Occupational Deregulation, Mixed Embeddedness, and Immigrant Self-Employment: The 2004 Reform of the German Crafts Code as a Quasi-Experiment

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To my friends and family.
This one’s for you!

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Although it surely felt like it sometimes, I did not write this dissertation in a bubble. Instead, without the love and support of a large number of my colleagues, friends, and family, I would not have been able to finish this dissertation.

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Introduction

As global migration numbers have continued to increase over the past twenty years (McAuliffe & Binod, 2019), so have the number of self-employed immigrants (OECD & European Union, 2019). Faced with the task of integrating into the destination country's labor market, millions of immigrants turn to self-employment. For example, the number of self-employed immigrants in the European Union (EU) increased from approximately 2.2 million in 2009 to 2.9 million in 2018 (OECD & European Union, 2019).[1] To put this into perspective, of the 18.5 million people that were born in another country working in the EU, about 13 percent were self-employed in 2018 (OECD & European Union, 2019). These figures illustrate that some immigrants start their own business, while others do not. One of the things that remains unclear, however, is *why* some immigrants choose self-employment and others do not. The pursuit of finding an answer to this question guided this manuscript.

Although there are economic and social risks involved with self-employment, successful (immigrant) entrepreneurs also enjoy economic and social rewards (Baycan-Levent & Nijkamp, 2009; Goss, 2005; Leicht, 2005; Leicht, et al., 2015; Portes & Jensen, 1989; Portes & Shafer, 2007; Thornton, 1999). For example, immigrant entrepreneurs often outearn their employed coethnic counterparts and even contend with the earnings of natives (Andrejuk, 2017; Clark & Drinkwater, 2000; Constant & Zimmermann, 2006, 2014; Portes & Zhou, 1996; Wilson & Portes, 1980). Furthermore, successful immigrant entrepreneurs often provide jobs for other immigrants, support local ethnic institutions, and help aspiring entrepreneurs start their own business, thus they are cornerstones of their ethnic communities (Aldrich & Waldinger, 1990; Portes, 1987; Xie & Gough, 2011; Zhou & Logan, 1989). Nonetheless, not all immigrant entrepreneurs are this prosperous. Instead, many of them enter self-employment

[1] These data exclude Germany because self-employment data by place of birth were not reported for Germany prior to 2017 (OECD/European Union 2019).

out of economic necessity, often setting up shop in markets with low entry barriers in terms of capital costs and required educational qualifications (Aldrich & Waldinger, 1990; Dana, 1997; Fairlie & Meyer, 1996; Waldinger et al., 1990).

Over the year migration scholars have developed different approaches, theories, and concepts to understand and explain ethnic entrepreneurship (for an overview see Aldrich & Waldinger, 1990).[2] However, according to Kloosterman, van der Leun, and Rath (1999) most of these approaches were too focused on the immigrants themselves and neglected to consider the economic and institutional structures in which they are embedded. Accordingly, Kloosterman, van der Leun, and Rath developed what they coined the *mixed embeddedness approach* to better understand immigrant entrepreneurship in modern urban economies (1999). This approach emphasized the interaction of supply-side (immigrants' resources) and demand-side (self-employment opportunities) factors in explaining immigrants' self-employment. They enhanced existing approaches, by emphasizing the dynamic role that institutions (e.g., immigration policies), economic contexts (e.g., market growth), and socio-cultural resources (e.g., ethnic capital) play in explaining immigrant self-employment (for a recent review see Barberis & Solano, 2018; Kloosterman & Rath, 2018). Above all, they emphasized the importance of the opportunity structure, which in their view had until then been largely neglected (Kloosterman & Rath, 2001).

They contended that immigrant self-employment is primarily located at the intersection of changes in sociocultural frameworks (characteristics of the group) and transformation processes in economies and institutional frameworks (opportunity structure). For example, they noted that previous studies had primarily focused on immigrants' resources, especially social and ethnic capital, to explain self-employment outcomes. However, without an opportunity to

[2] Throughout the literature the terms ethnic entrepreneurship, immigrant entrepreneurship, and immigrant self-employment are used interchangeably, albeit being slightly different phenomena.

start a business, immigrants with these resources will likely not start their own business. At the same time, available self-employment opportunities without "appropriate" resources will also not result in immigrants' self-employment (Kloosterman, 2010).

