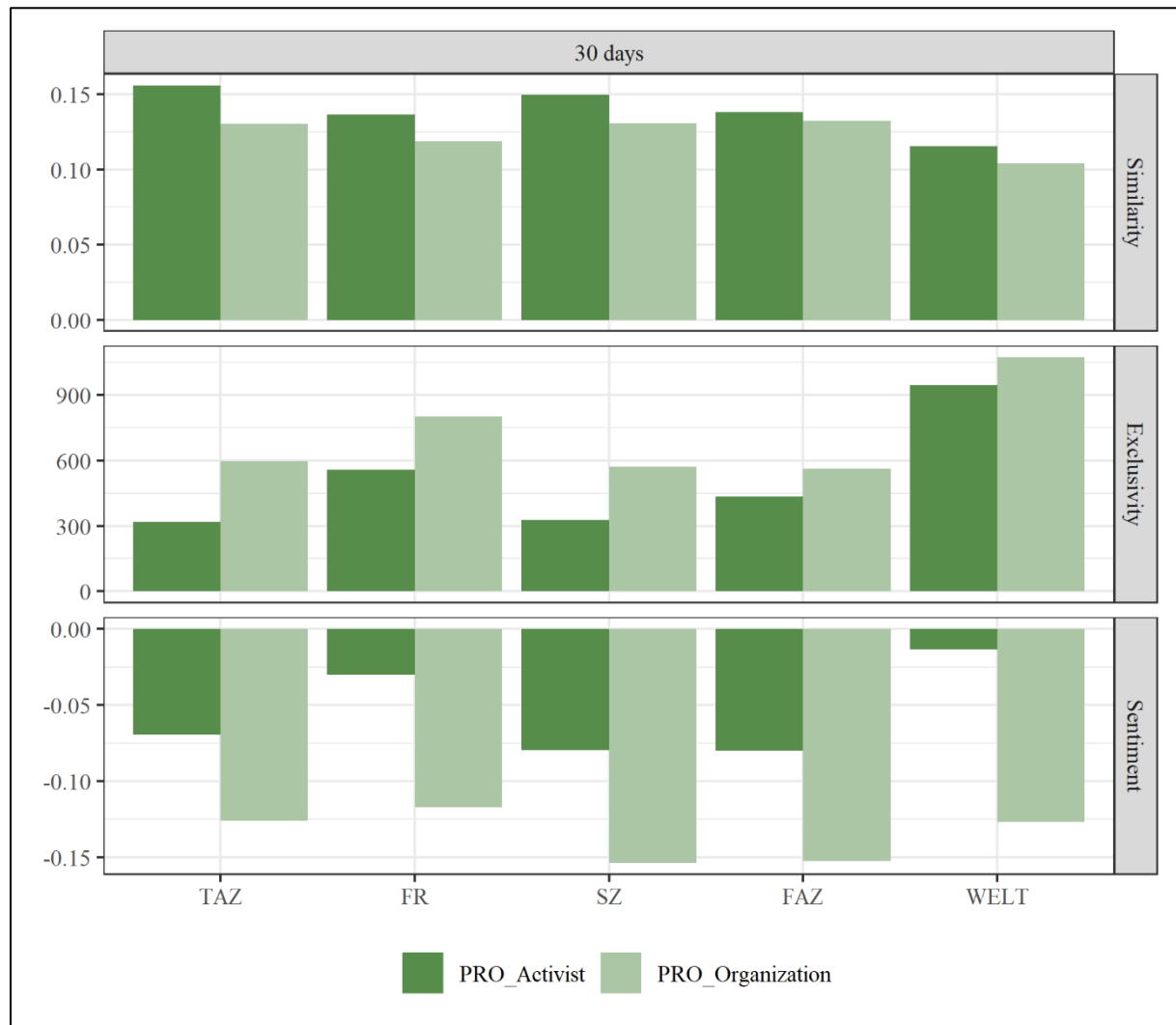


Notes: see Figure 7.1.

Unlike the patterns for political and business actors, the average similarity, exclusivity, and journalistic sentiment scores for civil society actors' press materials do not follow an obvious ideological pattern across newspapers (see Figure 7.11). The exception is the somewhat lower similarity and exclusivity of the coverage for civil society actors' issue interpretations in the Welt. Moreover, the advantage for activist climate protection actors is slightly less marked in right-leaning newspapers than in their left-leaning counterparts for similarity and exclusivity, possibly pointing to a preference for less radical climate change perspectives in more right-leaning newspapers. Yet, climate protection activists' issue interpretations were covered least negatively in the Welt, suggesting the opposite interpretation. In short, the reception of civil society actors' press materials across newspapers exhibits contradictory patterns for the different indicators. In line with the findings for the political and business domains, the patterns

for similarity and exclusivity are largely consistent, whereas journalistic sentiment follows its own pattern.

**Figure 7.11: The reception of civil society actors' press materials across newspapers**

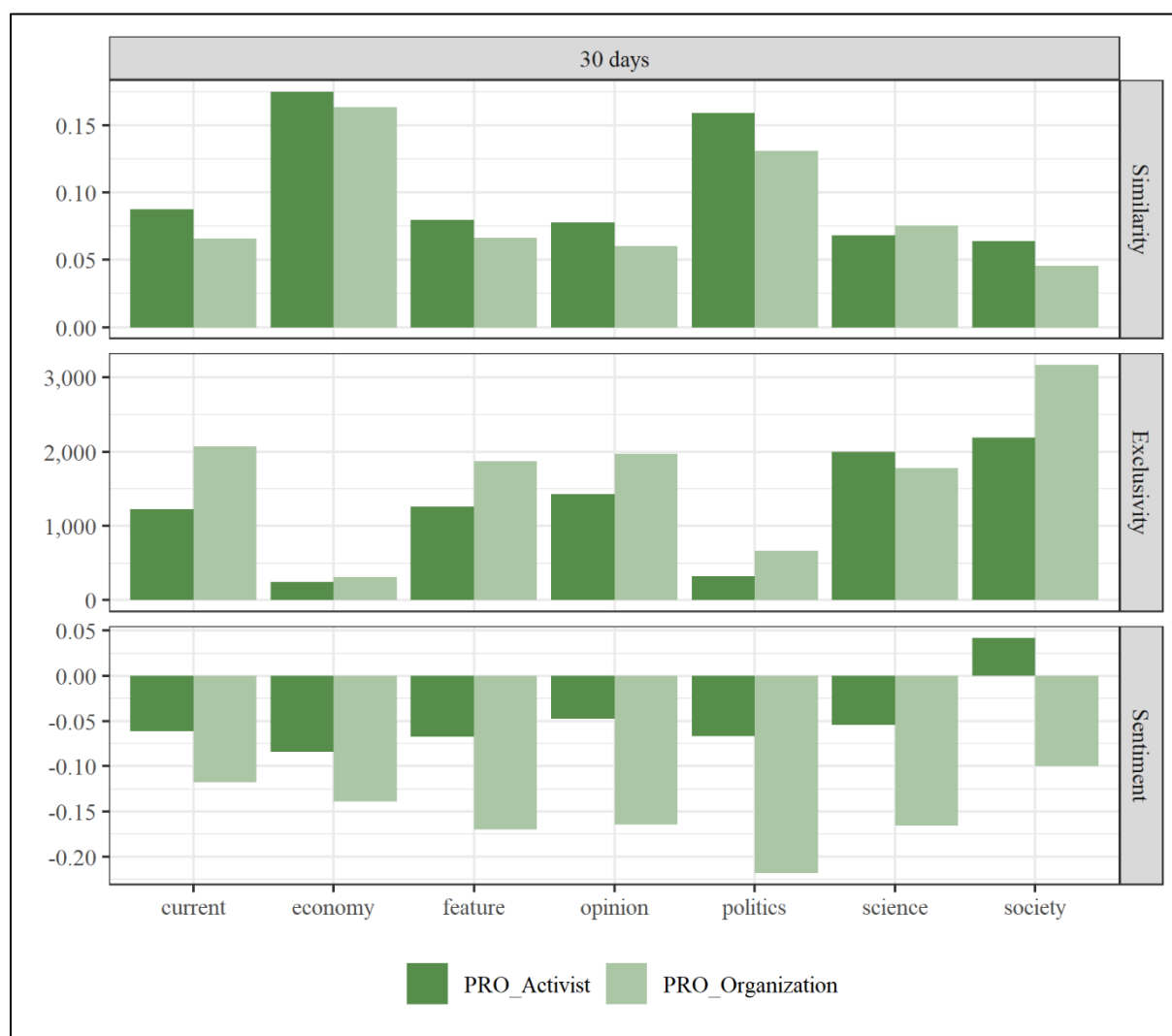


**Notes:** see Figure 7.1 (30-day frame only).

Looking at the reception metrics for individual newspaper sections depicted in Figure 7.12, we see that civil society actors' press materials were covered most closely and exclusively in the economy section, followed by the politics section. This mirrors the findings for actors from the political and business domains, suggesting that the coverage in these sections is generally more similar to actors' press materials than the coverage in the remaining sections (compare Figure 7.3). The similarity and exclusivity scores for the individual newspaper sections indicate the same advantage for activist actors observed in the other subsamples, except for the science section, where organizational actors' perspectives were covered more closely and exclusively

but not more positively than activist actors' materials. This corresponds to the lower visibility of climate protection activists in this section and dovetails with the notion that issue-specific expertise could be more important for coverage in the science section.

**Figure 7.12: The reception of civil society actors' press materials across sections**



**Notes:** see Figure 7.1 (30-day frame only).

The journalistic evaluations of civil society actors' press materials once again follow a different pattern than the other two indicators, instead reflecting the pattern found in the full sample. Curiously, the average journalistic sentiment scores based on the non-lemmatized corpus show that activist actors' perspectives were evaluated positively in the society section, whereas the scores based on the lemmatized version indicate that activist actors' perspectives were evaluated positively in the science but not the society section (see Appendix 21.4). Since lemmatization may temper the detected sentiment by reducing superlative and comparative

forms to their positive root (e.g., *the best* and *better* are reduced to *good*), the non-lemmatized version of the corpus should capture journalistic sentiment more accurately. Although the indicators based on the two versions of the corpus hardly ever diverge in terms of their substantive interpretation, observed differences point to inconsistencies that should be kept in mind for the interpretation of the regression results. Regardless of the discussed deviations, activist actors' issue interpretations received less negative coverage in all newspaper sections, matching the finding for the political domain that press materials from challenger actors were generally covered less negatively in all subsamples.

In the absence of reception metrics for the press materials of civil society actors with climate change skeptic views, the descriptive findings for activists and organizations demanding extensive action to mitigate climate change indicate that challenger actors generally had an advantage over mainstream actors, though the observed pattern may also be explained by different degrees of prominence or issue ownership. Unlike the results for political and business actors, the average reception metrics for the press materials of civil society actors do not exhibit any distinct ideological pattern across newspapers. The patterns for similarity and exclusivity are consistent across the different subsamples, suggesting that these indicators may be determined by similar agenda-building factors. Journalistic sentiment did not follow the same pattern, but the perspectives of challenger actors were consistently evaluated less negatively, adding to the findings for the political domain.

### ***Scientific Actors***

Given that conformist scientific actors were markedly more visible in newspaper articles on climate change than their contrarian counterparts, press materials were only collected for conformist scientists. In consequence, all actors from the scientific domain can be expected to promote interpretations in line with the IPCC consensus on climate change. Given that conformist actors were generally affiliated with traditional academic institutions and thus counted as mainstream actors, the sample of scientific actors is rather homogeneous. In other words, there are no actor groups with different incentives to be examined for this domain. To reiterate, the press materials of scientific actors were covered relatively less closely than the perspectives of civil society and political actors, but more closely than the issue interpretations of business actors (see Figure 7.1). This pattern holds for the exclusivity of the received coverage as well as the associated journalistic sentiment, offering no additional insights

regarding possible differences in the set of agenda-building factors that influence the different reception metrics. Considering that the sample of scientific actors included only mainstream actors, the more negative journalistic sentiment associated with actors from this domain matches the finding for political and civil society actors that the perspectives of challenger actors tended to be evaluated more positively than mainstream actors' press materials.

Looking at differences between the average reception metrics for scientific actors' press materials across newspapers (see Figure 7.2), we see that left-leaning newspapers covered scientific actors' issue interpretations relatively more closely than right-leaning newspapers. Accordingly, the climate change coverage in the *taz* was almost as similar to scientists' as to political actors' press materials, whereas articles in the *Welt* were less similar to scientific actors' perspectives than to the issue interpretation of actors from other domains. Though scientists' press materials were generally covered more exclusively than business actors' perspectives, this advantage was also smaller in right-leaning newspapers. Considering that scientific actors' press materials reflected the IPCC consensus, these findings further support the conclusion that left-leaning newspapers covered the perspectives of actors promoting more ambitious climate change more closely and exclusively, though not more positively.

Unlike other newspaper sections, the science section covered press materials from scientific actors most closely (see Figure 7.3), mirroring the findings from the visibility analyses (see Figure 6.2). Interestingly, coverage in the economy and politics section was even more similar to scientific actors' perspectives in absolute terms, indicating that the thematic focus increased the relative but not the absolute similarity between scientific actors' materials and coverage in the science section. Likewise, scientists' issue interpretations were covered more exclusively than the perspectives of other actors in the science section, yet received even more exclusive coverage in the economy and politics sections. In contrast, the thematic focus did not affect the journalistic evaluation of scientific actors' press materials. Given the similar patterns for similarity and exclusivity, this divergence reconfirms that journalistic sentiment may have been influenced by different agenda-building factors than the other two factors.

### *Summary*

Newspaper articles on climate change published between 2017 and 2020 tended to cover the perspectives of civil society actors most closely, exclusively, and positively, followed by the issue interpretations of political, scientific, and business actors. Expectably, the average

similarity and exclusivity scores for perspectives from different domains are higher when press materials are compared to newspaper articles published in the entire legislative period than in the shorter timeframes. Yet, the journalistic sentiment associated with actors' issue interpretations is consistent across timeframes. The patterns for the entire legislative period generally captured fewer differences between actor groups and differed from the patterns observed for the shorter timeframes. This is in line with the assumption that the newspaper coverage for the entire legislative period reflects factors beyond actors' ability to build the agenda, since the closest newspaper articles may reproduce actors' perspectives independent of their efforts to influence the media agenda.

The results for the 30-day frame should be linked more directly to actors' ability to build the agenda, yet the average similarity, exclusivity, and journalistic sentiment for press materials advocating different substantive interpretations of climate change do not consistently follow the same pattern. Nonetheless, the descriptive results suggest that similarity and exclusivity are influenced by similar agenda-building factors, though this conclusion is not reflected in all considered subsamples.<sup>46</sup> In contrast, the journalistic evaluations of actors' press materials were remarkably consistent across different subsamples and the observed pattern is clearly distinct from both similarity and exclusivity, hinting at the relevance of different agenda-building factors for this indicator. Unlike actors' visibility, the reception of their press materials does not seem to be linked to their executive authority, issue-specific relevance, or economic weight. Instead, the findings suggest that actors' challenger status was particularly relevant for the similarity, exclusivity, and especially for the evaluation of their perspectives in the media. This supports the notion that actor characteristics linked to the content of press materials could be more decisive for the degree to which actors' perspectives are reproduced in the media than other agenda-building factors.

There was an ideological pattern across newspapers, as left-leaning newspapers generally reproduced press materials from actors promoting more ambitious climate change more closely and exclusively than their right-leaning counterparts, and vice versa. Coverage in left-leaning newspapers was thus more similar to the issue interpretations of civil society actors advocating more extensive climate action, business actors profiting from more ambitious climate protection, and conformist scientific actors. The same pattern could be observed for exclusivity,

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<sup>46</sup> Similarity and exclusivity diverge for actors from different domains across newspaper sections (see Figure 7.3), and for party actors across newspapers (see Figure 7.5).

but not for journalistic sentiment. The advantage for actors demanding climate action in left-leaning newspapers is less clear for the political domain, as the *taz*, the *FR*, and the *SZ* covered interpretations from parties with positions to the right of the center more closely and exclusively than perspectives from parties with positions to the left of the center. Nonetheless, press materials from Green party actors were covered more closely and exclusively in left- than in right-leaning newspapers, whereas the reverse holds for the perspectives of AfD actors.

Regarding the reception of actors' press materials in individual newspaper sections, the findings show that the economy section covered business actors' perspectives more closely and exclusively than the other sections. Likewise, the science section reproduced scientific actors' issue interpretations more closely and exclusively, mirroring the advantage for relevant actors found in the visibility analyses (compare Figure 6.2). Yet, political actors' perspectives were not covered more closely or exclusively in the politics section, and journalistic evaluations were consistent across newspaper sections. The observed thematic advantage was thus less consistent than for visibility, and does not seem to be linked to economic weight for the economy section, though actors' scientific expertise is likely as decisive for the reception of their press materials as for their visibility in the science section. Given that the perspectives of actors from all domains were covered most closely in the economy section, followed by the politics section, the discussed patterns refer to relative rather than absolute advantages. Such general differences between newspaper sections could reflect incentives to economize the production of articles for larger sections in the face of increasing time constraints.

Overall, newspaper articles on climate change covered different substantive positions on climate change, confirming the conclusion from the visibility analyses that media coverage presented audiences with a range of different perspectives on climate change. The equal representation of actors' perspectives in articles published in the entire legislative period, in particular, shows that newspapers did not favor issue interpretations from any specific domain. Similarly, the higher similarity and exclusivity and the better evaluation for perspectives promoting more ambitious climate protection mirrors the prevalence of these interpretations in society. Hence, climate change coverage in German newspapers was diverse but accurately represented the balance of perspectives on the issue. Although left-leaning newspapers focused even more on press materials from actors demanding immediate climate action, the differences between newspapers with diverging ideological leanings offer no indication that positions on either side of the controversy were omitted in individual newspapers. Thus, all newspapers informed their readers about the whole range of climate change perspectives.



## 7.2 Regression Results for the Reception of Actors' Press Materials

In light of the inconsistent descriptive findings for similarity, exclusivity, and journalistic sentiment, the following subchapters discuss the effects of the agenda-building factors for all three measures to understand their distinctive influence, or lack thereof, for each indicator. Since newspaper articles published within 30 days of actors' press materials can be expected to reflect the influence of the agenda-building factors more closely than coverage in the longer timeframes, the depicted effects are based on the 30-day frame. However, the results from models based on the 90-day frame (see Appendix 26) or the entire legislative period (see Appendix 27) are discussed when their substantive interpretations diverge from the findings for the 30-day frame. To learn how the ideological leanings observed in the descriptive analysis influence the importance attached to individual agenda-building factors, the effects for the different newspapers were estimated in separate regression models. Although issue salience did not affect the relative importance of issue-specific relevance, scientific expertise, and issue ownership for actors' visibility, different newspapers dedicated smaller or larger shares of their coverage to the issue (see Figure 4.1). Hence, the newspaper models allow me to indirectly test the influence of issue salience on the relevance of individual agenda-building factors for the reception metrics, although the similarity analyses are based on a single legislative period and therefore cannot account for changes in the context conditions discussed in Chapter 2.5.

Separate models were also estimated for different newspaper sections, as the relevance of individual agenda-building factors, in general, and domain-specific factors, in particular, varied considerably across newspaper sections in the visibility analyses. While the descriptive findings for the reception of actors' press materials in the media offer no consistent evidence for the higher relevance of domain-specific agenda-building factors in the corresponding newspaper sections, the observed patterns confirm that the economy and science sections favored materials from actors with specific relevance to their thematic focus. Moreover, climate change was considerably more salient in some sections than in others (see Figure 4.2), providing an additional test for the impact of issue salience. Given that the effects of actors' issue ownership as well as their mainstream or challenger status differed across domains in the visibility analyses, I additionally estimated separate regression models for actors from the business and civil society domains (see Appendix 28). However, these estimates should be interpreted with caution in light of the small number of units at the macro level (27 business actors and 15 civil society actors).

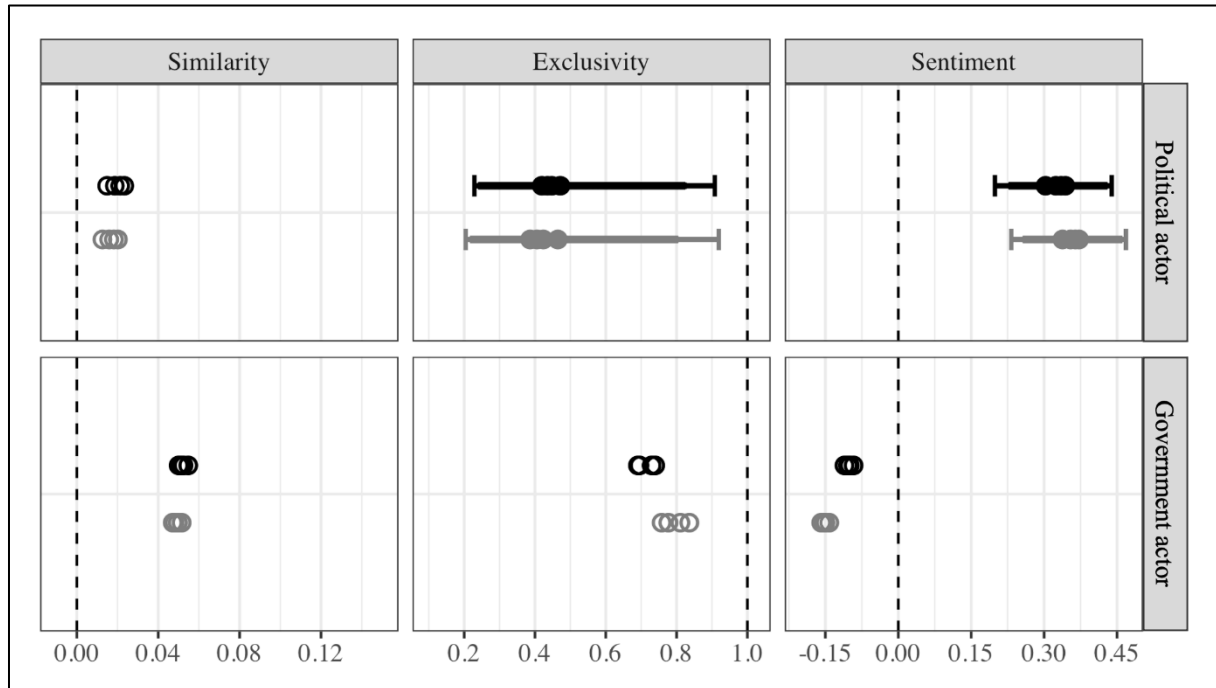
The depicted effects for the similarity between actors' press materials and newspaper articles, as well as for the associated journalistic sentiment, are linear regression coefficients. Estimates for the exclusivity of the received coverage are IRRs based on negative binomial regression models. Analogous to the visibility analyses, multiple estimates for the same agenda-building factor based on different operationalizations of actors' economic weight and mainstream or challenger status are superimposed in the figures to show the range of estimates, and the width of the confidence interval line increases with the number of superimposed estimates. Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. All models were estimated for reception indicators based on the lemmatized (c<sub>1</sub>-models) and the non-lemmatized (c<sub>2</sub>-models) versions of the corpus to detect potential differences and test the robustness of the effects to different levels of pre-processing. Estimates for all agenda-building factors except continuous issue ownership are based on the full model controlling for the other factors. In addition, all models include random effects at the actor level to account for the clustered structure of the data. References to the full regression results, further model specifications, and the respective sample sizes are available in the figure notes.

### *Executive Authority*

In line with the theoretical expectations, the visibility analyses show that actors with executive authority were named at higher rates than other actors. This advantage was larger for chancellors than for party chairs and ministers, who were more visible than other political actors, who were more visible than actors from other domains. Although the descriptive findings did not point to the relevance of executive authority for the reception of actors' press materials in newspaper articles, other factors could have confounded the respective patterns. Therefore, Figure 7.13 depicts the effects of actors' affiliation with the political domain (Political actor) and the government parties (Government actor) on the similarity between their perspectives and newspaper articles, the exclusivity of the received coverage, and the associated journalistic evaluation (see Appendix 23 for the full regression results). Unlike for visibility, political and even government actors did not have an inherent advantage over actors from other domains regarding the similarity between their press materials and climate change coverage, as their issue interpretations were reproduced as closely as other actors' perspectives. However, the expected advantage can be observed for exclusivity, as coverage for political actors'

perspectives was around 57 percent more exclusive than coverage for other actors' issue interpretations. Contrary to the expectations, actors affiliated with the government did not have an additional edge over other political actors.

**Figure 7.13: The effect of executive authority on newspaper reception**



**Notes:** Depicted are the effects of actors' affiliation with the political domain (Political actor) and the government (Government actor) on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment). The reference category for the political actor indicator are actors from the other three domains; the reference category for the government actor indicator are actors not affiliated with the government. **Legend:** The effects for similarity and sentiment are linear regression coefficients; the effects for exclusivity are IRRs. Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. For each specification, the upper estimate shows effects based on the lemmatized corpus (c<sub>1</sub>), whereas the lower estimate shows effects based on the non-lemmatized corpus (c<sub>2</sub>). Estimates and confidence intervals for the same specification based on different operationalizations of economic weight and mainstream status are superimposed to show the range of estimates. The width of the confidence interval line indicates the number of superimposed confidence intervals. Estimates are based on linear regression models for the similarity and sentiment indicators and negative binomial regression models for the exclusivity indicator; all models control for other agenda-building factors and include ACT-RE (see Appendix 23). The reception metrics are based on newspaper articles published in the 30 days following the release of the press materials. N for all models is > 8,688.

Mirroring the findings for the exclusivity of the received coverage, political actors' perspectives were covered around 8.6 percentage points more positively than other actors' issue interpretations (average coefficients 0.33 in c<sub>1</sub> and 0.36 in c<sub>2</sub>), whereas actors' affiliation with the government party did not affect the journalistic evaluation of their perspectives. With an average sentiment score of -0.09, political actors' press materials tended to be more positive

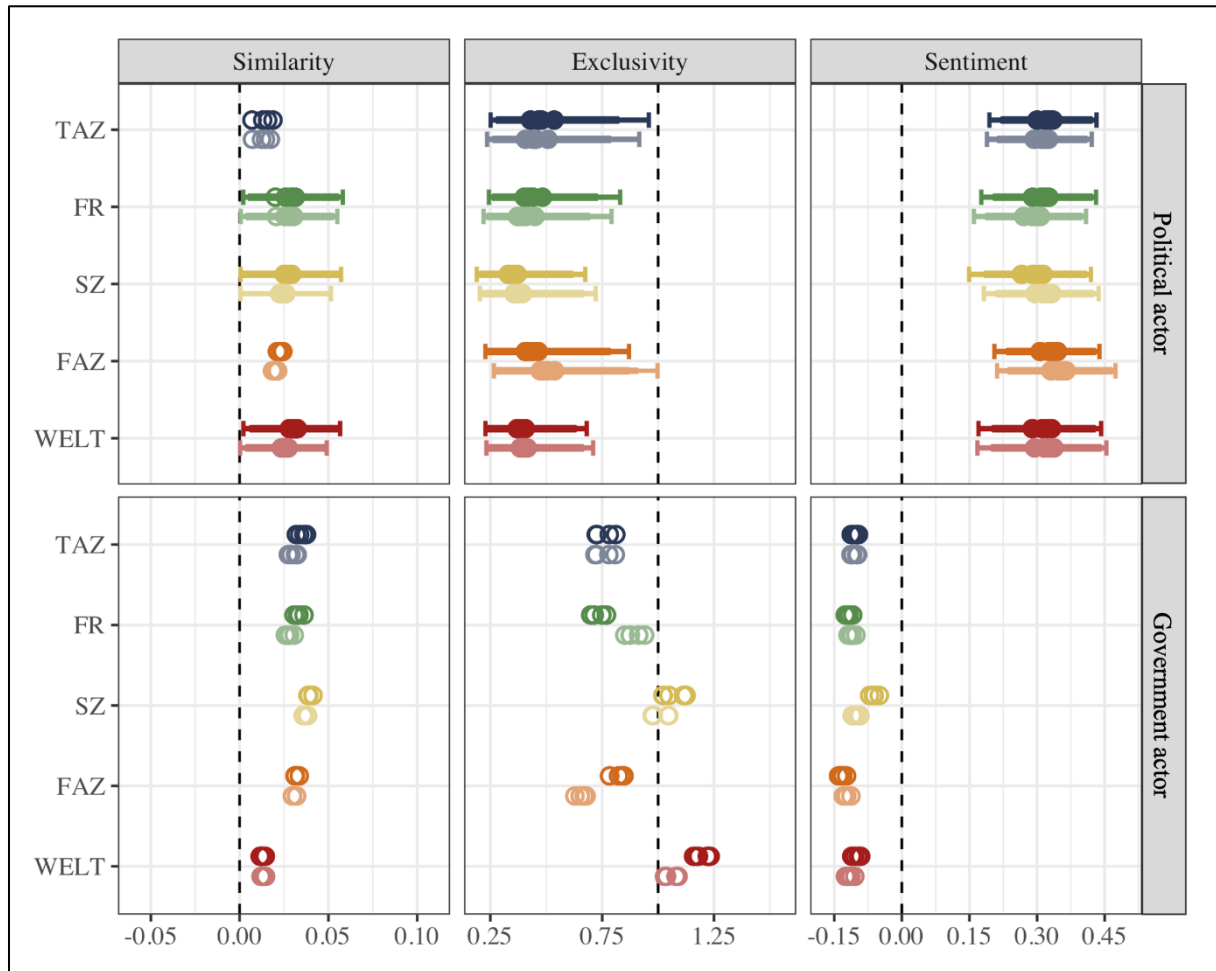
than the perspectives of actors from the business (average sentiment score: -0.41) and scientific (average sentiment score: -0.27) domains, and comparable to the issue interpretations of civil society actors (average sentiment score: -0.09). Consequently, the positive effect of actors' affiliation with the political domain on the journalistic evaluation of their issue interpretations is unlikely to reflect edits intended to soften extremely negative formulations, as suggested by the descriptive findings for different party actors (see *Political Actors* in Chapter 7.1). Overall, the findings offer mixed evidence for the influence of executive authority on the reception of actors' press materials, suggesting that political actors' press materials were covered more exclusively and positively but not more closely than other actors' perspectives. Moreover, there is no indication that government actors were better able to build the media agenda than other political actors, challenging the notion that actors' influence over the media agenda should increase with their degree of executive authority.

To understand how the ideological leanings of the collected newspapers influenced the relevance of executive authority for their coverage, Figure 7.14 shows the effects of actors' affiliation with the political domain or the current government separately for each newspaper (see Appendix 24 for the full regression results). Despite the ideological pattern observed in the descriptive findings, the regression results do not suggest that the relative importance of executive authority differs across the ideological spectrum. Yet, the results do not simply mirror the findings from the full models, as political actors' press materials were covered significantly more closely in the FR, the SZ, and the Welt, though not in the taz or the FAZ. Specifically, articles in the FR and the SZ were around 2.6 percentage points, and articles in the Welt around 2.8 percentage points more similar to political actors' perspectives. The null effects for the taz and the FAZ could be due to the small number of units on the macro level ( $N = 64$  actors), but may also point to genuine differences in the weight that these newspapers attach to executive authority. In line with the findings from the full models but against the expectations, press materials from government actors were not reproduced more closely than other political actors' perspectives in any of the considered newspapers.

Regarding the exclusivity of the received coverage, the effects for the individual newspapers show that political actors' perspectives were covered between 53 percent (FAZ) and 64 percent (SZ) more exclusively than other actors' issue interpretations (average IRRs: 0.46 for the taz; 0.42 for the FR; and 0.39 for the Welt). Actors' affiliation with the current government did not significantly affect the exclusivity of the coverage in individual newspapers and some point estimates for the SZ and the Welt are even positive, further disconfirming the

expectation that government actors have an edge over other political actors in building the media agenda.

**Figure 7.14: The effect of executive authority on newspaper reception across newspapers**



**Notes:** Depicted are the effects of actors' affiliation with the political domain (Political actor) and the government (Government actor) on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper. The reference category for the political actor indicator are actors from the other three domains; the reference category for the government actor indicator are actors not affiliated with the government.

**Legend:** The effects for similarity and sentiment are linear regression coefficients; the effects for exclusivity are IRRs. Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. For each specification, the upper estimate shows effects based on the lemmatized corpus ( $c_1$ ), whereas the lower estimate shows effects based on the non-lemmatized corpus ( $c_2$ ). Estimates and confidence intervals for the same specification based on different operationalizations of economic weight and mainstream status are superimposed to show the range of estimates. The width of the confidence interval line indicates the number of superimposed confidence intervals. Estimates are based on linear regression models for the similarity and sentiment indicators and negative binomial regression models for the exclusivity indicator; all models control for other agenda-building factors and include ACT-RE (see Appendix 24). The reception metrics are based on newspaper articles published in the 30 days following the release of the press materials. N for the TAZ, FR, SZ, and FAZ models is > 8,688; N for the WELT models is > 7,522.

The positive effect of actors' affiliation with the political domain on the journalistic evaluation of their perspectives persists across newspapers (average coefficients: 0.30 for the FR and the SZ; 0.32 for the taz and the Welt; and 0.34 for the FAZ), as does the irrelevance of actors' affiliation with the government. Hence, political actors' issue interpretations were covered more closely, exclusively, and positively than other actors' perspectives in the FR, the SZ, and the Welt, and more exclusively and positively in the taz and the FAZ, but the greater executive authority of actors affiliated with the current government did not add to these effects.

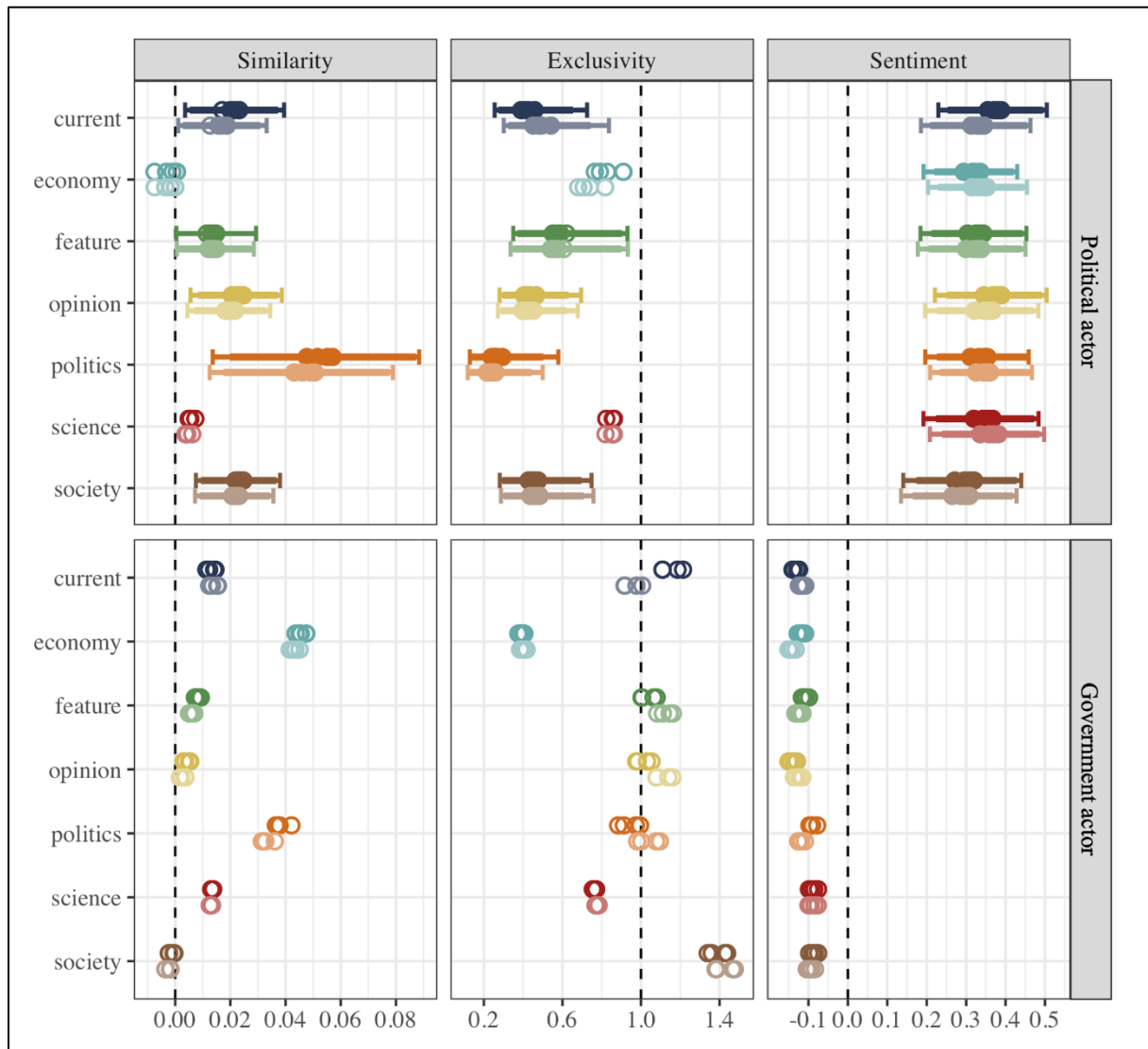
In line with the theoretical expectations, the politics section covered the perspectives of political actors around five percentage points more closely, 75 percent more exclusively, and 8.6 percentage points more positively than press materials from other actors. For similarity and exclusivity, their advantage was tendentially larger than in other sections (see Figure 7.15; full regression results are available in Appendix 25). The effects for the other sections show that political actors' issue interpretations were covered more closely than other actors' perspectives in the current, opinion, and society sections (average coefficients: 0.02), as well as the feature section (average coefficient: 0.01), but not in the economy or the science sections. In sum, these findings suggest that the insignificant effect of actors' affiliation with the political domain in the full model, as well as the inconsistent estimates for the newspaper models may reflect different distributions of climate change coverage across newspaper sections. Interestingly, the economy section covered political actors' press materials less closely than other actors' materials over the course of the legislative period (see Appendix 27.3), which could indicate that this section prioritized perspectives from the business domain.

The effects for the exclusivity of the coverage mirror the findings for the similarity indicator, as press materials from political actors were covered more exclusively in the current, feature, opinion, and society sections (average IRRs: 0.46; 0.58; 0.43; and 0.46) as well as the politics section. The effects for the journalistic sentiment associated with actors' press materials are consistent with the full and newspaper models, as political actors' perspectives were covered more positively in all newspaper sections, including the economy and science sections. The observed advantage for political actors in the politics section does not differ from the other sections,<sup>47</sup> mirroring the descriptive finding that the pattern for journalistic sentiment is consistent across subsamples and does not reflect shifts in similarity and exclusivity.

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<sup>47</sup> Average IRRs: 0.29 for the society section, 0.32 for the feature section, 0.33 for the economy section, 0.34 for the politics section, 0.35 for the current and science sections, and 0.36 for the opinion section.

**Figure 7.15: The effect of executive authority on newspaper reception across sections**



**Notes:** Depicted are the effects of actors' affiliation with the political domain (Political actor) and the government (Government actor) on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper section. The reference category for the political actor indicator are actors from the other three domains; the reference category for the government actor indicator are actors not affiliated with the government. **Legend:** The effects for similarity and sentiment are linear regression coefficients; the effects for exclusivity are IRRs. Filled points with 95 percent confidence intervals denote statistically significant effects, whereas hollow points indicate point estimates for insignificant effects. For each specification, the upper estimate shows effects based on the lemmatized corpus ( $c_1$ ), whereas the lower estimate shows effects based on the non-lemmatized corpus ( $c_2$ ). Estimates and confidence intervals for the same specification based on different operationalizations of economic weight and mainstream status are superimposed to show the range of estimates. The width of the confidence interval line indicates the number of superimposed confidence intervals. Estimates are based on linear regression models for the similarity and sentiment indicators and negative binomial regression models for the exclusivity indicator; all models control for other agenda-building factors and include ACT-RE (see Appendix 25). The reception metrics are based on newspaper articles published in the 30 days following the release of the press materials. N for all models is > 8,475.

The results for actors' affiliation with the current government show that government actors' press materials were neither covered more closely, nor more exclusively or positively than other political actors' perspectives, suggesting that the degree of executive authority was not decisive for the reception of actors' press materials. On the other hand, the executive authority of actors affiliated with the government party, most of whom are not part of the cabinet, may be too similar to the executive authority of other political actors to uncover substantive differences between these indicators based on the press materials of just 13 collective political actors.

Altogether, the findings show that executive authority tended to improve the reception of actors' press materials in newspaper articles on climate change, although different degrees of executive authority were either less relevant than expected or the differences were too small to be estimated given the low number of actors in the sample. Press materials from political actors were reproduced more closely than other actors' issue interpretations except in the taz and the FAZ, and were covered more exclusively and positively in all collected newspapers. The effects for the different newspaper sections show the same advantage for political actors except in the economy and science sections, where actors' affiliation with the political domain influenced neither the similarity nor the exclusivity of the received coverage. The inconsistencies in the effect of executive authority on similarity observed in the full and newspaper models may thus reflect diverging distributions of climate change articles across newspaper sections. Contrary to the descriptive findings, actors' affiliation with the political domain was tendentially more relevant for the similarity and exclusivity, though not the journalistic sentiment of coverage in the politics section. Hence, the findings generally support the expectation that executive authority increases actors' ability to build the agenda (Hypothesis 1.1) but offer no additional evidence that political actors' advantage rose with their degree of executive authority.

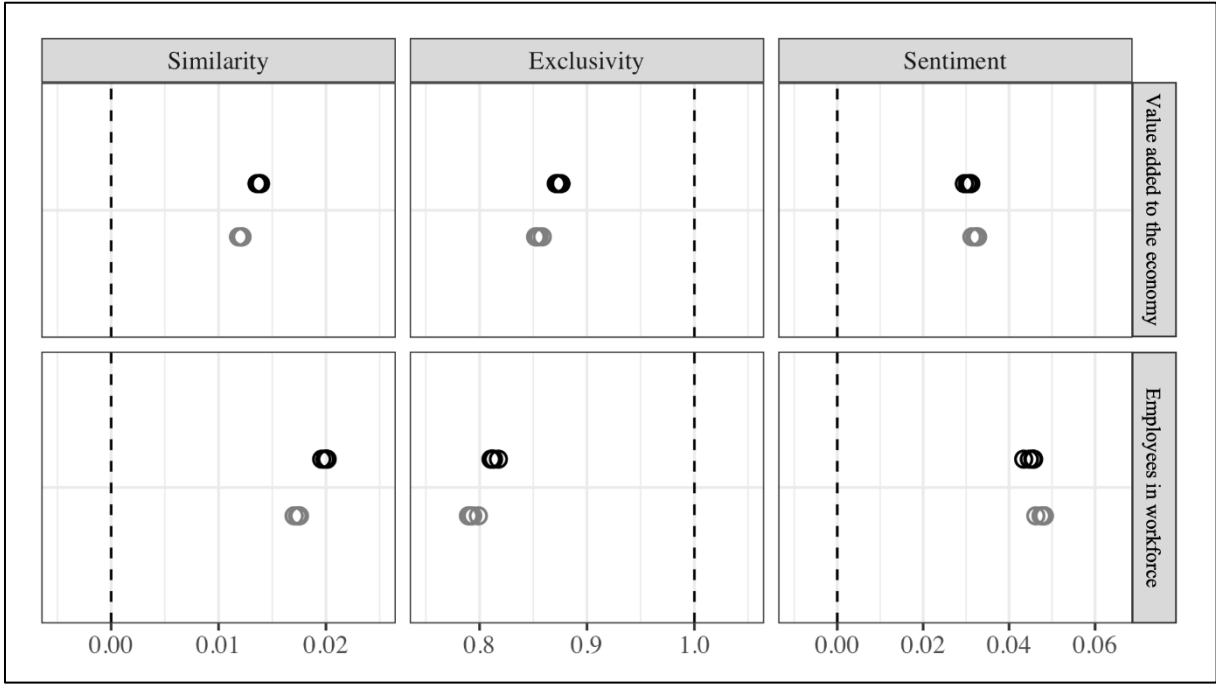
### *Economic Weight*

The visibility analyses also confirmed the relevance of economic weight, especially for coverage in the economy section. Figure 7.16 depicts the effects of the value added to the national economy and the number of employees relative to the national workforce on the reception of actors' press materials in newspaper articles, controlling for the other agenda-building factors (see Appendix 23 for the full regression results). Although the point estimates follow the expected pattern, the observed effects are not statistically significant, suggesting that actors with greater economic weight did not have an advantage regarding the reception of their



press materials in climate change coverage. Considering that business actors were more visible in right-leaning newspapers and that the influence of actors' economic weight on their visibility in climate change coverage was limited to the economy section, the uncertainty of the estimates may reflect differences in the relevance of economic weight across newspaper sections.

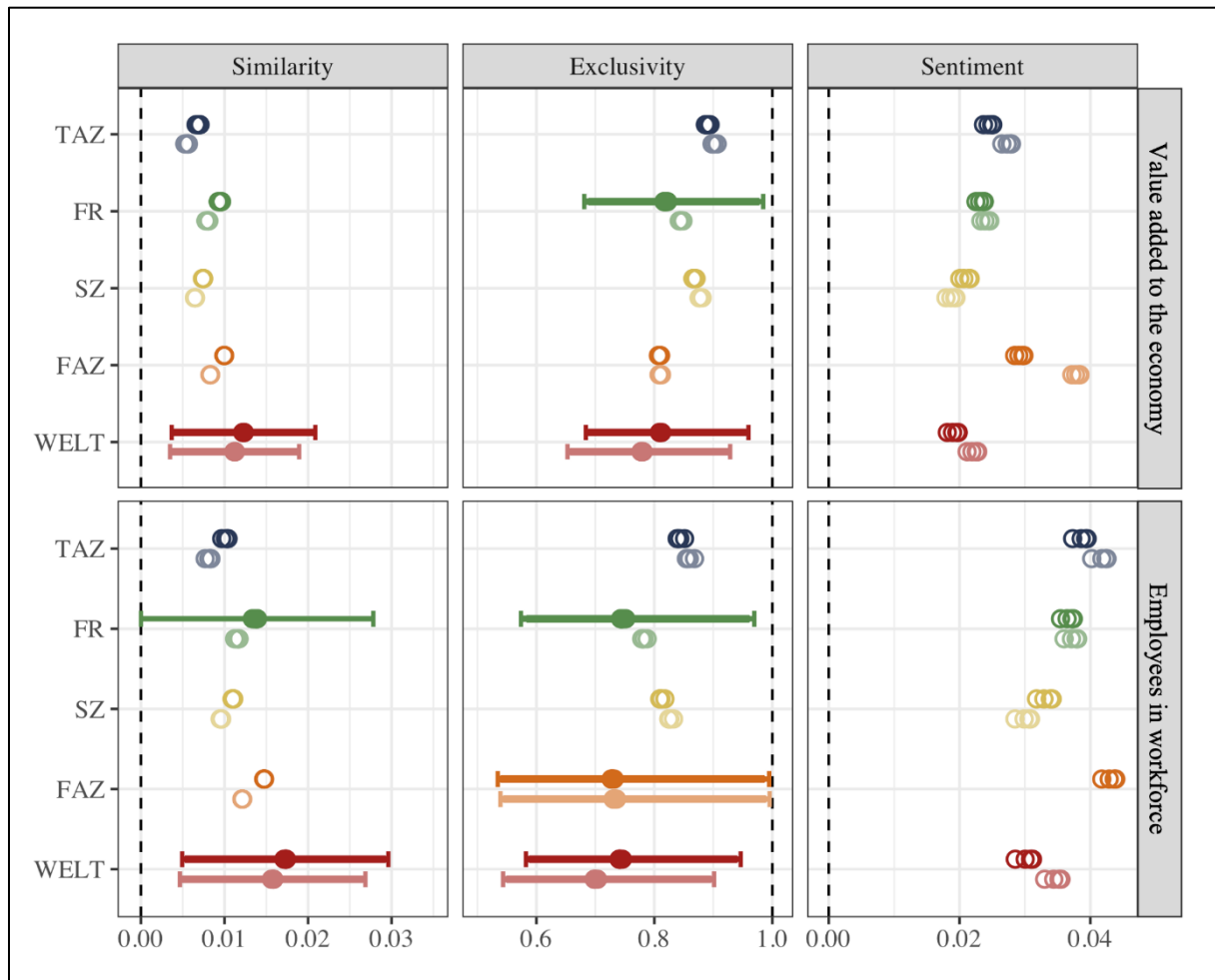
Figure 7.16: The effect of economic weight on newspaper reception



**Notes:** Depicted are the effects of economic weight on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment). **Legend:** see Figure 7.13.