Returning to the 2.9 million self-employed immigrants in the EU, the following question(s) then arises: all other things being equal, would these immigrants have chosen self-employment if, for example, self-employment restrictions in their country of residence were more stringent or the market demand for entrepreneurs in their occupation was lower? Obviously, we will never know for sure but according to the mixed embeddedness approach we can expect that without the opportunity to start a business, they likely would not have done so. The question that naturally follows then is, provided with the opportunity to start a business, who does so, or more specifically in this case which immigrants do so? Following the mixed embeddedness approach the expectation is that those immigrants with the necessary resources to start their own business, will do so (which resources those are will become clearer in chapter one).

Although the mixed embeddedness approach emphasizes the variability of the interaction between immigrants' skills and resources and the opportunity structure, empirical studies which examined this relationship are still rare. I begin to fill this gap with this manuscript. Furthermore, the mixed embeddedness approach never explicitly addresses different forms of self-employment e.g., solo self-employment or self-employment with employees. However, as several scholars including Kloosterman (2010) have pointed out, many immigrants enter self-employment out of economic necessity, often setting up shop in markets with low entry barriers in terms of capital costs and required educational qualifications (Aldrich & Waldinger, 1990; Dana, 1997; Fairlie & Meyer, 1996; Waldinger et al., 1990). Consequently, many of these businesses are single-person operations without paid employees (OECD & European Union, 2019; Sanders & Nee, 1996; Waldinger, 1989). To address this gap, I extended the mixed em-

beddedness approach by differentiating between solo self-employment (i.e., a business operated by just one person with no (paid) employees) and self-employment with employees. Lastly, until now most studies that examined ethnic entrepreneurship either concentrated explicitly on male immigrants or neglected to consider the differing contexts that female immigrants are embedded in (for an overview see Baycan-Levent et al., 2006). Yet, recent studies have found that immigrant women face a double disadvantage on the labor market: one for gender and another for migration status (Ballarino & Panichella, 2018; Donato et al., 2014; Fleischmann & Höhne, 2013). Thus, I also extended the mixed embeddedness approach by explicitly considering the different contexts in which immigrant women are embedded and how this affects their self-employment outcomes.

With increasing numbers of global migrants, understanding immigrant self-employment should be of particular importance for policymakers and researchers worldwide. To demonstrate the political and social relevance of immigrant entrepreneurship, I now turn to Germany, the setting of the forthcoming chapters.

With over 13 million migrants in 2019, Germany had the largest foreign-born population of any country in Europe and the second largest number of residing international migrants worldwide (McAuliffe & Binod, 2019). The integration of immigrants in Germany, especially labor market integration, has become a politically salient topic that has garnered much attention in recent decades (Constant & Massey, 2005; Kalter, 2006; Kalter & Kogan, 2014; Kogan, 2006, 2007a, 2007b; Kogan & Weißmann, 2013; Kosyakova & Brücker, 2020). Most of these studies found that immigrants fare worse on the German labor market than their native counterparts. Studies on immigrants' self-employment, however, found that self-employed immigrants generally fare better than their employed counterparts (Block et al., 2011; Constant & Zimmermann, 2006; Leicht, 2005; Leicht, et al., 2015; Özcan & Seifert, 2000; Struminskaya,

2011). Providing immigrants with self-employment opportunities may, therefore, be an effective way of promoting labor market integration.

To test this expectation, I developed a novel identification strategy in which I used the 2004 reform of the German Crafts Code as a quasi-experiment to investigate *how expanding self-employment opportunities affects the self-employment decisions of immigrants* and *how expanding self-employment opportunities affects the earnings of self-employed immigrants*. The following three chapters provide some first causal evidence on the effect of occupational deregulation on immigrant women's and men's self-employment decisions and immigrant entrepreneurs' earnings. In the following, I briefly summarize the forthcoming chapters.

In chapter one I incorporated a dynamic model of decision-making (Elster, 1979) into the mixed embeddedness approach to better understand immigrants' self-employment decisions. To test this approach, I used the 2004 reform of the German Crafts Code, which abolished occupational entry regulations in 53 of 94 occupations, as a quasi-experiment to estimate the causal effect of removing occupational entry restrictions on immigrants' self-employment decisions. To estimate the causal effect of occupational deregulation on immigrants' self-employment, I estimated difference-in-difference-in-differences (DDD) regressions based on German micro-census data. The results demonstrate that immigrants with more resources take advantage of self-employment opportunities and improve their labor market position, while those with less resources do not. The results show that expanding self-employment opportunities per se does not necessarily lead to equal outcomes but rather that cumulative (dis)advantage determines immigrants' self-employment outcomes and individual resources become more important as the occupational structure becomes less rigid.

Chapter one examined the causal effect of occupational deregulation on immigrants' self-employment decisions. In chapter two, I examined the causal effect of expanding self-employment opportunities on self-employed immigrants' earnings. Previous research found

that restricting occupational opportunities through occupational closure shelters certain immigrant groups from labor market discrimination (Alecu & Drange, 2019; Drange & Helland, 2019; Redbird, 2017; Redbird & Escamilla-García, 2020; Witte, 2020). Yet, these studies also found that more vulnerable groups i.e., those with a shortage of human, social, and cultural capital often suffer negative consequences of closure. Most of these studies, however, compared regulated to unregulated occupations or examined the effect of introducing new regulations in formerly unregulated occupations on labor market outcomes. Far less is known about the effect of removing occupational regulations and entry restrictions on labor market outcomes, especially among immigrants. I addressed this research gap by using the 2004 reform of the German Crafts Code as a quasi-experiment and implementing difference-in-difference-in-differences (DDD) estimators based on German micro-census data to determine the causal effect of removing occupational regulations on self-employed immigrant women's and men's earnings. The results show that self-employed women have higher returns to occupation-specific human capital and lower returns to general human capital once occupational restrictions were removed. Immigrant men, however, have higher returns to social and ethnic capital, albeit in solo self-employment. These results demonstrate that expanding self-employment opportunities does not lead to equal outcomes for all groups, but that individual resources become more important as the occupational structure becomes less rigid.

In the third and final chapter, I incorporated the concepts of bonding and bridging social capital into the theoretical framework of chapters one and two to develop a better understanding of the role of native and ethnic resources in determining immigrants' self-employment outcomes. I investigated how access to native and ethnic resources through marriage, indicated by the ethnicity of one's spouse, shapes immigrant women's and men's self-employment decisions and affects their earnings. Specifically, using the 2004 reform of the German Crafts Code as a quasi-experiment, I analyzed the causal effect of occupational deregulation on the self-

employment decisions and earnings of immigrants with native and migrant spouses. The results show that the self-employment decisions and earnings of immigrants with more bridging social capital were not affected by occupational deregulation. Immigrant women with more bonding social capital, however, were more likely to choose employment over solo self-employment given the opportunity to. Nevertheless, self-employed immigrant women with more bonding social capital also suffered an earnings penalty after occupational regulations were removed. These results demonstrate that expanding self-employment opportunities does not lead to equal outcomes for all groups, but that individual resources become more important as the occupational structure becomes less rigid.

Chapter One

Introduction

Roughly twenty years ago, Kloosterman, van der Leun, and Rath developed the *mixed embeddedness* approach to better understand and study immigrant entrepreneurship in modern urban economies (1999). This approach emphasizes the interaction of supply-side (immigrants' resources) and demand-side (the opportunity structure) factors in explaining immigrants' self-employment.[3] They enhanced existing interactionist approaches, by emphasizing the dynamic role that institutions (e.g. immigration policies), economic contexts (e.g. market growth), and socio-cultural resources (e.g. ethnic capital) play in explaining immigrant self-employment (for a recent review see Barberis & Solano, 2018; Kloosterman & Rath, 2018). Above all, they emphasized the importance of the opportunity structure, which in their view had until then been largely neglected (Kloosterman & Rath, 2001). This is rather surprising, since most of the scholars working on ethnic entrepreneurship at the time were sociologists (e.g., Light, 1984; Light & Gold, 2000; Metcalf et al., 1996; Portes, 1987, 1995) and the concept of the opportunity structure in explaining social action has a long tradition in sociology (see e.g., Merton, 1957, 1995; Petersen, 2011). Furthermore, Storti (2018) suggested that a micro-founded theory of social action is still missing from the mixed embeddedness approach and is needed to develop better explanations of the causal mechanisms of immigrant entrepreneurship. In his view, although the mixed embeddedness approach emphasizes agency by considering immigrants' resources, it does not sufficiently explain the action of those actors. Consequently, studies that both applied the mixed embeddedness approach and offered causal explanations of immigrant entrepreneurship are rare. This current study bridges this divide by incorporating a dynamic

[3] Throughout the literature the terms ethnic entrepreneurship, immigrant entrepreneurship, and immigrant self-employment are used interchangeably, albeit being slightly different phenomena.

model of decision-making (Elster, 1979) into the mixed embeddedness approach to better understand immigrants' self-employment decisions. To test this approach, I used the 2004 reform of the German Crafts Code (*Handwerksordnung*) as a quasi-experiment to estimate the causal effect of removing occupational entry restrictions on immigrants' self-employment decisions.