Since right-leaning newspapers covered the perspectives of business actors with incentives to prevent more ambitious climate protection regulations somewhat more closely than their left-leaning counterparts (see Figure 7.8), and these actors tend to have higher economic weight, this factor may be more influential for the reception of actors' press materials in right-leaning newspapers. Figure 7.17 shows the effects of the economic weight indicators for each newspaper, revealing some differences regarding the similarity and exclusivity of the received coverage (see Appendix 24 for the full regression results). The perspectives of actors who added an additional percentage point to the value of the national economy were covered around one percentage point more closely and 21 percent more exclusively in the Welt. According to the models based on the lemmatized corpus, their press materials were also covered around 18 percent more exclusively in the FR.

**Figure 7.17: The effect of economic weight on newspaper reception across newspapers**



Notes: Depicted are the effects of economic weight on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper. **Legend:** see Figure 7.14.

Similarly, the Welt reproduced press materials from actors who represented an additional percentage point of the national workforce around 1.7 percentage points more closely and 28 percent more exclusively, the FR covered their issue interpretations around 1.4 percentage points more closely and 25 percent more exclusively according to the  $c_1$ -models, and the FAZ portrayed their angles around 27 percent more exclusively. The remaining effects of both indicators on the similarity and exclusivity of coverage in the FR and the FAZ are statistically significant at the 90 percent confidence level. In contrast, neither the value added to the national economy nor the size of the represented workforce affected the journalistic evaluation of actors' perspectives. Hence, the newspaper models suggest that actors with greater economic weight had an advantage regarding the similarity and exclusivity of the coverage received in the Welt, the FAZ, and the FR, but not in the taz or the SZ. Given that the left-leaning FR did not attach

significantly less importance to actors' economic weight than the right-leaning FAZ or the Welt, the findings do not consistently corroborate the ideological pattern observed in the descriptive analyses despite the insignificant effects for the left-leaning taz and SZ.

Mirroring the thematic focus of the economy section as well as the findings from the visibility analyses, the influence of actors' economic weight is limited to coverage in the economy section (see Figure 7.18; full regression results are available in Appendix 25). Here, (business) actors' press materials were covered around 1.5 percentage points more closely and around 21 percent more exclusively for each percentage point added to the total value of the German economy. Likewise, the materials of actors representing an additional percentage point of the national workforce were covered around 2.1 percentage points more closely and 29 percent more exclusively. Neither the value added to the national economy nor the size of the represented workforce affected journalistic sentiment in the economy section or any other section.<sup>48</sup> Since actors' economic weight only affected the similarity and exclusivity of coverage in the economy section, the somewhat uncertain and inconsistent effects of economic weight in the full models, as well as the differences across newspapers, can be explained by the share of climate change articles published in the economy section.

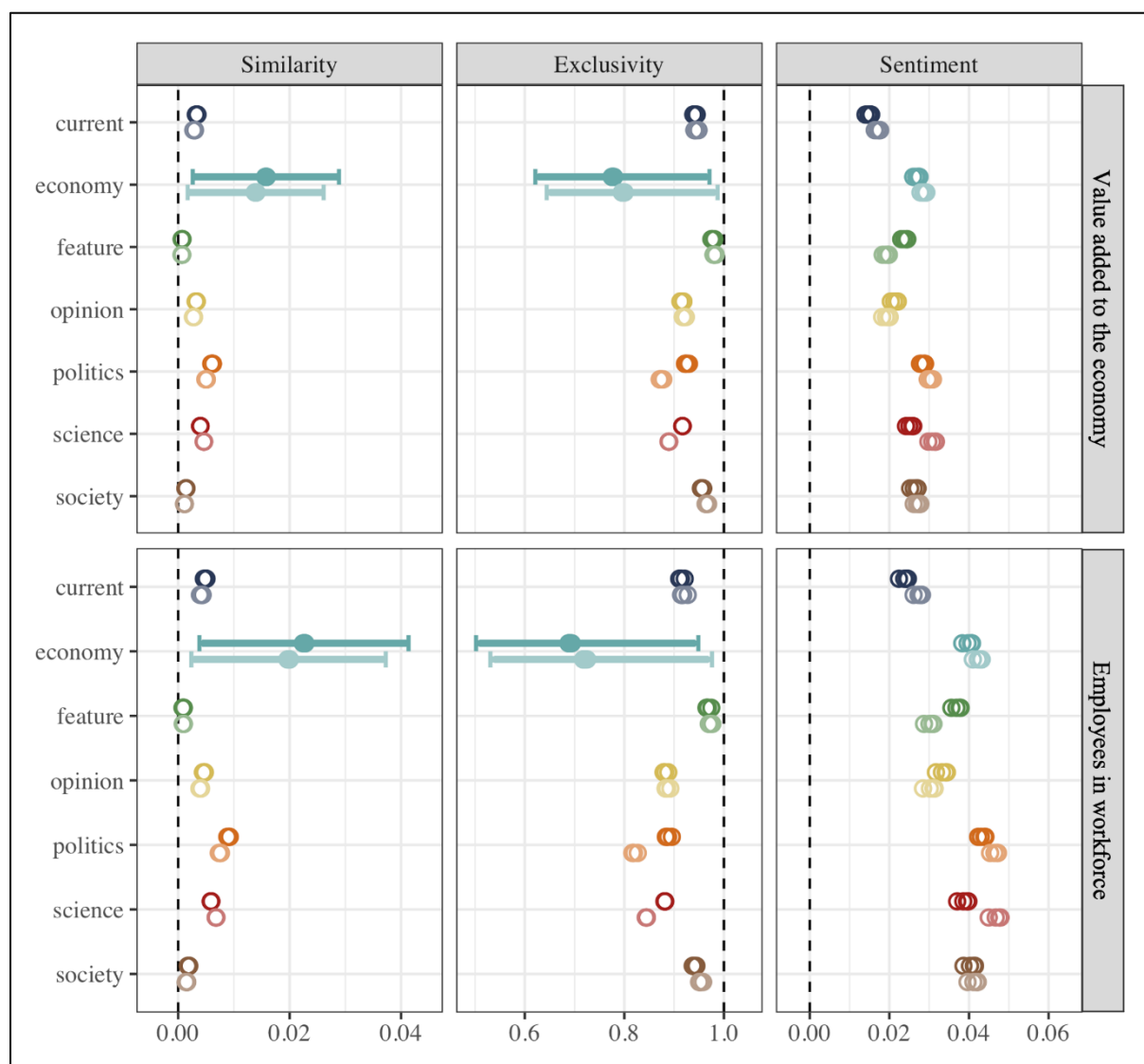
In conclusion, the perspectives of actors with greater economic weight were covered more closely and exclusively in the economy section, but not in other newspaper sections, and economic weight did not significantly affect journalists' evaluations of the reproduced materials. The consistently positive but less certain and robust effects of economic weight on similarity and exclusivity observed in the full and newspaper models thus likely reflect the distribution of climate change coverage across newspaper sections. Yet, this is not the case for the taz, which published roughly 55 percent of its climate change coverage in the economy section (compared to 48 percent in the FAZ, 45 percent in the Welt, 41 percent in the FR, and 39 percent in the SZ). The irrelevance of actors' economic weight for the reception of their perspectives in the taz thus points to an ideologically motivated difference in the weight attached to this factor, corroborating the pattern found in the descriptive analysis (see Figure 7.8) for the left-most newspaper in the corpus. While the effects of economic weight on similarity and exclusivity are similar across subsamples, journalistic sentiment does not follow

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<sup>48</sup> While coverage in the economy section evaluated press materials from actors with greater economic weight significantly more positively in the longer timeframes, the sentiment measure is not well suited to capture journalistic sentiment when newspaper articles do not directly reproduce actors' perspectives. Therefore, I refrain from interpreting these effects.

the same pattern. This divergence strengthens the descriptive finding that similarity and exclusivity, but not journalistic sentiment, may be determined by similar sets of agenda-building factors. With regard to the theoretical expectations, the findings confirm Hypothesis 1.3 only for the similarity and exclusivity of coverage in the economy section.

**Figure 7.18: The effect of economic weight on newspaper reception across sections**



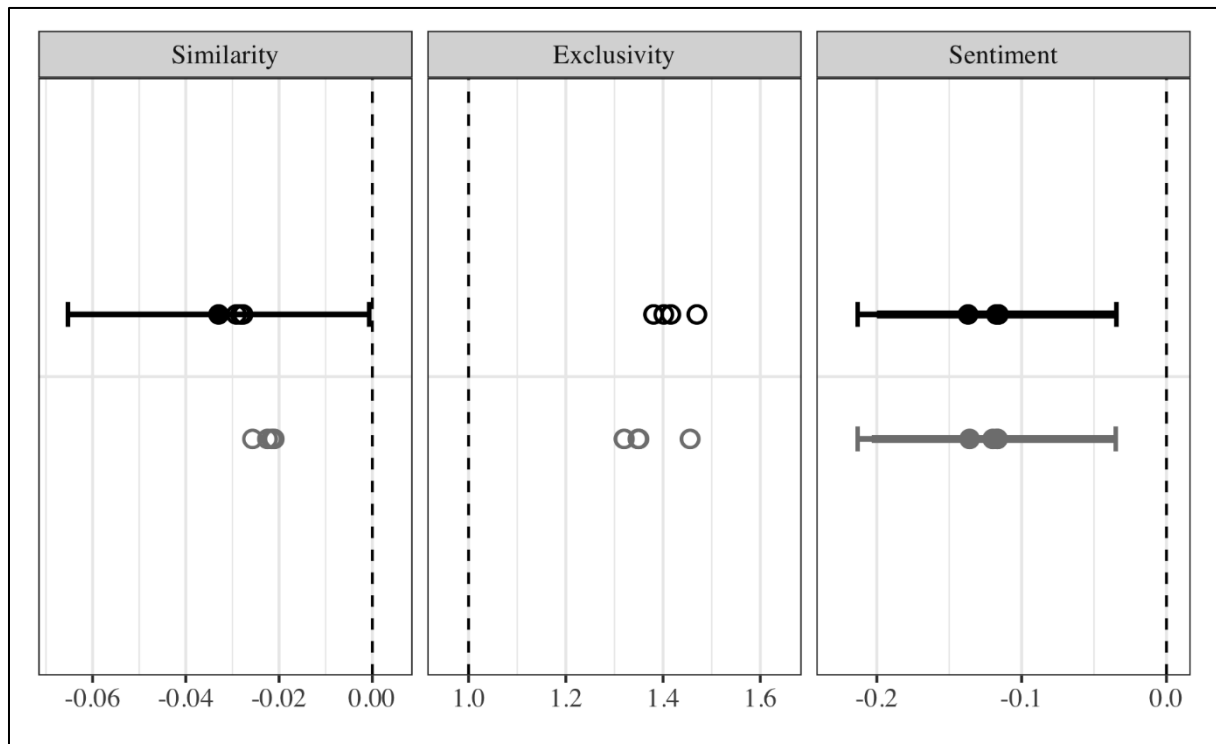
**Notes:** Depicted are the effects of economic weight on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper section. **Legend:** see Figure 7.15.

### *Scientific Expertise*

Although the press materials of actors with relevant scientific backgrounds evoke source cues pointing to the accuracy of the presented issue interpretation, scientific actors were not named

more frequently than other actors, except in newspapers' science sections. In fact, many other sections named scientific actors significantly less often than other actors. However, scientific actors' perspectives could be reproduced without an overt reference to their source, creating the impression that their interpretations reflect some kind of empirical truth, or at least the societal consensus on climate change (see Chapter 2.2). Figure 7.19 shows the effects of actors' scientific expertise on the reception of their press materials, controlling for the other agenda-building factors (see Appendix 23 for the full regression results). Contrary to the expectations, the results show that scientific actors' perspectives were evaluated around 3 percentage points more negatively, and may have been covered around 2.6 percentage points less closely than other actors' press materials, though the latter estimate is quite uncertain.<sup>49</sup>

**Figure 7.19: The effect of scientific expertise on newspaper reception**



**Notes:** Depicted are the effects of scientific expertise on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment). The reference category are actors without scientific qualifications. **Legend:** see Figure 7.13.

<sup>49</sup> Only 2 out of 16 estimates for similarity are statistically significant at the 95 percent confidence level and 7 out of 16 estimates are statistically significant at the 90 percent confidence level across the two versions of the corpus.

Given that scientific expertise was measured as the presence or absence of relevant scientific qualifications and thus cannot capture different degrees of expertise, these results support several substantive interpretations. First, scientific expertise may actually lower actors' visibility, the exclusivity of received coverage, and the associated journalistic sentiment for unknown reasons. Second, the observed effects may capture an advantage of civil society and political actors over scientific actors, as suggested by the descriptive analyses, rather than a genuine disadvantage for actors with greater scientific expertise. Since the depicted models control for other agenda-building factors such as executive authority and issue ownership, the observed differences could arise, for instance, because scientific actors' press materials require more editing to make them accessible to larger audiences, and neutral scientific language is dramatized in newspaper articles. However, without a continuous measure that would allow me to estimate the effect of different degrees of scientific expertise for actors from the scientific domain, neither interpretation can be empirically verified.

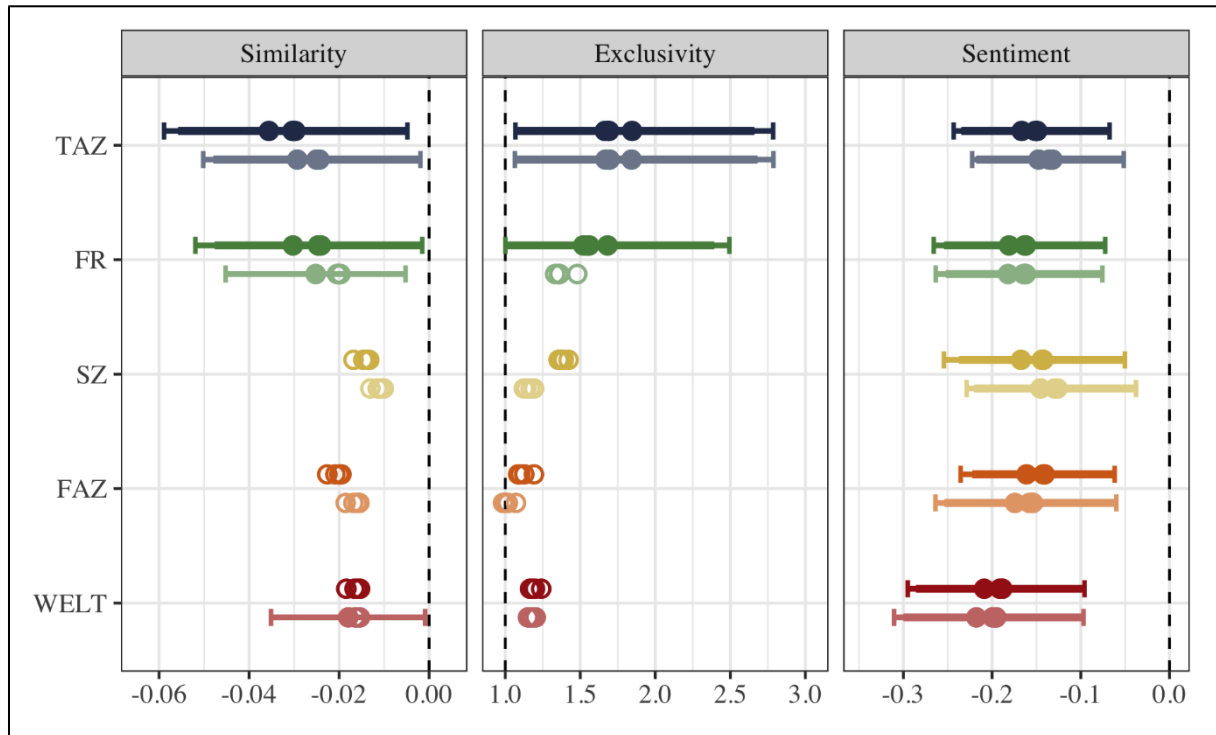
The descriptive findings show that left-leaning newspapers covered scientific actors' perspectives relatively more closely than their right-leaning counterparts, though not necessarily more closely than the press materials of civil society and political actors. To test whether scientific expertise was relatively more important for coverage in the taz, the FR, and the SZ, Figure 7.20 depicts the effect of scientific expertise on similarity, exclusivity, and journalistic sentiment separately for each newspaper (see Appendix 24 for the full regression results). The results offer no indication that press materials from actors with relevant scientific qualifications were covered more closely, exclusively, or positively in left-leaning newspapers. If anything, left-leaning newspapers reproduced scientific actors' issue interpretations less closely and exclusively than their more right-leaning counterparts. The direction of the estimates for all indicators is consistent with the full models across newspapers, offering tentative evidence that scientific actors' press materials were covered less closely in the taz, the FR, and the Welt (average coefficients: -0.03; -0.02; -0.02),<sup>50</sup> and evaluated more negatively in all newspapers (average coefficients: -0.15 for the taz; -0.17 for the FR; -0.14 for the SZ; -0.15 for the FAZ; and -0.20 for the Welt). The taz and tendentially the FR also covered scientific actors' perspectives around 72 and 48 percent less exclusively than other actors' materials. Since scientific expertise only increased actors' visibility in the science section, the inconsistent

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<sup>50</sup> All estimates for similarity in the FR and 10 out of 16 estimates for the Welt are statistically significant at either the 95 or the 90 percent confidence level.

patterns for the similarity and exclusivity indicators may point to differences in the share of climate change articles published in the different newspaper sections.

**Figure 7.20: The effect of scientific expertise on newspaper reception across newspapers**



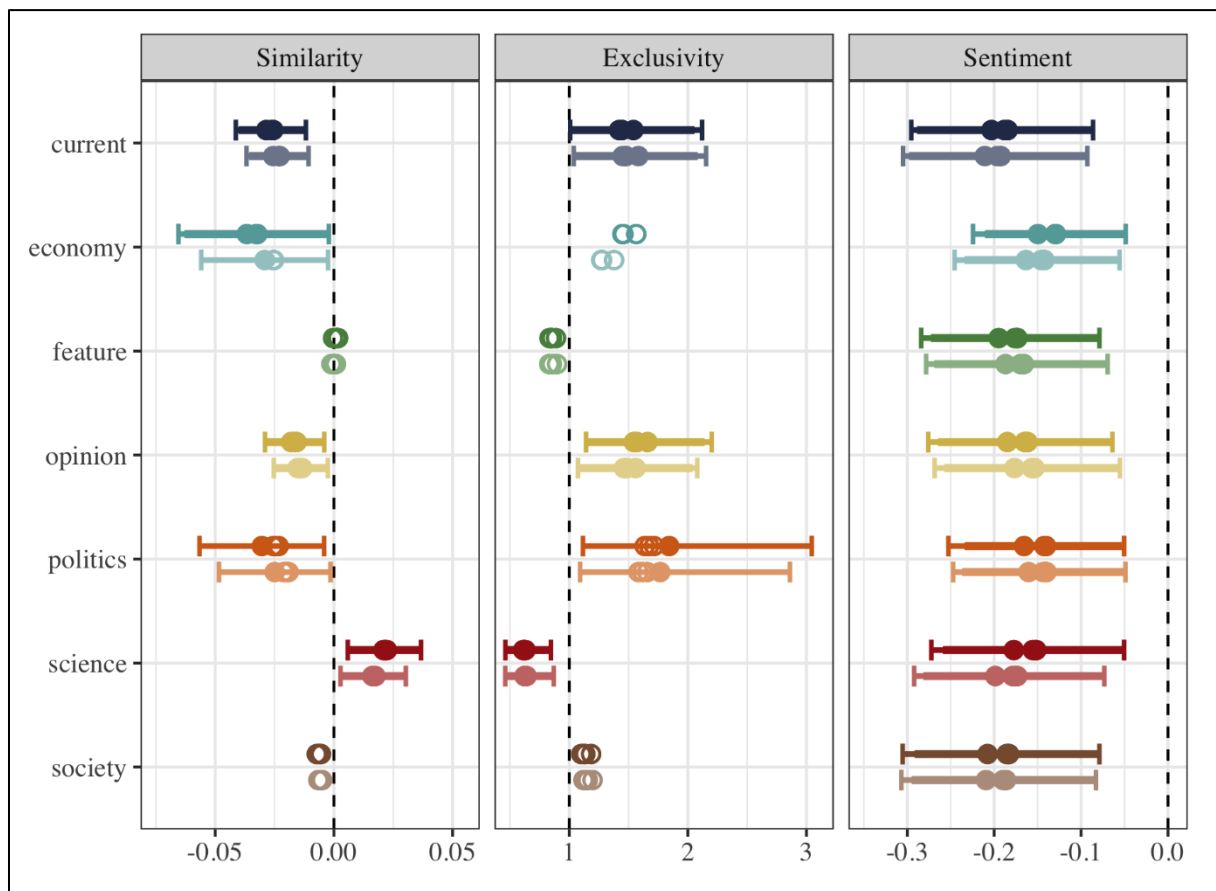
Notes: Depicted are the effects of scientific expertise on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper. The reference category are actors without scientific qualifications. **Legend:** see Figure 7.14.

To test this possibility, Figure 7.21 shows the effects of actors' scientific expertise on the reception of their press materials in individual newspaper sections (see Appendix 25 for the full regression results). In line with the findings from the visibility analyses, the science section covered the perspectives of actors with scientific expertise around two percentage points more closely and around 38 percent more exclusively than other actors' perspectives, whereas the opposite pattern can be observed for the current, economy, opinion, and politics sections.<sup>51</sup> Hence, differences in the shares of climate change articles published in individual newspaper sections can account for the uncertain and inconsistent effects in the full model and the

<sup>51</sup> Average coefficients for similarity: -0.02 for the opinion and politics sections, -0.03 for the current and economy sections; average IRRs for exclusivity: 1.48 for the current section, 1.54 for the opinion section, and 1.68 for the politics section.

newspaper models. Yet, all newspaper sections, including the science section, evaluated scientific actors' perspectives between 3.5 (economy section) and 4.9 percentage points (current section) more negatively than other actors' issue interpretations, strengthening the findings that the agenda-building factors influence journalistic sentiment differently than the similarity and exclusivity of the received coverage, and that the effect of individual factors on the sentiment indicator is the same irrespective of the considered subsample.

**Figure 7.21: The effect of scientific expertise on newspaper reception across sections**



**Notes:** Depicted are the effects of scientific expertise on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper section. The reference category are actors without scientific qualifications. **Legend:** see Figure 7.15.

Overall, scientific actors' perspectives tended to be covered less closely, exclusively, and positively than other actors' press materials, contradicting Hypothesis 1.4. The exception is the science section, which reproduced scientific actors' issue interpretations more closely and exclusively, though still more negatively than other actors' perspectives. In contrast, the current, economy, opinion, and politics sections covered scientific actors' materials less closely



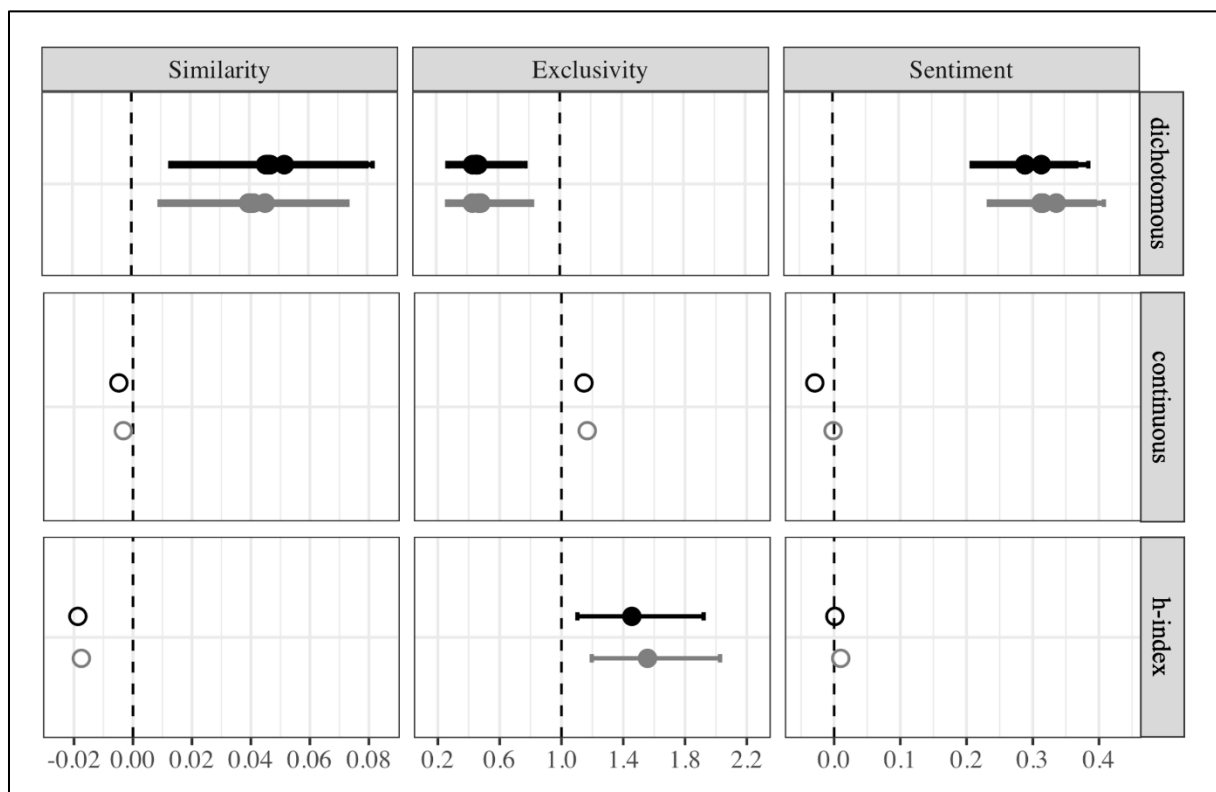
and, except for the economy section, less exclusively. The relatively uncertain and at times inconsistent effects of scientific expertise on similarity and exclusivity in the full and newspaper models can thus be explained by the different shares of climate change coverage across newspaper sections. Without a continuous measure of actors' scientific expertise, it is impossible to distinguish whether this factor had a genuine negative influence on the reception of actors' press materials in most newspaper sections, or captures other differences between scientific and other actors, such as writing styles. Contrary to the descriptive findings, the regression results offer no indication that scientific expertise was valued more in left- than in right-leaning newspapers. However, the consistently negative effect of scientific expertise on the journalistic evaluations of actors' perspectives reconfirms that the agenda-building factors affect this indicator differently than similarity and exclusivity, and that their influence is the same across different newspapers and newspaper sections.

### ***Issue Ownership***

Like scientific expertise, issue ownership offers source cues regarding the accuracy and possibly the relevance of actors' press materials. In consequence, the perspectives of actors who own the issue of climate change should be covered more closely, exclusively, and positively than the issue interpretations of non-owners. The visibility analyses show that issue owners from the politics, civil society, and science domains tended to have an advantage over non-owners from the same domains. Yet, issue owners from the business domain were less visible than non-owners, suggesting that their degree of specialization may not accurately capture issue ownership for business actors. To understand how actors' issue ownership affected the reception of their materials in newspaper articles on climate change, Figure 7.22 depicts the effects of the dichotomous issue ownership indicator and the two continuous issue ownership indicators on the similarity, exclusivity, and journalistic sentiment of the received coverage (see Appendix 23 for the full regression results). To reiterate, the dichotomous indicator varies for political and business actors but counts all civil society and scientific actors as issue owners, whereas the continuous indicators could only be collected for civil society and scientific actors. Given the small number of actors for whom the latter indicators are available ( $N = 16$  for continuous issue ownership;  $N = 13$  for continuous issue ownership based on the h-index), the corresponding estimates are based on bivariate regression models and need to be interpreted with caution.

In line with the expectations, the results show that press materials from (dichotomous) issue owners were covered around four percentage points more closely, around 54 percent more exclusively, and around 7.7 percentage points more positively than the issue interpretations of non-owners. Surprisingly, the positive influence on similarity and journalistic sentiment holds for business actors, whose perspectives were covered around 9 percentage points more closely ( $p < 0.06$ ) and around 7.5 percentage points more positively ( $p < 0.001$ ) if they specialized in climate change solutions (see Appendix 28.1). Hence, non-specialized business actors were more visible than their specialized counterparts, but visible specialized business actors received more similar and positive, though equally exclusive coverage as visible non-specialized business actors. These findings match the descriptive finding that issue ownership could be an important predictor for the reception of business actors' perspectives in climate change coverage, especially outside the economy section (see *Business Actors* in Chapter 7.1).

**Figure 7.22: The effect of issue ownership on newspaper reception**



**Notes:** Depicted are the effects of dichotomous and continuous issue ownership on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment). The reference category are non-issue owners.

**Legend:** Estimates for the dichotomous indicator are based on the full model; estimates for the two continuous indicators are based on bivariate models. N for all models is 3,472 for the first continuous indicator and 3,166 for the second continuous indicator (h-index). For further specifications, see Figure 7.13.

In contrast, continuous issue owners from the civil society and scientific domains did not have an advantage over non-owners, and their perspectives were even covered around 51 percent less exclusively than the press materials of non-owners according to the bivariate models measuring scientific actors' continuous issue ownership based on their h-index. While these effects may reflect the influence of other agenda-building factors, which could not be controlled in the bivariate models, continuous issue ownership had a positive and often statistically significant effect on actors' visibility in climate change coverage (see Figure 6.25). In short, there is no evidence to support the notion that higher degrees of issue ownership over climate change improved the reception of civil society and scientific actors' issue interpretations in the media. Hence, the higher similarity and exclusivity, and the better journalistic evaluations associated with civil society actors' press materials in the descriptive analyses seem to reflect the influence of their challenger status or prominence rather than their issue ownership (see *Civil Society Actors* in Chapter 7.1).

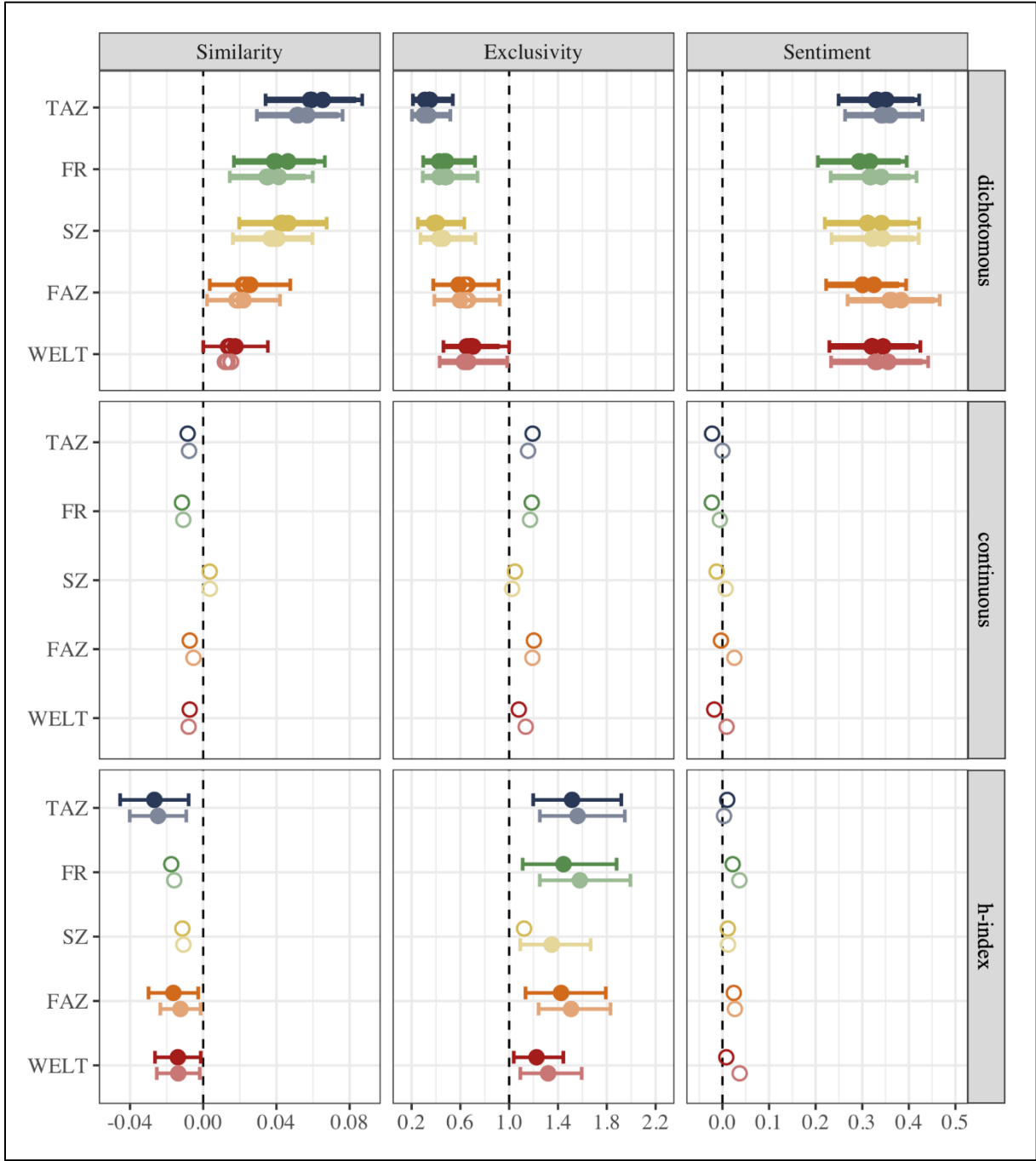
The patterns for the individual newspapers depicted in Figure 7.23 largely match the effects found in the full models, as dichotomous issue ownership generally increased the similarity between actors' press materials and newspaper articles as well as the exclusivity of the received coverage, and improved the associated journalistic evaluations (see Appendix 24 for the full regression results). The increases in similarity ranged between 5.7 percentage points in the taz and 2.1 percentage points in the FAZ (average coefficients: 0.04 for the FR and the SZ).<sup>52</sup> Similarly, the perspectives of issue owners were covered between 67 percent (taz) and 33 percent (Welt) more exclusively across newspapers (average IRRs: 0.46 for the FR; 0.42 for the SZ; and 0.63 for the FAZ). Although the differences between the estimates are not statistically significant, issue ownership was tendentially more important for the similarity and exclusivity of the coverage in left- than in right-leaning newspapers. This tendency cannot be observed for the journalistic sentiment associated with actors' press materials,<sup>53</sup> lending further support to the finding that journalists' evaluations are predicted by the same set of agenda-building factors across the considered subsamples, whereas the importance of individual factors for similarity and exclusivity varies largely parallelly across newspapers and newspaper sections.

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<sup>52</sup> For the Welt, only four out of 16 estimates were statistically significant at the 90 percent confidence level. I therefore do not substantively interpret this effect.

<sup>53</sup> Average coefficients: 0.34 for the taz and the FAZ; 0.33 for the Welt; 0.32 for the SZ; and 0.31 for the FR.

Figure 7.23: The effect of issue ownership on newspaper reception across newspapers



**Notes:** Depicted are the effects of dichotomous and continuous issue ownership on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper. The reference category are non-issue owners. **Legend:** Estimates for the dichotomous indicator are based on the full model; estimates for the two continuous indicators are based on bivariate models. N for the TAZ, FR, SZ, and FAZ models is 3,472 and N for the Welt models is 3,043 for the first continuous indicator; N for the TAZ, FR, SZ, and FAZ models is 3,166 and N for the Welt models is 2,771 for the second continuous indicator (h-index). For further specifications, see Figure 7.14.

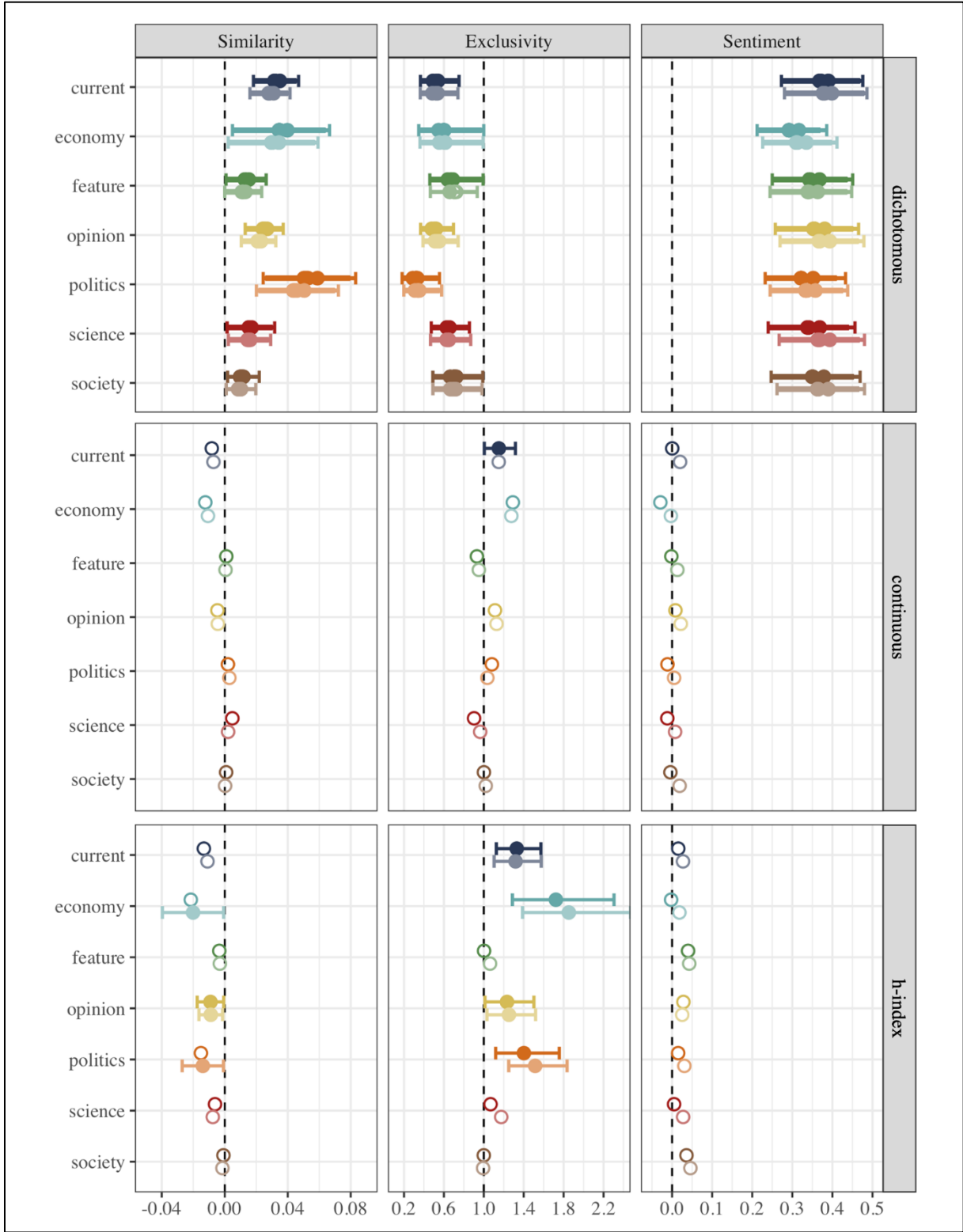
While continuous issue ownership did not generally affect the similarity, exclusivity, and journalistic evaluation of actors' press materials, the significant effects for the indicator based on actors' h-index suggest that actors with higher degrees of issue ownership were at a disadvantage compared to actors with lower issue ownership. Specifically, the results indicate that press materials from actors with higher issue ownership according to their h-index were covered between 2.6 (taz) and 1.4 percentage points (FAZ and Welt) less closely and between 54 (taz) and 24 percent ( $c_2$ -models for the SZ) less exclusively (average IRRs: 1.51 in the FR, 1.47 in the FAZ, and 1.27 in the Welt). The direction of the point estimates for the effects of issue ownership (h-index) on the similarity and the exclusivity of the received coverage is largely consistent across the three timeframes (see Appendices 26.2 and 27.2). Hence, the results for the individual newspapers further disconfirm the expectation that higher continuous issue ownership increases actors' influence over the media agenda (cf. Hypothesis 2.2).

The visibility analyses indicate that (dichotomous) issue ownership was particularly important for actors' visibility in the current and science sections and generally increased the number of articles naming an actor except in the politics section (see Figure 6.28). The effects of dichotomous issue ownership on the reception of actors' press materials depicted in Figure 7.24 tell a different story, as the perspectives of visible issue owners tended to be covered most closely (average coefficient 0.05) and exclusively (average IRR: 0.32) in the politics section (see Appendix 25 for the full regression results). This advantage does not extend to the journalistic evaluation of issue owners' perspectives, which oscillated between 7.7 (economy section) and 9.5 percentage points (current section), mirroring the effects found in the full and newspaper models. Although issue owners' press materials were evaluated relatively more positively in the current section than in other sections, the point estimates<sup>54</sup> offer no indication that issue ownership was more important in the current or science sections. Still, press materials from issue owners were covered more closely, exclusively, and positively than the perspectives of non-owners in all newspaper sections, adding to the evidence that (dichotomous) issue owners were better able to build the media agenda.

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<sup>54</sup> Average coefficients for similarity: 0.05 for the politics section, 0.03 for the current and economy sections, 0.02 for the opinion and science sections, and 0.01 for the feature and society sections; average IRRs for exclusivity: 0.33 for the politics section, 0.52 for the current and opinion sections, 0.59 for the economy section, 0.64 for the science section, 0.68 for the feature section, and 0.70 for the society section; average coefficients for sentiment: 0.38 for the current section, 0.37 for the opinion section, 0.36 for the society and science sections, 0.35 for the feature section, 0.33 for the politics section, and 0.31 for the economy section.

Figure 7.24: The effect of issue ownership on newspaper reception across sections



**Notes:** Depicted are the effects of dichotomous and continuous issue ownership on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper section. The reference category are non-issue owners. **Legend:** Estimates for the dichotomous indicator are based on the full model; estimates for the two continuous indicators are based on bivariate models. N for all models is > 3,378 for the first continuous indicator and > 3,082 for the second continuous indicator (h-index). For further specifications, see Figure 7.15.

The influence of the continuous issue ownership indicators based on scientific actors' publications and citations remains largely insignificant, but almost all significant effects in the depicted 30-day frame as well as in the longer timeframes (see Appendices 26.3 and 27.3) suggest that the press materials of civil society actors with more members and incoming donations, and scientific actors with more publications and citations, respectively with higher h-indices, were covered less closely and exclusively than the perspectives of actors with lower degrees of issue ownership.<sup>55</sup> In light of the very small number of macros level units in these models and the missing controls for the other agenda-building factors, these effects should not be overinterpreted. However, the findings tendentially weaken rather than strengthen the expectation that actors with higher degrees of issue ownership should be better able to push their perspectives onto the media agenda (cf. Hypothesis 2.2).

In summary, the findings for the dichotomous issue ownership indicator confirm the expectation that issue owners' press materials should be covered more closely, exclusively, and positively irrespective of the considered subsample (Hypothesis 2.2). Despite the opposite effect observed for visibility, this advantage extends to the business domain for similarity and journalistic sentiment, challenging the conclusion that specialized business actors are not perceived as issue owners. The respective domain models controlled for the other agenda-building factors and the effect of issue ownership in the business domain is independent of the estimates for actors from other domains. Hence, the opposite effects of issue ownership on business actors' visibility and the reception of their press materials point to another difference between specialized and non-specialized business actors, which is not considered in the theoretical discussion and therefore not controlled in the regression models.

Although issue owners had an advantage over non-owners in all newspapers, their perspectives tended to be covered somewhat more closely and exclusively in left- than in right-leaning newspapers. Similarly, the perspectives of visible issue owners tended to be reproduced more closely and exclusively in the politics section than in other newspaper sections, although issue owners were mentioned less frequently in this section. Since the latter finding is presumed to reflect an inherent advantage for political actors that the similarity analyses control for, the markedly positive influence of dichotomous issue ownership in the politics section corroborates the interpretation of the results from the visibility analyses. In line with the results for economic

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<sup>55</sup> The exception is the positive significant effect of the first continuous issue ownership indicator on the similarity between actors' perspectives and coverage in the politics section in the entire legislative period.

weight and scientific expertise, the effects of the dichotomous issue ownership indicator on similarity and exclusivity exhibit matching patterns, whereas the impact on journalistic sentiment follows another pattern that is consistent across subsamples.

In contrast, the results for the two continuous issue ownership indicators were largely inconsistent, but almost all significant effects suggest that actors with higher degrees of issue ownership were at a disadvantage compared to actors with lower degrees of issue ownership. While these findings are based on bivariate models with very small numbers of macro units ( $N = 16/13$ ) and tend to be uncertain and inconsistent across the two indicators, the observed tendency does not support the expectation that actors with higher issue ownership should be better able to build the media agenda than actors with lower issue ownership. Considering that individual agenda-building factors influenced actors' visibility and the reception of their press materials differently, the finding that continuous issue ownership tended to increase actors' visibility in climate change coverage does not preclude the possibility that the tendentially negative influence on the reception of actors' press materials reflects missing controls for other agenda-building factors. Hence, further research is needed to understand the influence of different degrees of issue ownership on actors' ability to build the media agenda.

### *Prominence*

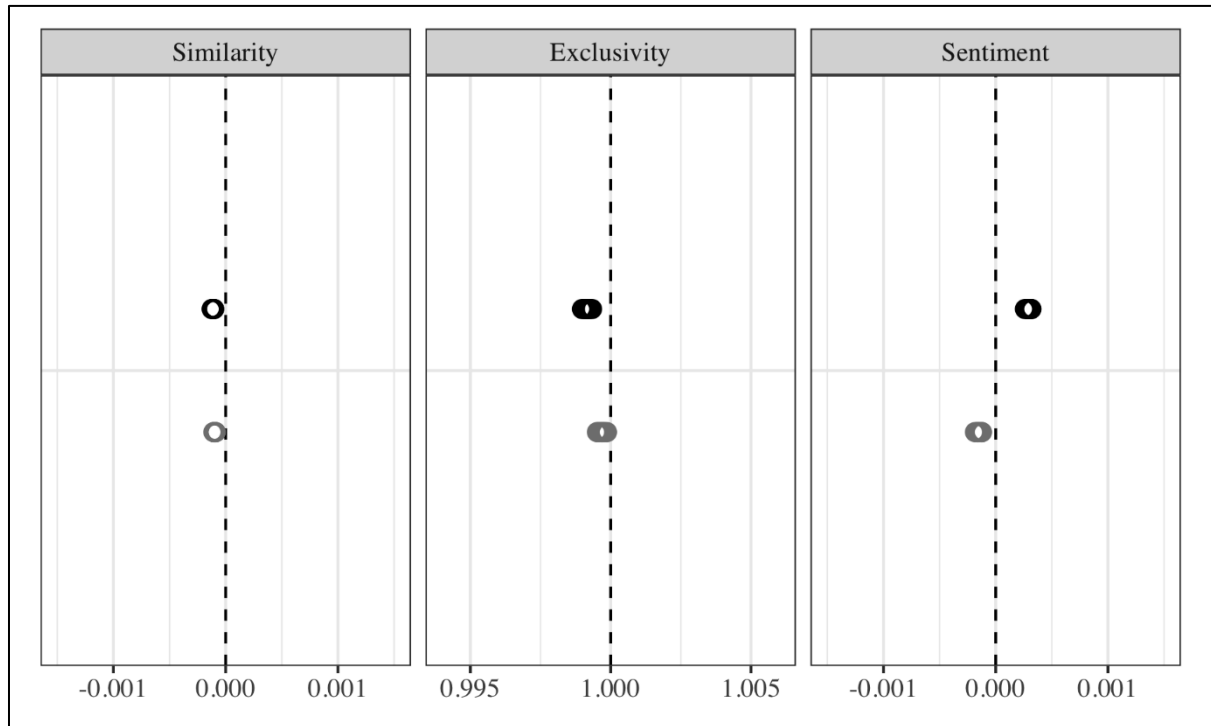
Actors' prominence was the most decisive factor for their visibility in climate change coverage across newspapers and newspaper sections. To investigate whether prominence also influenced the reception of actors' press materials, Figure 7.25 shows the effects of prominence on the similarity and exclusivity of the received coverage, as well as the associated journalistic sentiment, controlling for the other agenda-building factors (see Appendix 23 for the full regression results). Contrary to the expectations, the results show that actors' prominence affected neither the similarity between their issue interpretations and newspaper articles, nor the exclusivity of the coverage, or journalists' evaluations of the supplied materials. Moreover, the insignificant effects in the full models do not conceal differences in the effects across newspapers (see Appendix 24) or newspaper sections (see Appendix 25).

Hence, the findings indicate that actors' prominence was decisive for their visibility in newspaper articles on climate change, but not for the reception of visible actors' issue interpretations in the media. In other words, prominence allowed actors to attract media attention for their perspectives but did not give them greater control over the closeness,



exclusivity, or evaluation of their materials in climate change coverage. Since prominence cannot account for the descriptive differences between activist and organizational civil society actors, these findings strengthen the notion that activists' challenger status or their issue ownership were decisive for the reception of their press materials in newspaper articles on climate change (see *Civil Society Actors* in Chapter 7.1).

**Figure 7.25: The effect of prominence on newspaper reception**



**Notes:** Depicted are the effects of prominence on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment). **Legend:** see Figure 7.13.

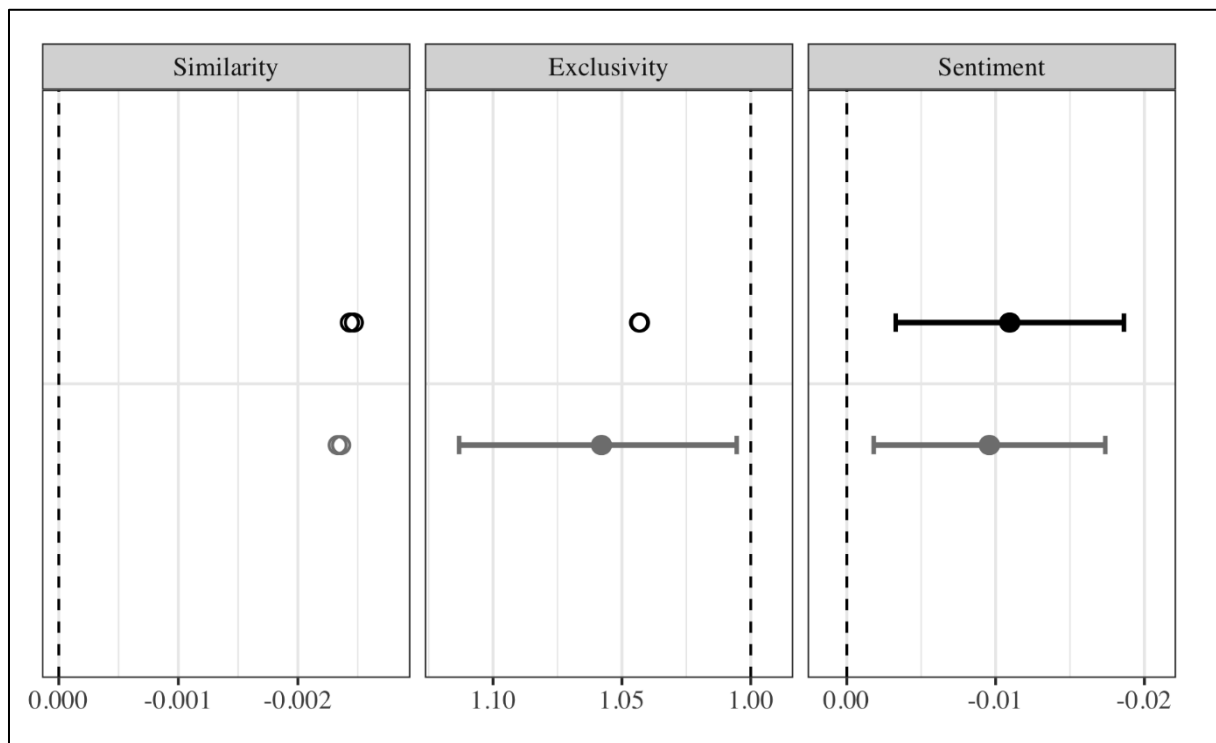
### *Novelty*

Contrary to the expectations, actors' establishment rather than their novelty tended to increase their visibility in newspaper articles on climate change, although the advantage for established actors decreased over time and was even reversed in the most recent legislative period, for which actors' press materials were collected. The exceptions were the business domain and the politics section, where newer actors were more visible than established actors. Figure 7.26 depicts the effects of actors' novelty on the similarity, exclusivity, and journalistic sentiment associated with their issue interpretations, controlling for the other agenda-building factors (see

Appendix 23 for the full regression results). As for the visibility analyses, the x-axis for the figures in this section is reversed to match the direction of the other factors.

The results indicate that novelty was irrelevant for the similarity between actors' press materials and newspaper articles. Yet, newer actors' perspectives were covered around five percent more exclusively ( $p < 0.1$  for the lemmatized version of the corpus) and evaluated around 0.5 percentage points more positively than the issue interpretations of more established actors. Although the effect on exclusivity is not consistent across the different versions of the corpus, these findings tentatively support the expectation that novelty increased actors' ability to build the media agenda (Hypothesis 2.4), and thus match the conclusion from the visibility analyses that newer actors had an advantage over more established actors in the most recent legislative period. In addition, the effects are in line with the notion that contentual factors could be more relevant for the reception of actors' materials than for their visibility (see the comparison between the relative importance of individual agenda-building factors at the end of Chapter 7.2).

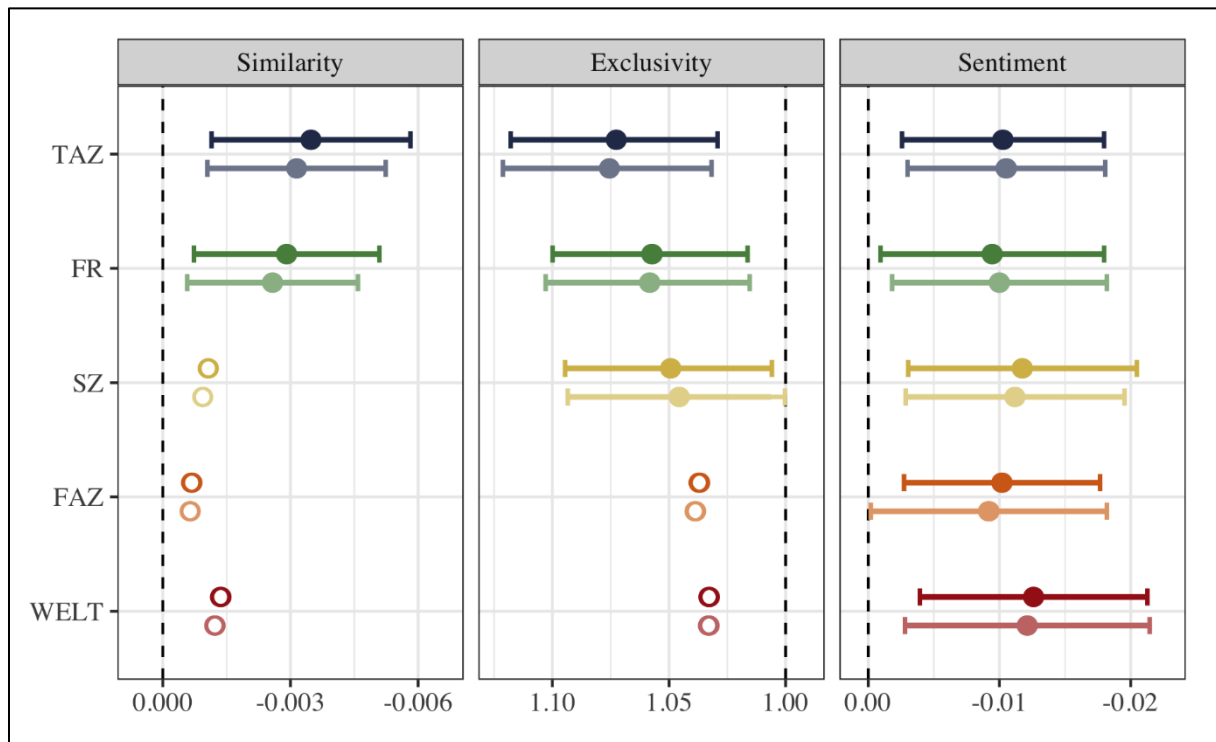
**Figure 7.26: The effect of novelty on newspaper reception**



**Notes:** Depicted are the effects of novelty on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment). **Legend:** see Figure 7.13.

Looking at the effects of novelty on the reception of actors' press materials in individual newspapers depicted in Figure 7.27, we see that the taz and the FR reproduced newer actors' perspectives around 0.3 percentage points more closely than the issue interpretations of their more established counterparts. The taz, the FR, and the SZ also covered newer actors' materials between 4.7 and 7.4 percent more exclusively, and all newspapers evaluated them around 0.3 percentage points more positively (see Appendix 24 for the full regression results). The null effects for similarity and the inconsistent positive effects for exclusivity in the full model thus conceal that newer actors tended to have an advantage in more left-leaning newspapers. The results for the individual newspapers qualify the tentative support for Hypothesis 2.4 from the full model insofar as novelty only increased the similarity and exclusivity of coverage in left-leaning newspapers. On the other hand, even right-leaning newspapers evaluated newer actors' perspectives more positively than established actors' issue interpretations.

**Figure 7.27: The effect of novelty on newspaper reception across newspapers**

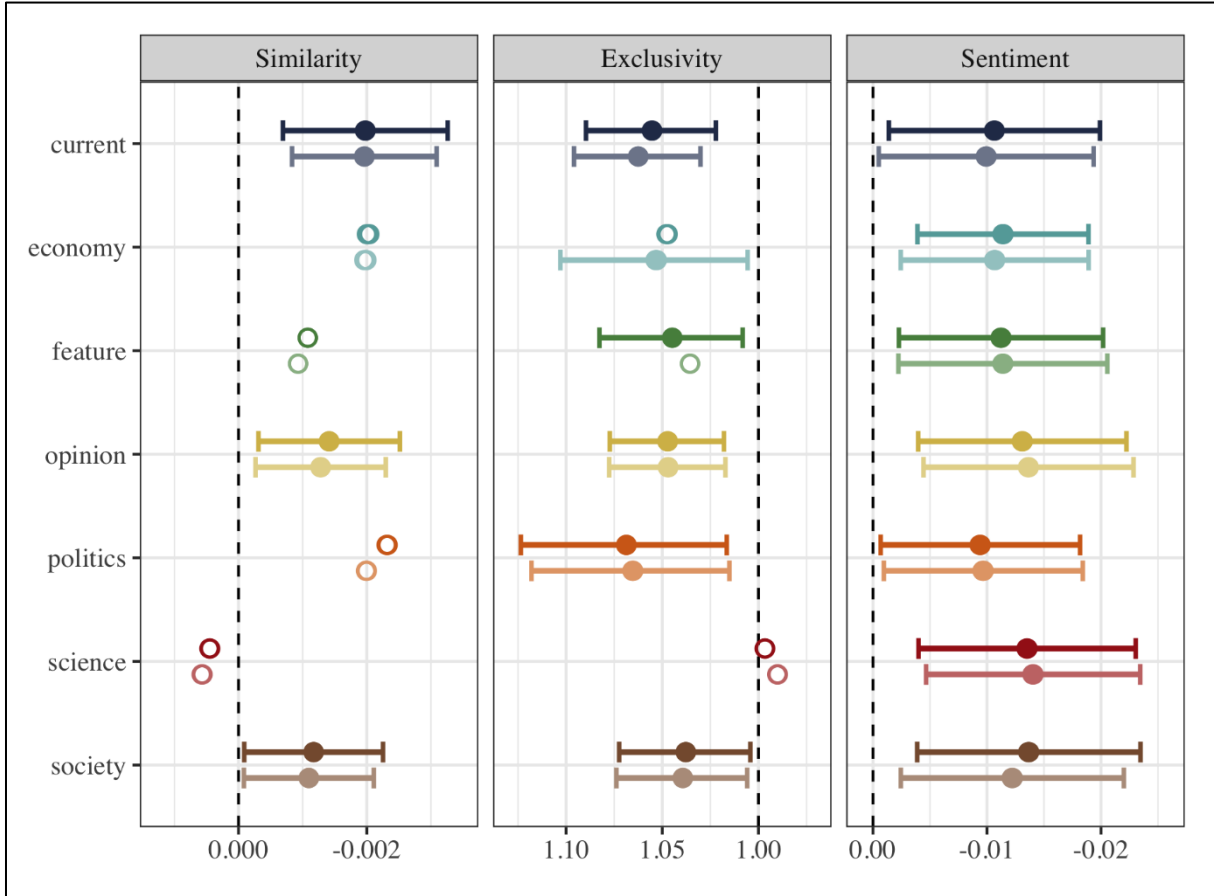


**Notes:** Depicted are the effects of novelty on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper. **Legend:** see Figure 7.14.

The findings from the visibility analyses indicate that newer actors were mentioned at higher rates in the politics section as well as the current section in later legislative periods, whereas

other sections named established actors more frequently (see Figure 6.36). Figure 7.28 shows the effect of novelty for the different newspaper sections (see Appendix 25 for the full regression results), confirming that the perspectives of newer actors were covered around 0.2 percentage points more closely, 5.9 percent more exclusively, and 0.3 percentage points more positively in the current section. Newer actors also tended to have an advantage over their established counterparts in the opinion and society sections, where their issue interpretations were covered around 0.1 percentage points more closely, between 3.9 and 4.7 percent more exclusively, and 0.3 percentage points more positively.

Figure 7.28: The effect of novelty on newspaper reception across sections



**Notes:** Depicted are the effects of novelty on the similarity between actors’ press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper section. **Legend:** see Figure 7.15.

The effects for the politics section are somewhat more ambiguous, since newer actors’ press materials tended to be covered most exclusively (average IRR: 1.07) and were evaluated around 0.2 percentage points more positively, but the effects on similarity are only statistically significant at the 90 percent confidence level (average coefficient: 0.002). Similarly, the

economy and feature sections tended to cover newer actors' issue interpretations more exclusively (average IRRs: 1.05; 1.04), although these effects are not consistently significant at the 95 percent confidence level ( $p < 0.06$  for the  $c_1$ -models for the economy section and  $p < 0.07$  for the  $c_2$ -models for the feature section). Nonetheless, the results suggest that newer actors' perspectives received more exclusive coverage in all newspaper sections except the science section. In line with the findings from the full and newspaper models, journalists from all sections evaluated newer actors' issue interpretations more positively than established actors' perspectives (average coefficient: -0.01 for all sections). Overall, the findings for the individual newspaper sections suggest that newer actors generally had an advantage over their established counterparts, although this advantage did not extend to exclusivity in the science section, and to similarity in the economy, feature, and science sections.

Contrary to the findings from the visibility analysis, the results show that novelty tended to influence the reception of actors' press materials in newspaper articles on climate change positively and thus tentatively support Hypothesis 2.4. Specifically, newer actors' perspectives were evaluated more positively than press materials from more established actors, irrespective of the considered subsample, and covered more closely and exclusively in the left-leaning newspapers taz and FR. The advantage for newer actors in the taz is also reflected in the effects for the current and opinion sections, collected exclusively for the taz, and the society section, where 61 percent of the collected articles were published in the taz. Although novelty did not influence the exclusivity of the received coverage in the FAZ and the Welt, newer actors' perspectives tended to be covered more exclusively in all newspaper sections except the science section. Taken together, these findings strongly support Hypothesis 2.4 for journalistic sentiment and offer more tentative evidence that novelty increased the exclusivity and the similarity of the received coverage. The pattern for journalistic sentiment is once again consistent across subsamples, but there are distinct differences in the effects of novelty on similarity and exclusivity for the full and newspaper section models, suggesting that this factor accounts for some of the differences between the patterns for similarity and exclusivity observed in the descriptive analysis.

### ***Mainstream or Challenger Status***

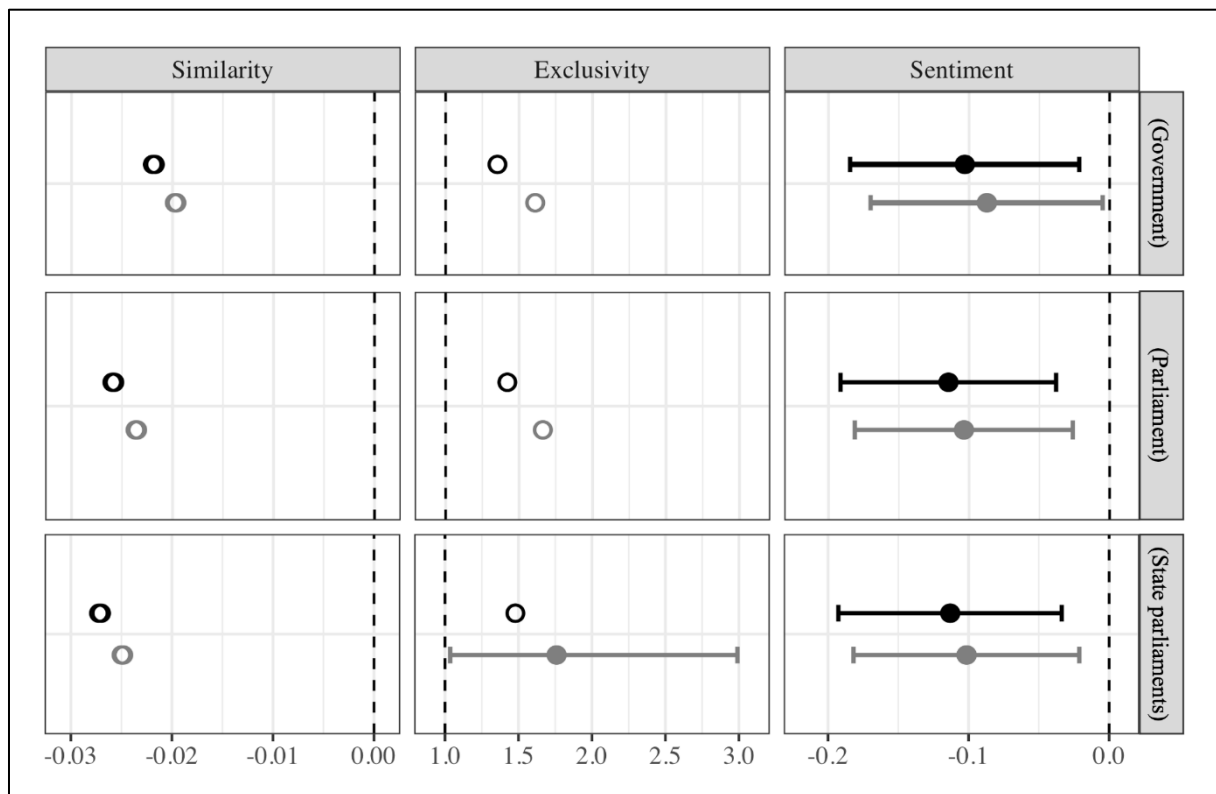
Since actors' mainstream or challenger status is linked to the expected consonance, respectively the controversy and surprise, of their press materials and thus to the content of their

perspectives, this factor could be especially important for the reception of actors' press materials. While the results from the visibility analyses indicate that mainstream actors generally had an advantage over challenger actors, this advantage disappears in more recent legislative periods. The descriptive findings suggest that challenger actors' issue interpretations were evaluated more positively than mainstream actors' perspectives and that the press materials of challengers from the civil society domain were covered more closely, exclusively, and positively than organizational actors' perspectives (see *Civil Society Actors* in Chapter 7.1). Figure 7.29 depicts the effects of actors' mainstream status on the similarity between their press materials and newspaper articles, the exclusivity of the received coverage, and the journalistic sentiment associated with their perspectives, controlling for the other agenda-building factors (see Appendix 23 for the full regression results). The three indicators only vary for political actors, whose mainstream status is alternatively measured based on their inclusion in the government, the national parliament, or state parliaments. Since business actors should have incentives to promote consonant issue interpretations, they are invariably coded as mainstream actors. Hence, business actors' positions on the challenger-mainstream continuum capture the discounted length of their establishment.

In line with the descriptive findings, the results indicate that challenger actors' press materials were evaluated between 2.4 (Government) and 2.7 (Parliament) percentage points more positively than mainstream actors' perspectives. However, actors' mainstream or challenger status did not significantly affect the similarity of the coverage for their issue interpretations and influenced exclusivity only according to the non-lemmatized version of the corpus. The corresponding estimates indicate that challenger actors' perspectives were covered between 61 and 76 percent more exclusively than mainstream actors' angles, but the effects of the government and parliament indicators are only statistically significant at the 90 percent confidence level. Since the descriptive results suggest that their challenger status may have been especially relevant for actors from the civil society domain, I additionally estimated the domain-specific effects of the mainstream-challenger indicator on the reception of actors' press materials in newspaper coverage (see Appendix 28). The results largely match the pattern observed in the full model and offer no consistent evidence that civil society actors' challenger status influenced the similarity or the exclusivity of the received coverage. Considering that actors' prominence did not affect the reception of their press materials in the media and that the advantage for (dichotomous) issue owners cannot account for the observed difference between activist and organizational civil society actors, because both actor groups are considered issue

owners, the discussed agenda-building factors cannot conclusively explain the observed descriptive pattern. Like the negative effects of issue ownership on business actors' visibility, these findings could thus point to differences between activist and organizational civil society actors which are not captured by the discussed agenda-building factors.

**Figure 7.29: The effect of mainstream status on newspaper reception**



**Notes:** Depicted are the effects of actors' mainstream status on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment). **Legend:** see Figure 7.13.

However, the insignificant effects in the full models may conceal diverging effects of actors' positions on the mainstream-challenger continuum for different newspapers. The corresponding results in Figure 7.30 confirm the positive influence of actors' challenger status on the evaluation of their perspective but also point to challenger actors' press materials being covered around three percentage points more closely, and between 70 and 84 percent more exclusively, in the more left-leaning newspapers taz and FR (see Appendix 24 for the full regression results). This pattern is consistent across the alternative mainstream-challenger measures and mirrors the effects observed for actors' novelty, raising the question whether the effects of the

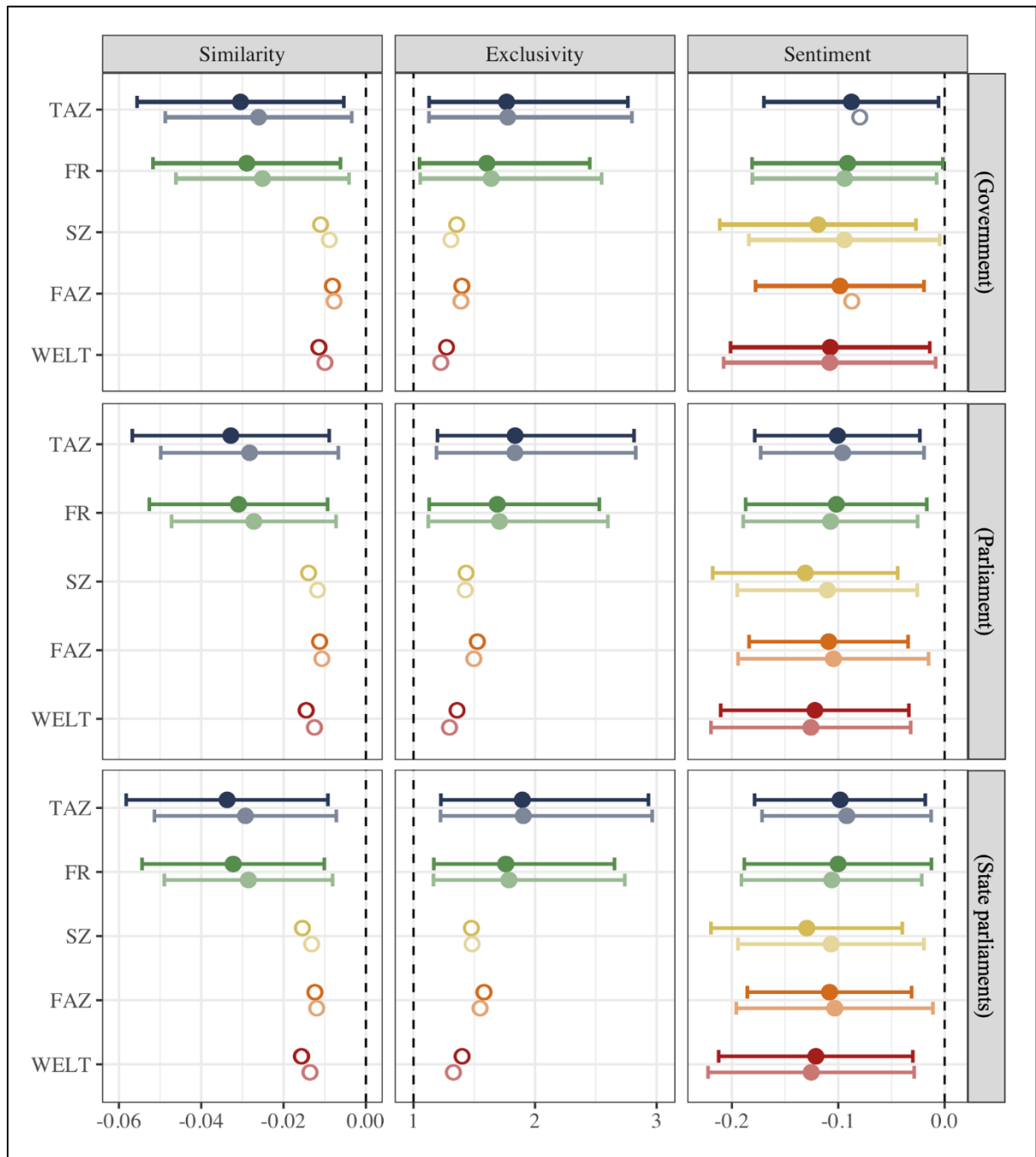
mainstream-challenger indicators are driven solely by the discounted length of their establishment.

To test this possibility, I re-estimated the newspaper models replacing the mainstream-challenger indicators with the undiscounted and unaccumulated mainstream-challenger status that indicates whether an actor was a mainstream (1) or challenger (0) actor in the current legislative period (see Appendix 29.2). The results show that the observed advantage for challenger actors is not driven by the establishment component of the mainstream-challenger indicators. Instead, the effects of the raw measure suggest that all newspapers tended to cover the perspectives of challenger actors around two (FAZ and Welt), three (SZ), or even four (taz and FR) percentage points more closely, and between 62 (Welt) and 118 (taz) percent more exclusively than press materials from mainstream actors, irrespective of their ideological leaning. At the same time, the effects of actors' challenger status on the journalistic evaluation of their perspectives were smaller, less certain, and less consistent across the three mainstream-challenger indicators in these models.

In combination with the findings on novelty, these effects imply that challenger actors tended to have an advantage over mainstream actors regarding the similarity and exclusivity of the received coverage, as well as the journalistic evaluations of their perspectives, in all newspapers. Since newer actors' press materials were generally covered more positively than established actors' issue interpretations and visible mainstream actors tended to be more established than visible challenger actors, the inconsistent positive influence of actors' raw challenger status on journalistic sentiment was reinforced by the discounted length of their establishment. While the same mechanism could have been at work for similarity and exclusivity in the left-leaning taz and FR, newer actors did not have an advantage over established actors in the other newspapers for these metrics. In consequence, the discounted length of their establishment masks the positive influence of actors' raw challenger status in these newspapers. Substantively, these findings support the expectation that (visible) challenger actors had an advantage over mainstream actors in building the media agenda (Hypothesis 2.5), although the preference for established actors offset this advantage in the SZ, the FAZ, and the Welt.



**Figure 7.30: The effect of mainstream status on newspaper reception across newspapers**



**Notes:** Depicted are the effects of actors' mainstream or challenger status on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper. **Legend:** see Figure 7.14.

In light of the findings for the individual newspapers, the largely insignificant effects in the full models likely conceal the opposing influences of actors' raw challenger status and their establishment. To understand the substantive meaning of the observed effects, I additionally re-estimated the full models with the raw mainstream-challenger indicators. The results confirm

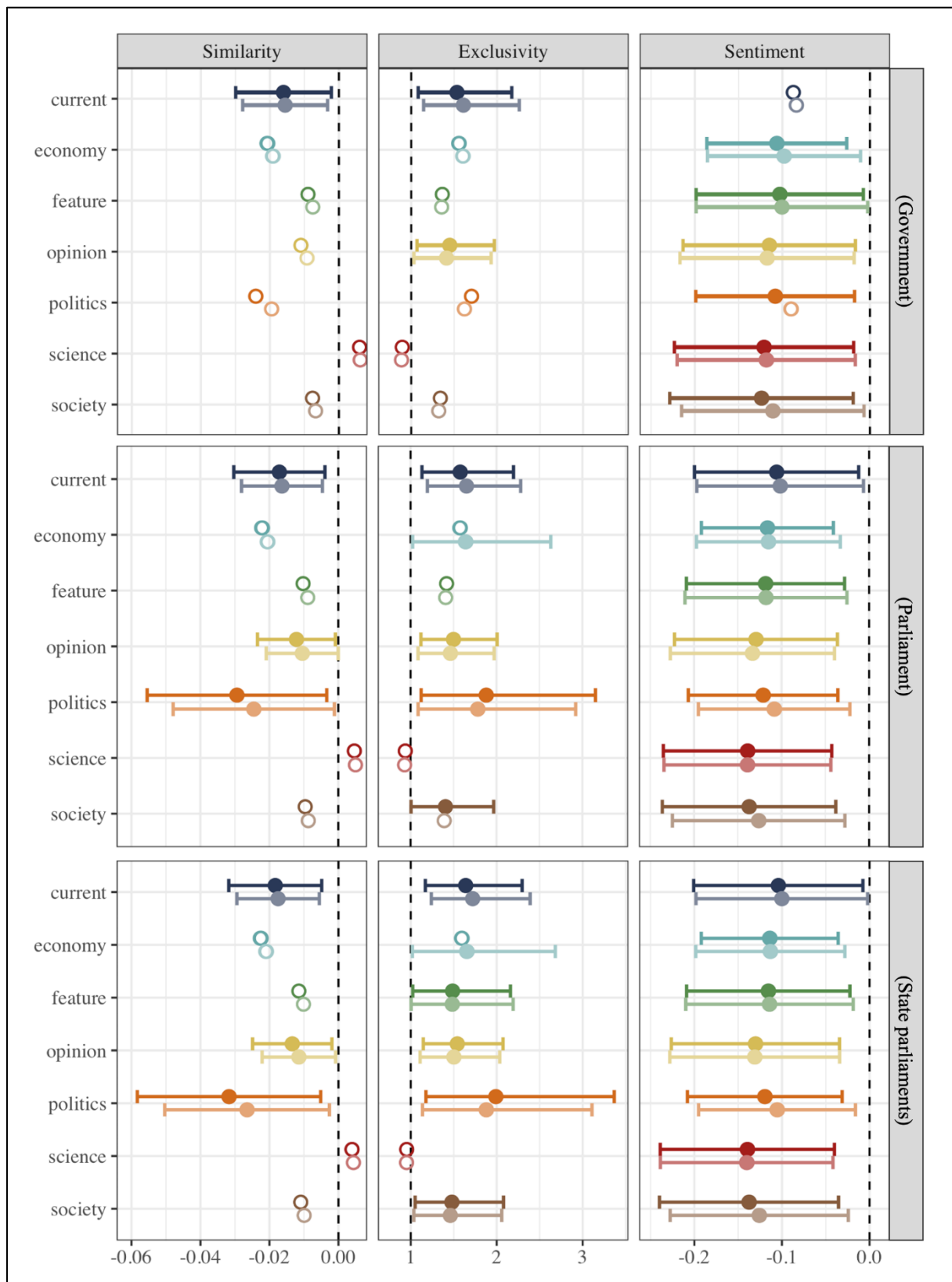
that the issue interpretations of (raw) challenger actors were generally covered around four percentage points more closely, twice as exclusively, and two percentage points more positively (see Appendix 29.1). However, the latter effect is insignificant for the measures based on political actors' inclusion in the national or state parliaments. These findings strengthen the conclusions from the newspaper models that actors' raw challenger status positively influenced the similarity and exclusivity of the received coverage, and that the establishment component was decisive for the positive journalistic evaluations of challenger actors' perspectives.

Given the close connection between actors' novelty and their mainstream or challenger status, the effects of the latter can also be expected to vary across newspaper sections (see Figure 7.31; see Appendix 25 for the full regression results). While challenger actors' angles were covered around 1.7 percentage points more closely and 62 percent more exclusively in the current section, their advantage in the opinion and society sections varies across measures. According to the indicators based on political actors' inclusion in national and state parliaments, challenger actors' press materials were covered around 2.6 percentage points more closely and 81 percent more exclusively than mainstream actors' issue interpretations in the politics section, and around 60 percent more exclusively in the economy section ( $c_2$ -models). The results for the state parliaments indicator even suggest that challenger actors' press materials were covered more exclusively in all sections except the science section. Hence, the pattern for the mainstream-challenger indicators diverges from the effects of novelty, strengthening the notion that the advantage for challenger actors is not limited to more left-leaning newspapers.

To understand how the components of the mainstream-challenger indicators influenced these effects, I again re-estimated the models using the raw mainstream-challenger measure for the most recent legislative period (see Appendix 29.3). The results show that challenger actors' perspectives were covered between two and four percentage points more closely and between 65 and 137 percent more exclusively in all newspaper sections except the science section.<sup>56</sup> Given that press materials were only collected for mainstream actors from the scientific domain, the insignificant effects for the latter section likely reflect the focus on scientific actors' press materials. The findings thus corroborate the notion that actors' raw challenger status improved the reception of their press materials across subsamples, adding support to Hypothesis 2.5.

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<sup>56</sup> Average coefficients: 0.02 in the current, feature, opinion, and society sections, 0.03 in the economy section, and 0.04 in the politics section; average IRRs: 1.65 in the opinion section, 1.76 in the society section, 1.71 in the economy section, 1.80 in the feature section, 1.88 in the current section, and 2.37 in the politics section.

**Figure 7.31: The effect of mainstream status on newspaper reception across sections**

**Notes:** Depicted are the effects of actors' mainstream or challenger status on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment) by newspaper section. **Legend:** see Figure 7.15.

The diverging effects of actors' novelty and their challenger status on the similarity and exclusivity of the coverage of their perspectives suggest that their lower establishment attenuated the observed advantage for challenger actors, but did not offset it for all newspaper sections. Moreover, the influence of the establishment component varied across the different mainstream-challenger indicators. When political actors' mainstream or challenger status was measured based on their inclusion in state parliaments, the results match the effects of the corresponding raw indicator more closely, whereas larger differences can be observed for the measures based on political actors' inclusion in the parliament, and especially the government. This is most likely an artifact of the lower variance captured by the latter two indicators but may also point to an increased importance of the establishment component for more elite mainstream actors. The perspectives of challenger actors were consistently covered between 2.3 and 3.3 percentage points more positively than the materials of mainstream actors,<sup>57</sup> although the effects of the raw challenger measures are once again less consistent, underlining the relevance of the establishment component for journalistic evaluations.

Taken together, the findings suggest that visible challenger actors had an advantage over mainstream actors regarding the reception of their press materials in newspaper articles on climate change, though this advantage was offset by their lower establishment in more right-leaning newspapers and individual newspaper sections. More specifically, the press materials of actors who were challengers in the most recent legislative period (raw measure) were covered more closely and exclusively, except in the science section. When the establishment component of actors' mainstream status is included in the measure, the advantage for challenger actors loses statistical significance for the FAZ and the Welt, as well as the SZ for similarity. Moreover, the estimates become inconsistent across the different mainstream-challenger indicators for most newspaper sections. The raw mainstream-challenger indicators did not consistently affect journalists' evaluations of supplied press materials, whereas the perspectives of challenger actors were invariably evaluated more positively when the establishment component was included. While the results rule out that the observed effects are driven exclusively by the discounted length of actors' establishment, the similarities between the patterns for the discounted and cumulated mainstream-challenger indicators and novelty

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<sup>57</sup> Average coefficients: 0.09 for the current section, 0.11 for the economy, feature, and politics sections, 0.13 for the opinion, science, and society sections. All effects are statistically significant at  $p < 0.1$  or below.

suggest that the establishment component of the mainstream-challenger indicators captures the same concept as the novelty indicator.<sup>58</sup> Hence, the mainstream-challenger indicators likely confound two concepts with potentially opposing influences on the reception of actors' press materials in climate change coverage.

Assuming that journalists base their expectations of surprise and controversy on actors' current mainstream or challenger status, without regard for the establishment component, the observed effects suggest that (visible) challenger actors had an advantage over mainstream actors regarding the similarity and exclusivity of the received coverage, but not necessarily the journalistic sentiment associated with their perspectives. This interpretation could account for the advantage of activist over organizational civil society actors observed in the descriptive analysis (see *Civil Society Actors* in Chapter 7.1), and would partially support the expectation that challenger actors have an advantage over mainstream actors in building the media agenda (Hypothesis 2.5). Inversely, the diverging effects of the discounted and cumulated mainstream-challenger indicators would then point to the influence of the establishment component. Since these effects largely match the findings for novelty, the results would strengthen the support for Hypothesis 2.4. Moreover, this interpretation would explain the universally more positive journalistic evaluations of challenger actors' perspectives observed in the descriptive analysis, as challenger actors in the sample were generally less established than mainstream actors. Irrespective of the interpretation of the establishment component, the effects offer no indication that mainstream actors had an advantage over challenger actors regarding the reception of their press materials, and thus clearly disconfirm Hypothesis 2.6. The implications of the different interpretations for the influence of actors' novelty and their mainstream status on their visibility are discussed in Chapter 8.

### ***Comparing the Relative Importance of Agenda-Building Factors***

The previous sections have shown that actors' executive authority, their economic weight, their scientific expertise, their issue ownership, their novelty, and their challenger or mainstream status all influenced the reception of actors' press materials in newspaper articles on climate change, though this influence is limited to individual newspapers or newspaper sections for some agenda-building factors, and to specific aspects of the coverage for others. To understand

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<sup>58</sup> Models including the mainstream-challenger indicators cannot control for novelty due to multicollinearity.

to which degree the different factors affect newspaper coverage in both absolute and relative terms, Figure 7.32 depicts the effects of all studied agenda-building factors on the similarity between actors' press materials and newspaper articles, the exclusivity of the received coverage, and the journalistic sentiment associated with their perspectives on the same scale. The depicted estimates are based on the full model controlling for all other agenda-building factors except the two continuous issue ownership indicators (see Appendix 23). Due to the very small number of actors whose continuous issue ownership could be measured, the estimates for these indicators are based on bivariate models without controls. The observed effects vary considerably less than the estimates for actors' visibility, however, the different scales on which the individual agenda-building factors were measured need to be considered to meaningfully interpret the strength of the effects.

For executive authority, the results show that political actors' perspectives were covered around 2.7 percentage points more closely than the issue interpretations of actors from other domains in the FR, the SZ, and the Welt, and around 57 percent more exclusively and 8.6 percentage points more positively across newspapers. This advantage is mirrored in most newspaper sections and was especially marked in the politics section, which covered political actors' perspectives around five percentage points more closely and 75 percent more exclusively than other actors' press materials. The exception are the economy and science sections, where executive authority only influenced journalistic evaluations. While the results allow no conclusions about the relative importance of the different degrees of executive authority, they suggest that executive authority perceptibly improved the exclusivity, journalistic evaluation, and often also the similarity of the received coverage.

The perspectives of actors with greater economic weight were covered more closely and exclusively, though not more positively, primarily in the economy section. The value added to the national economy ranged between 0 and 5.3 percentage points for the actors in the smaller sample for the reception analyses. Hence, the estimated average increase of 1.5 percentage points in similarity and 21 percent in exclusivity in the economy section suggests that the perspectives of actors who added the most value to the national economy were covered around 8.0 percentage points more closely and 71 percent more exclusively than the press materials of actors who did not add value to the national economy. Similarly, the observed share of employees relative to the national workforce varied between 0 and 3.6 percentage points. The estimated average increase of 2.1 percentage points in similarity and 29 percent in exclusivity thus indicates that the press materials of actors with the largest workforces were reproduced

around 7.6 percentage points more closely and 71 percent more exclusively than the perspectives of actors without employees in the economy section. Given that executive authority did not affect the similarity and exclusivity of the coverage in the economy section, economic heavyweights had an advantage over political actors. This advantage can also be observed for the Welt, the FR, and exclusivity in the FAZ, though the differences in the effect sizes are not statistically significant. Inversely, political actors had an edge regarding the similarity and exclusivity of the received coverage in the taz, the SZ, and other newspaper sections, as well as for journalists' evaluations of their perspectives in all subsamples.

Since the perspectives of actors from other domains were generally covered more closely, exclusively, and positively than scientific actors' issue interpretations, scientific expertise was evidently less important for actors' ability to build the media agenda than other factors. The exception are articles in the science section, which were around two percentage points more similar to scientific actors' press materials and covered them around 38 percent more exclusively than other actors' perspectives (see Figure 7.21). Considering that issue ownership was the only other factor to influence the similarity and exclusivity of coverage in the science section (see Figure 7.24), scientific expertise was relatively more important than most other agenda-building factors for coverage in this section. The influence of issue ownership and scientific expertise is comparable, as issue owners' perspectives were also covered around two percentage points more closely, and 36 percent more exclusively than materials from non-owners. On the other hand, even the science section evaluated scientific actors' perspectives more negatively.

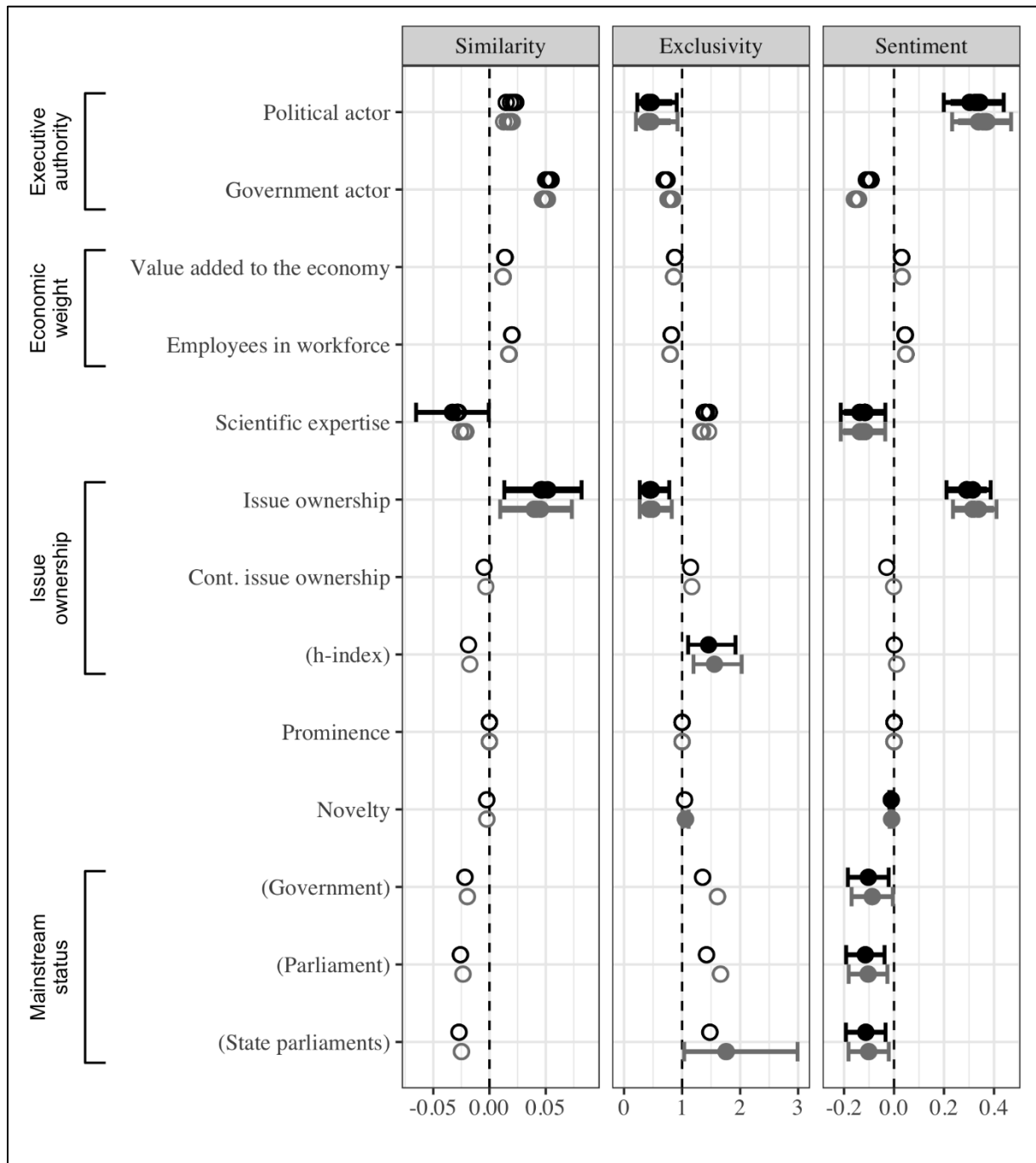
Regarding the general impact of issue ownership on the reception of actors' press materials, the estimates in Figure 7.32 indicate that (dichotomous) issue owners' perspectives were covered around four percentage points more closely, 54 percent more exclusively, and 7.7 percentage points more positively than materials from non-owners. The positive influence of dichotomous issue ownership on similarity is thus tendentially larger than the impact of executive authority, though the differences between the point estimates are not statistically significant. The advantage of issue owners and political actors was comparable regarding the exclusivity and journalistic sentiment of the received coverage. In contrast, where economic weight influenced the similarity and exclusivity of the coverage, it tended to be more relevant than issue ownership. Contrary to the expectations, the estimates for the continuous issue indicators suggest that higher degrees of issue ownership did not enhance civil society and scientific actors' influence over the media agenda, and may even have decreased the exclusivity

of the received coverage. While further research is needed to understand the impact of continuous issue ownership, the available results offer no indication that continuous issue ownership was relevant for actors' ability to build the media agenda.

Newer actors' press materials were covered around 0.3 percentage points more positively in newspaper coverage overall, between 4.7 and 7.4 percent more exclusively in the more left-leaning newspapers taz, FR, and SZ, and around 0.3 percentage points more closely in the taz and the FR. Since the novelty indicator ranged between one and twelve legislative periods, these estimates suggest that press materials from actors who emerged in the most recent legislative period were covered around 3.6 percentage points more positively overall, as well as about 3.6 percentage points more closely and at least 74 percent more exclusively in the more left-leaning newspapers, than the perspectives of actors who emerged before 1980. The advantage for newly emerged actors is thus significantly lower than the advantage for political actors and issue owners with regard to journalists' evaluations of their perspectives. On the other hand, novelty was only slightly less relevant for the similarity of the received coverage in the taz and the FR than issue ownership and tendentially more relevant than executive authority. Furthermore, novelty was most decisive for the exclusivity of the received coverage in left-leaning newspapers. Hence, novelty was as important as issue ownership and executive authority for coverage in left-leaning, but not in right-leaning newspapers.

Since the mainstream-challenger indicators likely confound the influence of actors' establishment (or their discounted novelty) and their current mainstream or challenger status, the strength of these individual components is not easily discerned. The results suggest that the two components reinforce each other for journalists' evaluations, increasing the sentiment score for challenger actors between 2.4 and 2.7 percentage points across the different indicators. This estimate is almost comparable to the advantage for newly emerged actors, reconfirming that the influence of actors' mainstream or challenger status on journalistic sentiment is driven by the establishment component of the measures. For similarity and exclusivity, the influence of the two components is less consistent, which is reflected in the insignificant effects for these indicators. In contrast, the estimates for actors' raw mainstream or challenger status in the current legislative period suggest that their perspectives were covered around four percentage points more closely and twice as exclusively as press materials supplied by mainstream actors. Based on these estimates, the influence of actors' raw challenger status on similarity and journalistic sentiment would be similar to the impact of novelty, whereas it would be the most decisive factor for exclusivity across newspapers.



**Figure 7.32: The relevance of the agenda-building factors for newspaper reception**

**Notes:** Depicted are the effects of all agenda-building factors on the similarity between actors' press materials and newspaper articles (Similarity), the exclusivity of received coverage (Exclusivity), and the journalistic evaluation of the presented perspective (Sentiment). The reference category for the political actor indicator are actors from the other three domains; the reference category for the government actor indicator are actors not affiliated with the government; the reference category for scientific expertise are actors without scientific qualifications; the reference category for issue ownership are non-issue owners. **Legend:** N for the full models is > 8,688; N for the bivariate models is 3,472 for the first continuous indicator and 3,166 for the second continuous indicator (h-index). For further specifications, see Figure 7.13.

Since the impact of individual agenda-building factors on journalistic sentiment was consistent across the different newspapers and newspaper sections, executive authority and issue ownership invariably influenced journalists' evaluations the most, followed by novelty and the discounted establishment component of the mainstream-challenger indicators. For similarity, only actors' issue ownership and their raw challenger status had an impact in the full models. For exclusivity, actors' raw challenger status was most relevant, followed by their novelty, their issue ownership, and their executive authority. However, this order is not consistent across newspapers, as additional factors were relevant in individual newspapers. Generally, left-leaning newspapers tended to value issue ownership, raw challenger status, and novelty more than their right-leaning counterparts, and also more than executive authority and economic weight. In turn, right-leaning newspapers tended to attach more value to economic weight.

Individual agenda-building factors were also more or less relevant in the science economy, and politics sections. Scientific expertise and issue ownership were the only factors to influence the similarity and exclusivity of coverage in the science section, and their impact was comparable for both indicators. Similarly, only economic weight, issue ownership, and actors' raw challenger status consistently affected the similarity and exclusivity of coverage in the economy section. While economic weight was tendentially twice as important as the two other factors for the similarity between actors' press materials and articles in the economy section, the three factors were similarly decisive for the exclusivity of the received coverage. Lastly, executive authority, issue ownership, and raw challenger status equally influenced the similarity of coverage in the politics section, whereas raw challenger status and novelty were considerably more important than executive authority and issue ownership for exclusivity in this section. Hence, (dichotomous) issue ownership was the only agenda-building factor to affect the similarity and exclusivity of coverage in all newspaper sections. Overall, the results suggest that contentual agenda-building factors were only significantly more important than other factors for the exclusivity of the received coverage, although the influence of the individual agenda-building factors on the reception of actors' press materials in newspaper coverage was generally more comparable than their impact on actors' visibility.

### ***Summary***

Actors' executive authority, their economic weight, their scientific expertise, their dichotomous issue ownership, their novelty, and their challenger status all influenced the reception of their

press materials in climate change coverage, though this influence was not always consistent across the indicators for similarity, exclusivity, and journalistic sentiment, or all newspapers and newspaper sections. Prominence had no significant effect on the reception of actors' press materials, contradicting the expectation that prominence should increase actors' ability to build the media agenda (Hypothesis 2.3). In combination with the strong positive effects on actors' visibility, this finding suggests that prominence enabled actors to draw newspapers' attention, but did not allow them to influence how their perspectives were covered.

Only actors' dichotomous issue ownership and challenger status consistently improved the similarity between their issue interpretations and newspaper articles, the exclusivity of the received coverage, and the associated journalistic evaluations. For dichotomous issue ownership, this positive effect holds even for sources from the business domain, strengthening the evidence that issue owners have an advantage over non-owners in building the media agenda (Hypothesis 2.2). However, the differential influence of dichotomous issue ownership for business actors' visibility and the reception of their press materials points to an omitted agenda-building factor. In addition, the results for the continuous issue ownership indicators contradict the expectation that actors with higher degrees of issue ownership profit more than actors with lower degrees of issue ownership. Hence, further research is needed to understand how different degrees of issue ownership affect actors' ability to build the media agenda.

The implications of the results for actors' mainstream or challenger status are less obvious since the two components captured by the corresponding indicators influenced the reception of actors' press materials differently and the establishment component likely captures the same concept as novelty. The results for novelty confirm the increasing importance of this factor observed in the visibility analyses (see Figure 6.34) and generally corroborate the expectation that newer actors have an advantage over established actors in building the media agenda (Hypothesis 2.4) for journalistic sentiment. If we assume that actors' current mainstream status and their establishment are inherently related, the results would only consistently support the expectation that challenger actors have an advantage over mainstream actors in building the media agenda (Hypothesis 2.5) for journalistic sentiment. If we instead assume that journalists base their expectations of surprise and controversy on actors' raw challenger status in the current legislative period, the findings would corroborate Hypothesis 2.5 for similarity and exclusivity. Challenger actors' advantage regarding the journalistic evaluation of their perspectives could then be attributed to the establishment component of the mainstream-challenger indicators, further strengthening the expectation that newer actors have an advantage

over more established actors regarding journalistic sentiment (Hypothesis 2.4). In either case, the results disconfirm the notion that mainstream actors are better able to build the media agenda than challenger actors in the most recent legislative period (Hypothesis 2.6).

Executive authority did not generally improve the similarity between press materials and newspaper articles, but political actors' perspectives were covered more closely in all newspaper sections except the economy and science sections. Moreover, an affiliation with the political domain positively influenced the exclusivity of the coverage and the journalistic sentiment associated with actors' perspectives in all subsamples. While these results offer additional support for the expectation that executive authority increased actors' ability to build the media agenda (Hypothesis 1.1), government actors did not have an edge over other political actors. This could suggest that the difference in executive authority between political actors and actors affiliated with the current government is too small to be detected in the limited sample of political actors whose press materials on climate change could be collected ( $N = 13$ ). Yet, I cannot rule out that actors' degree of executive authority does not affect the reception of their materials beyond the observed advantage for political actors without further research. Hence, the support for Hypothesis 1.1 is less unequivocal than the evidence for the positive influence of executive authority on actors' visibility in the media.

Actors' economic weight and their scientific expertise only increased the similarity and exclusivity of the coverage in the economy and science sections, respectively, and neither factor improved the associated journalistic sentiment. Contrasting the findings from the visibility analyses, the positive influence of actors' economic weight in the economy section was not sufficient to significantly affect the overall similarity and exclusivity of the received coverage. Hence, the results only offer limited support for the expectation that actors with greater economic weight are better equipped to build the media agenda (Hypothesis 1.3). Scientific expertise even decreased the similarity between actors' press materials and newspaper articles, as well as the exclusivity of the received coverage, outside the science section. In addition, journalists consistently evaluated the issue interpretations of actors with relevant scientific qualifications less positively. Although these findings clearly contradict the expectation that scientific expertise should increase actors' ability to build the media agenda (Hypothesis 1.4), they may reflect an advantage for political and civil society actors over scientific actors rather than a genuine disadvantage for actors with relevant scientific expertise on an issue. For instance, press materials from scientific actors may need more heavy editing to be accessible for broader publics and appeal to newspapers' audiences. To understand what drives the

observed effects, future research should consider continuous measures of actors' scientific expertise that would allow comparisons within the scientific domain.

The relative importance of the individual agenda-building factors for the reception of actors' press materials differs considerably from their relevance for visibility. Whereas prominence was the most important predictor of actors' visibility, followed by issue-specific relevance on the national level, executive authority, economic weight, mainstream status, novelty, and issue ownership, this factor did not affect the reception of actors' press materials in newspaper articles on climate change. The relevance of the individual agenda-building factors also varies across the reception metrics. For the journalistic evaluations of actors' perspectives, issue ownership and executive authority were relatively more important than novelty (respectively the establishment component of the mainstream-challenger indicators), whereas economic weight had no effect. For similarity and exclusivity, a general pattern is hard to discern. While actors' affiliation with the political domain, their economic weight, their issue ownership, their novelty, and their challenger status all affected the similarity and exclusivity of the coverage in individual newspapers or newspaper sections, the relevance of individual factors varied significantly across subsamples and the differences between the observed effects were much smaller than for visibility. Overall, the contentual agenda-building factors novelty and mainstream-challenger status were relatively more important for the reception of actors' press materials in climate change coverage than for their visibility, but were only consistently more relevant than other factors for the exclusivity of the received coverage.

Considering the relevance of individual agenda-building factors for the similarity and exclusivity of coverage in different newspapers and newspaper sections, some broader patterns emerge. Left-leaning newspapers tended to attach greater importance to issue ownership, controversy, and surprise than to executive authority and economic weight, whereas the latter was tendentially more relevant for coverage in right-leaning newspapers. This is largely in line with the findings from the descriptive analysis, though the regression results do not confirm the expected relative advantage for scientific actors in left-leaning papers. Mirroring the theoretical expectations as well as the findings from the visibility analyses, the politics, economy, and science sections tended to cover the perspectives of actors from related domains more closely and exclusively than other sections. Accordingly, executive authority was tendentially more important than other agenda-building factors in the politics section, as was economic weight in the economy section, and scientific expertise in the science section.

Neither actors' raw challenger status nor their executive authority influenced coverage in the science section, and the latter was also irrelevant for coverage in the economy section. Novelty was only relevant for coverage in the current, opinion, and society sections, reflecting the higher value attached to this factor in the taz. In conclusion, dichotomous issue ownership was the only factor to influence the reception of actors' materials in all newspaper sections. Since individual newspapers and newspaper sections dedicated more or less coverage to climate change, differences in the relative importance of scientific expertise and issue ownership across these subsamples could speak to the expectation that these factors should gain relevance when issues are salient (Hypothesis 4.2).<sup>59</sup> However, the observed patterns offer no indication that this is the case, reconfirming the findings from the visibility analyses.

Overall, the findings support the preliminary conclusion from the visibility analyses and the descriptive exploration of the reception metrics that climate change coverage in German newspapers presented audiences with a range of substantively different perspectives on climate change. While the relative importance of individual agenda-building factors for the similarity and the exclusivity of the received coverage differs across newspapers, these differences are not sufficiently pronounced to imply that newspapers on either side of the ideological spectrum omitted substantive positions in their coverage. However, the relevance of individual agenda-building factors, and thus the reception of actors' press materials, differed considerably across newspaper sections. Mirroring the conclusions from the visibility analyses, this finding indicates that diversity emerges across rather than within newspaper sections. While the descriptive results only allow conclusions about the reproduction of climate change positions in the media, the diverging importance of individual agenda-building factors across newspaper sections suggests that the coverage for other issues may be equally diverse.

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<sup>59</sup> Unfortunately, the analyses allow no conclusions about the relative importance of issue-specific relevance, as this factor is linked to specific offices held by individual political actors and press materials were only available for collective political actors.

## Chapter 8: Conclusion

The definition of political issues affects political and societal responses, affording actors who succeed at shaping public perceptions considerable influence over the policy agenda as well as people's beliefs, attitudes, and behaviors. Since the media are an important intermediary between stakeholders and the public, understanding which actors are best equipped to push their issues and perspectives onto the media agenda is a vital step toward comprehending the balance of power between different actor groups in democratic societies. In this dissertation, I developed an integrated theoretical framework to explain the ability of different actors to build the media agenda under changing conditions, considering actors' visibility as well as the reception of their press materials in the media. I tested this framework on an extensive corpus of German newspaper articles addressing the issue of climate change and found that actors from different societal domains dominated the debate at different points in time. The identified agenda-building factors affected the influence of individual actors over the media agenda, but there are important differences across the collected newspapers and newspaper sections. Moreover, the relevant set of agenda-building factors is distinct for actors' visibility, the similarity between their press materials and newspaper articles, the exclusivity of the received coverage, and the journalistic evaluations of their interpretations.

The analysis cannot support firm conclusions about the influence of context conditions on the relative importance of individual agenda-building factors, but my findings suggest that the transformation of the media system and severe crises may affect the relevance of specific factors, whereas issue salience and the societal consensus on an issue had no effect. Newspapers with diverse ideological leanings favored the perspectives of different actors; yet, these differences were not marked enough to suggest that newspapers on either side of the ideological spectrum did not supply audiences with a diverse set of issue interpretations. The coverage for specific actors and their angles also differed considerably across newspaper sections, which based their source selection on different agenda-building factors depending on their thematic focus. Overall, German newspapers covered the perspectives of actors promoting more ambitious climate protection more frequently, closely, and favorably than opposing angles, mirroring the prevalence of perspectives in Germany and the IPCC consensus on climate change. In the following subchapters, I summarize my contribution and findings, elaborate on theoretical, methodological, and empirical limitations, and offer suggestions for future research.

### 8.1 Summary and Contribution

This dissertation contributes theoretically and empirically to the broad literature on media agenda-building and uses an innovative combination of automated text analysis techniques, adding to the toolkit of social scientists and communication scholars. Departing from the largely descriptive approach applied in previous studies, I integrated and extended theoretical arguments from several fields to explain the ability of four broad actor groups to build the media agenda under different context conditions. Building on these arguments, I derived hypotheses for the influence of ten actor characteristics and the moderating impact of four context conditions. To test these hypotheses, I collected 41,864 newspaper articles on climate change published in German quality dailies between 1976 and 2020, and 9,159 press materials released between 2017 and 2020. In addition, I compiled a dataset of agenda-building factors for 960 individual and collective actors with incentives to shape public perceptions of climate change.

To capture degrees of similarity between the collected press materials and the 12,993 newspaper articles on climate change published in the same period, I combined supervised and unsupervised machine learning techniques that require very limited manual input to compare the meaning of texts. The implemented soft cosine similarity measures calculate the contentual similarity between labeled documents based on context-sensitive word embedding models trained on the full comparison corpus without further supervision. Researchers only have to provide the categories for the compared texts, in my case the source of the press materials. The manual comparison of article-press material pairs with different similarity scores confirmed that the resulting indicator captures degrees of contentual closeness in line with human interpretations and the plausibility of the descriptive findings further adds to the face validity of the automated classification.

Bridging the gap between resource-intensive supervised and hard-to-interpret unsupervised approaches, soft cosine similarity measures based on context-sensitive word embedding models thus offer a feasible, cost-efficient, and easily adaptable alternative for researchers interested in the prevalence of specific interpretations in media coverage, or the comparison of large collections of labeled documents in general. While this approach cannot capture the same level of meaning as manual coding, it provides an important tool to access intermediary levels of meaning for applications where limited resources inhibit the implementation of fully supervised approaches.



The findings support conclusions regarding the diverging ability of different actors and actor groups to build the media agenda, the influence of individual agenda-building factors, and the extent to which actors' perspectives are reproduced in the media. By considering the influence of business and civil society actors, as well as recent developments in the debate, the results moreover extend existing research on the discursive construction of climate change in Germany. The remainder of this chapter summarizes the findings and discusses their implications for the four central questions raised at the outset of this dissertation:

- (1) Which actors succeed in pushing their issues and interpretations onto the media agenda?
- (2) Which characteristics can explain actors' influence over the media agenda?
- (3) To which extent can specific actors and characteristics shape the media agenda?
- (4) Do context conditions affect the influence of individual actors and characteristics?

### ***Successful Agenda-Builders in the German Climate Change Debate***

While political actors generally had an advantage over business, civil society, and scientific actors when it came to pushing their interpretations of climate change onto the media agenda, this advantage did not ensure the dominance of their perspectives across contexts, newspapers, or newspaper sections. In line with previous research on early stages of the climate change debate, my findings show that scientific actors tended to be more visible than political actors in newspaper articles addressing climate change before the 1990s. With the increasing politicization of the issue starting in the mid-1980s, political actors became more visible in climate change coverage and surpassed scientific actors in all legislative periods after 1990. Despite their limited resources, civil society actors received more media attention than even political actors in the period 1994-1998, long before the media system transitioned from traditional to hybrid in the mid-2000s. Although civil society actors also dominated the media agenda in the period between 2017 and 2020, the results for the three preceding periods offer no indication that the transition of the media system extended the opportunities to influence the media agenda for this actor group. Business actors were generally least visible but received more attention in the 2000s, when the limits of ecological modernization became apparent and the prevalent interpretation of climate change threatened their profits. Considering different substantive positions, I found that actors promoting more ambitious climate protection were

generally more visible than opposing actors, and that their perspectives were covered more closely, exclusively, and positively between 2017 and 2020.

Extending previous research focused on the influence of political and scientific actors, these findings suggest that civil society and business actors played an active role in the discursive construction of climate change in Germany, challenging the conclusion that political actors have dominated the debate since the issue became politicized in the mid-1980s. While business actors refrained from promoting divergent interpretations as long as the ecological modernization paradigm promised that sustainability could be achieved without curbing economic growth, this changed when their incentives shifted. In addition, the findings for civil society actors tendentially discount the expectation that hybrid media systems offer more opportunities for actors with fewer resources to promote their perspectives. More broadly, my findings offer empirical evidence that actors from different domains successfully built the media agenda, adding to the growing body of research comparing the influence of different actor groups. In addition, individual actors' influence over the media agenda changed over time, suggesting that contextual variations are an important moderator of actors' agenda-building ability. The comparatively small advantage observed for political actors further indicates that studies focusing on the influence of political elites over the media agenda neglect important stakeholders, limiting their ability to explain the discursive construction of political issues. Overall, the descriptive evidence regarding the ability of different actor groups to build the media agenda on climate change underscores the need for a comprehensive theoretical framework that can be applied across actor groups and accounts for contextual variations.

### *Explaining Actors' Influence over the Media Agenda*

The identified agenda-building factors systematically affected actors' ability to push their climate change perspectives onto the media agenda, however, not all factors had the expected effect and the influence of individual factors varied considerably across actor groups, contexts, newspapers, and newspaper sections. Table 8.1 reiterates my expectations for the individual agenda-building factors, nine of which could be tested in the empirical analysis. Although these hypotheses were expected to hold for all considered degrees of influence over the media agenda, different sets of agenda-building factors explained actors' visibility in climate change coverage, the similarity between their press materials and newspaper articles, the exclusivity of the received coverage, and the journalistic sentiment associated with their perspectives.

**Table 8.1: Hypotheses for the agenda-building factors (repeated)**

No.	Hypothesis
1.1	Actors' agenda-building ability increases with their executive authority.
1.2	Actors' second-level agenda-building ability increases with the issue-specific relevance of their office.
1.3	Actors' agenda-building ability increases with their economic weight.
1.4	Actors with scientific expertise have a relative advantage over other actors in building the second level of the media agenda.
2.1	Actors with personal expertise have a relative advantage over other actors in building the second level of the media agenda. (not tested)
2.2	Issue owners have a relative advantage over other actors in building the second level of the media agenda.
2.3	Actors' ability to build the agenda increases with their prominence.
2.4	New actors have an advantage over established actors in building the media agenda.
2.5	Challenger actors have an advantage over mainstream actors in building the media agenda.
2.6	Mainstream actors have an advantage over challenger actors in building the media agenda.

The findings support Hypothesis 1.1, showing that actors with higher executive authority were more visible in newspaper articles on climate change and that their perspectives were covered more exclusively, positively, and often closely. This influence was stable over time and largely consistent across newspapers with different ideological leanings and newspaper sections, though executive authority was irrelevant for the similarity and exclusivity of coverage in the economy and science sections. Executive authority was among the most relevant predictors for actors' visibility, yet was less important than other factors for the reception of their press materials except in the politics section.

In contrast, Hypothesis 1.2 could only be corroborated for federal environment ministers, who received considerably more attention in climate change coverage than other actors, whereas the same advantage could not be observed for state environment ministers. Federal environment ministers tended to be even more visible than chancellors; an advantage that was particularly pronounced in the science and current sections, although it temporarily decreased in the period 2005-2009. Unfortunately, the influence of issue-specific relevance could not be tested in the second part of the analysis because press materials were only available for collective political actors. Together, executive authority and issue-specific relevance can thus at least partially account for the often observed advantage that political actors have over actors from other societal domains with respect to building the media agenda.

The results further show that actors' visibility, as well as the similarity and the exclusivity of coverage in the economy section markedly increased with their economic weight. For visibility, this advantage in the economy section drives corresponding effects in the full sample,

where economic weight was only slightly less relevant than holding a cabinet post or party chair. This is not the case for similarity and exclusivity, which economic weight could only enhance in individual newspapers. This influence was especially pronounced in the right-leaning *Welt*, where economic weight was more important than all other factors. In contrast, press materials from economic heavyweights were not covered more positively in any of the considered subsamples, including in the economy section and the *Welt*. Overall, the findings indicate that actors whose decisions can perceptibly influence the national economy and thus have the potential to constrain people's actions via their pocketbooks are also better equipped to build the agendas of newspapers' influential economy sections. Yet, this advantage neither extends to journalists' evaluations, nor does it hold for the full sample for similarity and exclusivity. Hence, the findings only partially affirm Hypothesis 1.3.

Contrary to Hypothesis 1.4, actors with scientific expertise were not more visible than other actors in newspaper articles on climate change, and their press materials were covered significantly less closely, exclusively, and positively than the perspectives of other actors. The exception is the science section, where actors with scientific expertise were named at higher rates than other actors and their issue interpretations were reproduced more closely and exclusively, though not more positively. While I suspect that the observed negative effects at least partly reflect different writing styles, the dichotomous indicator for scientific expertise does not allow me to distinguish the influence of increased scientific expertise from general disadvantages for actors from the scientific domain. Irrespective of the exact mechanism, my findings indicate that scientific actors were less able to influence climate change coverage than other actors, which is somewhat surprising given the substantive relevance of scientific findings for the debate. Yet, the descriptive results offer no indication that this potential disadvantage for scientific actors led to the exclusion of scientific perspectives from newspaper articles published outside the science section.

Issue owners were generally more visible in climate change coverage than non-owners, and their perspectives were covered more closely, exclusively, and positively, supporting Hypothesis 2.2. While issue ownership was the least important factor for actors' visibility in climate change coverage, its positive influence on journalists' evaluations was comparable to the effect of executive authority and it was among the most decisive factors for the similarity between press materials and climate change coverage. Moreover, issue ownership was the only agenda-building factor to affect the similarity and exclusivity of the coverage in all considered newspaper sections. However, two important inconsistencies weaken the evidence for

Hypothesis 2.2. First, the effect of issue ownership on actors' visibility is reversed in the business domain, which cannot be attributed solely to the operationalization of issue ownership for business actors and thus points to a difference between specialized and non-specialized business actors that my theoretical framework does not account for. Second, the influence of the continuous issue ownership indicators on the reception of actors' press materials in the media is inconsistent and sometimes negative, especially for the indicator based on scientific actors' h-index. The corresponding models work with very small samples at the macro level and cannot control for other agenda-building factors, casting doubt on the substantive meaning of these estimates. Nevertheless, further research is needed to explore how different degrees of issue ownership affect actors' ability to build the media agenda.

The evidence for Hypothesis 2.3 is mixed, as prominence was the most decisive factor for actors' visibility in climate change coverage but had no effect on the reception of their press materials. Since prominent actors from all four domains were consistently more visible across contexts, newspapers, and newspaper sections and prominence was equally consistently irrelevant for the reception of actors' press materials, my findings indicate that prominence enabled actors to attract newspapers' attention, but not to influence how their issue interpretations were reproduced in climate change coverage. This finding illustrates the importance of distinguishing degrees of influence over the media agenda, both empirically and theoretically. The distinct effects observed for prominence, executive authority, and economic weight, which are frequently subsumed under the label 'elite', show that the more nuanced approach pursued in this dissertation enhances our understanding of the influence of different elite actors over the media agenda.

Contrary to Hypothesis 2.4, newer actors were generally less rather than more visible in climate change coverage than their established counterparts. However, the reverse can be observed for the business domain, the period after 2013, and the politics section. In addition, left-leaning newspapers covered newer actors' press materials more closely and exclusively, and journalists from all considered newspapers evaluated their perspectives more positively than established actors' interpretations. While some of these inconsistencies can be explained by the increasing relevance of novelty over time, others may reflect the confounding influence of actors' current mainstream or challenger status, which is not discussed in the first part of the analysis. Based on the assumption that all business actors are mainstream actors and the findings from the second part of the analysis, the observed effects could plausibly indicate that novelty had a small positive effect on actors' visibility, which increased over time but was

reversed by the larger negative effect associated with the challenger status of many newer actors in earlier legislative periods. Although my findings cannot offer conclusive evidence for the influence of novelty on actors' ability to build the media agenda, they support the central assumption that contentual news values such as surprise can be meaningfully linked to actor characteristics. Hence, the inclusion of such indirectly linked characteristics within my theoretical framework improves our understanding of actors' ability to build the agenda.

The findings for mainstream and challenger actors' visibility in climate change coverage suggest that mainstream actors had an advantage in earlier legislative periods, which diminished over time. This pattern also holds when actors' mainstream or challenger status is defined relative to the current societal consensus rather than their general position. In line with this trend, challenger actors' press materials were evaluated more positively and tended to be reproduced more closely and exclusively than mainstream actors' perspectives in the most recent legislative period. Hence, the results support Hypothesis 2.6 for actors' visibility in legislative periods before 2013, but tend to corroborate Hypothesis 2.5 for the reception of their press materials between 2017 and 2020. The latter conclusion is more tentative since the findings suggest that actors' raw mainstream or challenger status and their establishment, which are combined in the mainstream-challenger indicators, had inconsistent effects on the similarity and exclusivity of the received coverage in right-leaning newspapers. Therefore, the conclusion that challenger actors' perspectives were generally covered more closely and exclusively is limited to actors' undiscounted and unaccumulated challenger status in the current legislative period. Irrespective of the considered indicator, mainstream actors did not have an advantage over challenger actors with regard to the reception of their press materials in the most recent legislative period.

Unlike the other factors, actors' novelty and their mainstream or challenger status are assumed to influence their ability to build the media agenda indirectly through the characteristics of their press materials. In light of their contentual nature, these factors were expected to be more relevant for the reception of actors' perspectives in the media than for their visibility. The results confirm that the two contentual factors were least important for actors' visibility in climate change coverage and that they were relatively more important for the reception of their issue interpretations, though they were only significantly more important than the other factors for the exclusivity of the received coverage. Overall, the findings thus do not only corroborate the assumption that contentual news values can be meaningfully linked to

actors' characteristics, but also suggest that such contentual factors are more decisive for the portrayal of visible actors' perspectives in the media than for gaining media attention.

Yet, the set of relevant agenda-building factors for actors' visibility and the reception of their press materials differed not only with regard to the contentual factors, suggesting that different factors are decisive for actors' ability to attract media attention and the portrayal of their perspectives in the media. Since press materials were only collected for the most visible actors, this conclusion rests on the assumption that actors who are not named in climate change coverage are unable to push their perspectives onto the media agenda, which is not necessarily the case when actors' issue interpretations are presented as a general consensus (see Chapter 2.2). In contrast, the inconsistent effects on continuous exclusivity in the visibility analyses are not easily explained if actors indeed seek to be named alongside the fewest possible number of other actors, pointing to a disregarded difference between exclusivity and continuous exclusivity that warrants further exploration. The set of relevant agenda-building factors also differed for the three reception metrics, although the patterns for similarity and exclusivity tended to be more similar than the pattern for journalistic sentiment. These differences indicate diverging processes for different aspects of the received coverage and do not discount the utility of a generalized theoretical framework to explain actors' ability to build the agenda. However, they suggest that the proposed framework needs to be developed further to explain different degrees of influence over the media agenda.

The relevance of the universal agenda-building factors, especially for the reception of actors' press materials in the most recent legislative period, suggests that actors outside the political (and economic) elite can shape public perceptions of political issues and thus initiate policy change. Nonetheless, the greater relative importance of prominence, executive authority, issue-specific relevance, and economic weight for actors' visibility in the media indicates that elite actors continue to have an advantage in raising media attention for their perspectives, limiting the potential for such changes. The rising prominence of climate activists in recent years has increased their visibility in the German climate change debate, opening new possibilities for them to intervene in the discursive construction of climate change. Yet, their influence over the reception of their press materials fundamentally rests on the current preference for surprise and controversy in the news production process, which may reverse when context conditions change. Future research will determine whether the findings from the second part of my analysis capture a temporary peak in the ability of non-elite actors to build

the media agenda on climate change or point to a lasting shift in the power balance between different actor groups.

Focusing on the characteristics that affect actors' ability to build the media agenda rather than the prevalence of individual actors and perspectives, this dissertation moves from the largely descriptive approach applied in many existing studies toward a causal explanation and thereby advances theory building in the field of media agenda-building. The empirical results show that all considered factors influenced actors' ability to build the media agenda and thus confirm the utility of an integrated theoretical framework to explain the influence of different actor groups. Nonetheless, the findings reveal several patterns that cannot be explained by the considered agenda-building factors. While these patterns may partially reflect the influence of contentual and procedural factors that cannot be linked to actors' characteristics or indicate shortcomings in the operationalization of individual factors, they may also point to the relevance of additional factors. Moreover, the importance of the considered factors varies for different aspects of actors' influence over the media agenda, suggesting that the proposed theoretical framework needs to be elaborated to explain the observed differences. Hence, this dissertation constitutes an important step toward explaining the ability of different actor groups to build the media agenda and thus to shape public perceptions, although further theoretical and empirical work is required to identify missing factors and understand the differential impact of individual factors on diverse aspects of the media agenda.

### ***The Relevance of Context Conditions***

The descriptive findings show that different actor groups were more or less visible in newspaper coverage at different points of the climate change debate, pointing to changes in actors' ability to build the media agenda over time. These differences partly reflect changes in the set of agenda-building factors that individual actors possess, for instance the rising prominence of climate activists in recent years. However, they also reveal variations in the relative importance of individual agenda-building factors under changing context conditions. I hypothesized that the transformation of the media system, issue salience, crises, and the current societal consensus would increase the relevance of specific factors while decreasing the importance of others (see Table 8.2 for an overview of the moderation hypotheses). Since these conditions often change concurrently, observed changes in the relevance of individual agenda-building factors across periods only provide limited evidence for the influence of specific context conditions.



Nonetheless, the results suggest that the transition from traditional to hybrid in the media system and the occurrence of crises may have influenced the relative importance of specific factors. Perhaps more importantly, the observed pattern offers no indication that the salience of an issue or the current societal consensus influenced the relevance of the agenda-building factors.

**Table 8.2: Hypotheses for the moderating impact of context conditions (repeated)**

No.	Hypothesis
3.1	The relative importance of executive authority, issue-specific relevance, and economic weight is slightly lower in hybrid than in traditional media systems.
3.2	The relative importance of prominence is slightly higher in hybrid than in traditional media systems.
3.3	The relative importance of surprise and controversy is higher in hybrid than in traditional media systems.
3.4	The relative importance of consonance is higher in hybrid than in traditional media systems.
4.1	The relative importance of prominence, controversy, and surprise is not affected by the salience of an issue.
4.2	Issue-specific relevance, expertise, and issue ownership only take effect when an issue is sufficiently salient in the media and their relative importance increases with the salience of the issue.
4.3	The relative importance of executive authority, economic weight, and consonance increases with the salience of an issue.
5.1	The relative importance of executive authority, issue-specific relevance, economic weight, and consonance increases during (issue-specific) crises.
5.2	The relative importance of surprise, controversy, and prominence decreases during crises.
6.1	The relative importance of executive authority, issue-specific relevance, and consonance decreases when there is societal consensus on an issue.
6.2	The relative importance of surprise and controversy increases when there is societal consensus on an issue.
6.3	The relative importance of prominence, economic weight, expertise, and issue ownership is not affected by the societal consensus on an issue.

With the transition of the German media system from traditional to hybrid, institutionalized press channels were expected to lose importance, whereas prominence should have become more relevant in the news selection process. Equally plausible considerations suggested that either surprise and controversy or consonance are valued more in hybrid than in traditional media systems. Partially supporting Hypothesis 3.1, the results offer tentative support for the notion that issue-specific relevance and economic weight lost relevance when the media system transitioned from traditional to hybrid. However, executive authority remained similarly influential, suggesting that the observed shift is less than systematic. Contradicting Hypothesis 3.2, the relative importance of prominence tendentially decreased over time. Although actors' novelty gained and their mainstream status lost importance in more recent legislative periods, pointing to an increasing relevance of controversy and surprise, these shifts cannot be clearly

linked to the transition of the media system. Hence, Hypothesis 3.3 cannot be conclusively confirmed, whereas the findings discount the competing expectation that consonance may be more important in hybrid media systems (Hypothesis 3.4). Overall, the results do not preclude that the transformation of the media system affected the relative importance of issue-specific relevance, economic weight, and controversy and surprise, but cannot provide evidence for a systematic effect.

In line with Hypothesis 4.1, issue salience did not affect the relative importance of prominence, controversy, and surprise. Yet, actors' issue-specific relevance, their scientific expertise, and their issue ownership were equally unaffected, although these factors are only pertinent for specific issues and were therefore expected to gain relevance with increasing issue salience (Hypothesis 4.2). The results also disconfirm the expectation that issue salience increases the relevance of executive authority, economic weight, and consonance (Hypothesis 4.3). While the salience of climate change in individual newspaper articles was a necessary condition for their inclusion in the newspaper corpus, biasing the baseline for the visibility of actors with issue-specific relevance, scientific expertise, and issue ownership, this should not conceal the effects of broader shifts in the level of attention for this issue. The lack of any perceptible pattern thus indicates that the relevance of individual agenda-building factors was independent of the salience of an issue.

The evidence for Hypothesis 5.1 is mixed as the relative importance of issue-specific relevance and economic weight tendentially increased during crises, but the same could not be observed for executive authority and consonance. Inversely, the results disconfirm the expectation that surprise and controversy or prominence are valued less during crises (Hypothesis 5.2), and offer no evidence that issue-specific expertise was either more or less relevant in crisis contexts. As for the transformation of the media system, the findings thus cannot rule out that crises affected the relevance of specific agenda-building factors, but also do not provide evidence for a systematic influence.

Matching the descriptive findings, the observed changes in the relevance of individual agenda-building factors over time contradict the expectation that the current societal consensus on climate change impacted the relative importance of specific factors. Executive authority, issue-specific relevance, and consonance were not less relevant in times of broad societal consensus (Hypothesis 6.1), nor were surprise and controversy more relevant (Hypothesis 6.2). While the results thus corroborate the irrelevance of the current societal consensus for the relative importance of prominence, economic weight, scientific expertise, and issue ownership

postulated in Hypothesis 6.3, the lack of evidence for the other two hypotheses suggests that the current societal consensus did not affect media audiences' preferences or journalists' perceptions of these preferences in the expected manner. Hence, this context condition cannot account for variations in actors' influence over the media agenda at different points in time or in different settings.

Taken together, the results show that both the visibility of different actor groups and the relevance of specific agenda-building factors changed over time, confirming the importance of considering the impact of context conditions to understand actors' ability to build the media agenda. However, these changes are not adequately explained by shifts in the considered context conditions. There is some tentative evidence that the emergence of the hybrid media system limited the influence of elite actors over the media agenda while expanding opportunities for newer and challenger actors, but this pattern is not sufficiently pronounced to support the conclusion that the transformation of the media system altered the balance of power between these actor groups. In consequence, the findings indicate that exploring the influence of context conditions on actors' ability to build the media agenda is worthwhile, though further research is required to identify relevant context conditions and empirically isolate their influence on the relative importance of individual agenda-building factors.

### ***The Role of the Media***

Despite their different ideological leanings, the collected newspapers generally covered the issue of climate change quite similarly, presenting their audiences with a range of perspectives from actors with distinct substantive positions. Overall, actors promoting more ambitious climate protection were more visible in the coverage than actors with opposing positions and their perspectives were covered more closely, exclusively, and positively. This tendency was slightly more pronounced in the left-leaning newspapers in the sample, which nevertheless mentioned opposing actors and interpretations. Across all collected newspapers, diversity in the presented perspectives commonly emerged from the distinct source preferences and selection criteria applied in different newspaper sections rather than from the deliberate confrontation of different positions within domains or sections. These findings suggest that climate change coverage in German quality newspapers largely mirrored the societal and scientific consensus on climate change and that critical issue interpretations were included without inflating their relevance through excessive balancing.

While the descriptive findings can only speak to the diversity of actors and angles covered in newspaper articles addressing the issue of climate change, the observed differences in the relative importance of individual agenda-building factors across newspapers and newspaper sections suggest that an equally diverse set of actors and perspectives is covered for other issues. Given that issue ownership, surprise, and controversy were relatively more important for the similarity and exclusivity of coverage in left-leaning newspapers, whereas economic weight was more relevant for their right-leaning counterparts, these outlets can be expected to favor press materials from different actor groups for any covered issue. More importantly for the diversity of issue interpretations within newspapers, the relevance of the individual agenda-building factors varies considerably across newspaper sections, suggesting that different sections will emphasize the positions of different sets of actors. Hence, diversity can be expected to emerge across newspaper sections irrespective of the issue at hand.

### 8.2 Limitations and Future Research

While this dissertation constitutes an important step toward an integrated theoretical framework explaining individual actors' ability to build the media agenda under different context conditions, the analysis suggests several important extensions to the theoretical argument. Moreover, the proposed theoretical framework could only be tested for newspaper coverage of the German climate change debate, limiting the generalizability of the conclusions. In addition, the influence of individual agenda-building factors and especially the impact of context conditions require further empirical examination. The observed differences for actors' visibility in the media, the similarity between their press materials and newspaper articles, the exclusivity of the received coverage, and journalistic sentiment likewise merit additional attention. In short, more research is needed to elaborate the proposed theoretical framework and systematically test its implications.

For the theoretical argument, the observed inconsistencies in the influence of issue ownership across domains point to the relevance of additional characteristics that explain actors' ability to build the media agenda. These inconsistencies cannot be explained by considered agenda-building factors that could not be adequately operationalized for the examined case, namely personal expertise, and do not seem to reflect more elusive influences such as successful legal action (see summary for Chapter 2.4). Furthermore, several patterns in the descriptive results cannot be conclusively linked to the considered agenda-building factors

and may thus point to factors that have been omitted in the proposed theoretical framework. Although the observed variations could reflect procedural or contentual factors rather than actor characteristics, future research needs to take a closer look at these patterns to identify potentially omitted agenda-building factors. Further research is also required to test the influence of actors' personal expertise on their ability to build the media agenda and to understand how different degrees of executive authority, issue ownership, and scientific expertise affect the coverage of actors' perspectives.

The findings show that the relevance of individual agenda-building factors varies over time, supporting the notion that context conditions influence actors' ability to build the agenda, but provide limited evidence for the impact of the examined context conditions. Hence, more research is needed to identify theoretically relevant context conditions that explain the observed variations. Comparing the settings of existing studies that explore the ability of (political) actors to build the media agenda (e.g., Andsager, 2000; Bennett et al., 2006; Berkowitz & Adams, 1990; Carmichael & Brulle, 2017; Kroon & van der Meer, 2021; T. Meyer et al., 2017) could yield valuable insights which context conditions warrant further examination. The influence of specific context conditions also requires more rigorous empirical testing. Future studies should focus on cases where relevant context conditions change consecutively rather than concurrently to empirically isolate the effect of specific conditions. Since the limited evidence in this dissertation suggests that characteristics of the media system affected the relevance of specific agenda-building factors, the conclusions from the German case cannot readily be generalized to more partisan and less consensus-oriented media systems. Although the introduced theoretical framework is expected to generalize to countries with similarly neutral media systems, additional research is needed to back this expectation with empirical evidence.

Given that the influence of the examined agenda-building factors differed for actors' visibility and the reception of their press materials, as well as across the considered visibility and reception metrics, more research is required to ascertain whether the observed variations result from imprecise measures or reflect factual differences in the relevance of specific agenda-building factors for diverse aspects of the media coverage. For the visibility metrics, the diverging pattern for continuous exclusivity indicates that actors may be indifferent about the number of other actors named in the same news item if the coverage is not truly exclusive. Some influential factors like prominence, issue-specific relevance, and executive authority even showed reversed effects for this metric, suggesting that continuous exclusivity is associated with different incentives and thus differs fundamentally from the other considered visibility

metrics. For the reception metrics, the smaller differences between the patterns for similarity and exclusivity could reflect the limitations of the used automated measures. However, the markedly diverging pattern for the journalistic sentiment scores likely (additionally) points to substantive differences in the relevance of the individual agenda-building factors for these aspects of the coverage. Future research should elaborate the introduced theoretical framework to derive expectations for specific aspects of the media agenda.

The presented theoretical framework only considers the incentives and the ability of individual actors to push their issues and perspectives onto the media agenda, leaving aside the possibility that different actors with similar perspectives may join forces to promote their preferred perspective more effectively. If several actors push the same angle, the agenda-building factors that each actor possesses may be considered jointly rather than individually, allowing coalitions of less influential actors to compete with more influential actors for media attention. Such issue coalitions are more likely to emerge across rather than within domains because most actors have incentives to distinguish themselves from other actors within the same domain, who tend to compete for the same resources such as votes, customers, or donations. On the other hand, actors have to compromise on the details, if not on more important attributes, of their issue interpretations and share the benefits from the increased media attention in issue coalitions. Further theoretical and empirical work is needed to understand under which conditions issue coalitions form and to assess their prevalence and performance.

With regard to the empirical analysis, relevant actors were identified based on their presumed incentives to shape public perceptions of climate change, but these incentives could not be empirically verified in this dissertation. Because incentives are specific to the issue at hand and tend to be implicit, their measurement is not straightforward. Nonetheless, the consideration of actors based on empirically determined rather than presumed incentives could improve the accuracy of agenda-building analyses, as the resulting sample of actors will likely include fewer actors who do not seek to push their interpretations onto the media agenda despite their ability to do so, and whose lack of observable impact may attenuate the effects. This limitation does not pertain to the reception analyses, where the focus was on press materials from visible actors. Yet, this focus reduced the variance for factors associated with actors' visibility and may therefore likewise have attenuated the corresponding effects for the reception metrics. While it is plausible that newspapers name actors alongside their perspectives and the theoretical argument suggests that such attributable coverage benefits actors most, individual actors' issue interpretations could also be presented as a general consensus without an overt

attribution (see Chapter 2.2). To account for this possibility and more generally increase the variance on the actor level, future studies should analyze the reception of press materials from a larger sample of stakeholders.

Although my theoretical argument relates to the first as well as the second level of the media agenda, the empirical focus on climate change precluded the analysis of actors' influence over the issues covered in the media. Hence, more research is needed to test the expectation that issue-specific relevance, personal and scientific expertise, and issue ownership only affect actors' ability to build the second level of the media agenda. In light of the observed differences in the relevance of individual agenda-building factors for actors' visibility and the three reception metrics, effects for the first level of the media agenda may also differ from the reported results in other substantive ways. In addition, much more research is required to validate the proposed theoretical framework for other issues, which are linked to a distinct set of incentives and stakeholders.

To facilitate the longitudinal analysis of the climate change debate, the proposed theoretical framework was applied exclusively to quality newspaper coverage, neglecting other media such as tabloid newspapers, television, and social media. Although prevalent perspectives should eventually be covered in legacy media and the analysis allows sufficient time for intermedia agenda-setting, tabloid newspapers and television broadcasters may value the examined agenda-building factors differently than quality newspapers, and the dynamics of attention on social media sites can be expected to differ considerably from professionalized news selection processes. Hence, further research is needed to test the influence of the agenda-building factors across media genres. Moreover, the analysis considered only the textual features of newspaper articles, neglecting the positioning of articles and associated visual cues such as pictures, which can be as important for audiences' perceptions of the presented interpretations as the exclusivity or tonality of the coverage and should therefore be considered in future studies.

With regard to the measures for the reception of actors' press materials in media coverage, further validation is required to determine whether differences in the second decimal place of the soft cosine similarity scores capture meaningful variation or can be aggregated to increase the interpretability of the indicator. To improve the performance of the journalistic sentiment measure for less similar comparison materials, future work should explore the possibilities of moving or dictionary-assisted thematic text windows. Instead of comparing the sentiment for press materials and entire newspaper articles, such an approach would aim to identify the part

of the newspaper article that is most similar to the comparison material before calculating the difference in the sentiment scores for the comparison material and the relevant text window. Although more computationally expensive, this approach could increase the accuracy of the reference for the measured journalistic sentiment and thus reduce the captured noise.

Finally, the empirical analysis can identify correlations that are in line with the expectations but the research design does not enable causal inferences. The actor-centric approach pursued in this dissertation necessarily neglects procedural and contentual factors that can be expected to affect actors' visibility and even more the reception of their press materials in the media. Moreover, not all considered agenda-building factors could be operationalized for the examined issue and the results point to further omitted factors, whose influence may confound the effects of the examined agenda-building factors. In addition, the relation between individual agenda-building factors and the visibility and reception indicators may be reciprocal rather than directional. For instance, prominence raises actors' visibility in the media, but media visibility could also plausibly increase actors' prominence. Future research may partly overcome these issues with more fine-grained time series or experimental designs.

Despite these limitations, this dissertation constitutes an important step toward understanding the ability of individual actors to build the media agenda and extends the toolkit for automated text analyses. The proposed theoretical framework moves beyond descriptive accounts of actors' influence over the media agenda to focus on the contribution of individual-level factors. The results confirm that these factors can explain the ability of actors from different domains to push their perspectives onto the media agenda. In addition, I consider the moderating impact of context conditions and show that the relative importance of individual factors varies in different settings. Future research can build upon this framework to explain the influence of different actor groups for diverse issues, understand variations in this influence across settings, and study the diverging impact of individual agenda-building factors for various aspects of the media coverage.



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## **Supplementary Materials**

The Online Appendix for this dissertation as well as the data and the replication materials are available here: [https://osf.io/ex2w3/?view\\_only=a1a69963758445a6b4c6a638999b07cf](https://osf.io/ex2w3/?view_only=a1a69963758445a6b4c6a638999b07cf). Since access to the raw newspaper articles is restricted through the respective license agreements with the F.A.Z.-Bibliotheksportal, the SZ-Archiv, and WISO, the newspaper corpus is only available upon request with permission from these providers.