The 2004 reform of the German Crafts Code abolished occupational entry regulations in 53 of 94 occupations. Since then, in principle anyone, regardless of their level of qualification, can start a business in these 53 occupations. Whereas, in the remaining 41 occupations self-employment is still regulated. Hence, this setting resembles a quasi-experiment. Accordingly, I leveraged the reform to causally investigate how removing occupational restrictions affects immigrants' self-employment outcomes. To estimate the causal effect of occupational deregulation on immigrants' self-employment, I applied a difference-in-difference-in-differences (DDD) approach based on German micro-census data. The results of which demonstrate that immigrants with more resources can take advantage of self-employment opportunities and improve their labor market position, while those with less are not. These results show that (i) equal opportunity does not necessarily lead to equal outcomes; (ii) that cumulative (dis)advantage determines economic outcomes; and (iii) that individual resources become more important as the occupational structure becomes less rigid.

Theoretical Background

For decades sociologists have demonstrated that individuals' economic, legal, political, social, and technical constraints determine the opportunities they have access to and the decisions they make (Merton, 1995; Petersen, 2011). Elster (1979) formalized a model of decision-making that describes a two-step filtering process. In the first step, individuals filter out a set of feasible actions from all possible actions based on their constraints. In the second step, they choose an action from this feasible set based on their desires and beliefs (figure 1.0). This is an ongoing process that is constantly repeated and adjusted given new and changing opportunities,

constraints, and preferences (Elster, 1983). By extension then, given the possible opportunities and individuals' constraints and preferences one can explain why certain individuals choose action *X*, while others choose action *Y*.[4] Thus, I applied Elster's decision-making model to the mixed embeddedness approach to better understand why some immigrants start their own business while others do not.

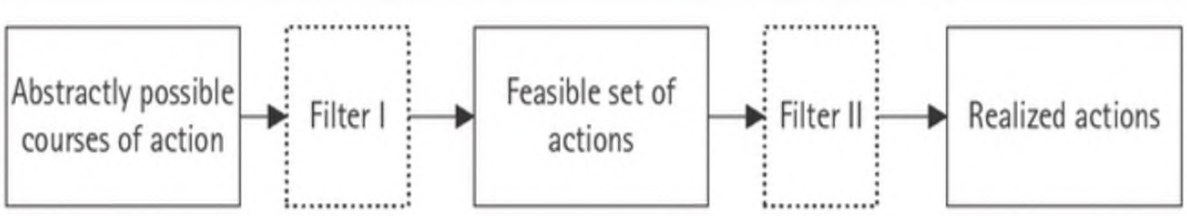


Figure 1.0 Elster's two-filter model

Kloosterman and colleagues (Kloosterman, 2010; Kloosterman et al., 1999; Kloosterman & Rath, 2001) developed the mixed embeddedness approach to better understand immigrant entrepreneurship in advanced urban economies. They contended that immigrant entrepreneurship is primarily located at the intersection of changes in sociocultural frameworks (characteristics of the group) and transformation processes in economies and institutional frameworks (opportunity structure). They emphasized the variability of this interaction i.e., immigrants' skills and resources (e.g., human and social capital) and the opportunity structure, which consists of economic (e.g., local markets) and institutional (e.g., regulations and policies) contexts, are constantly changing. For example, they noted that previous studies had primarily focused on immigrants' resources, especially social and ethnic capital, to explain self-employment outcomes. However, without an opportunity to start a business these resources will not lead to self-employment. Conversely, available self-employment opportunities without 'appropriate' resources will also not result in self-employment (Kloosterman, 2010). Nevertheless, they also concluded that due to a lack of access to financial capital and appropriate

[4] Admittedly, this is a simplified account of a much more complex process. Yet, to better understand and explain complex social processes, developing simple and testable claims is, in my view, the best strategy.

human capital, generally most immigrant entrepreneurs set up shop at the lower end of the opportunity structure i.e., in markets with low entry barriers in terms of capital costs and required human capital (Kloosterman, 2010; Kloosterman et al., 1999).

Despite this, the mixed embeddedness approach never explicitly addresses different forms of self-employment e.g., solo self-employment or self-employment with employees. Instead, Kloosterman (2010) implicitly hints at varying forms of self-employment by describing differences in entrepreneurs' resources, local markets, and potential business performance. However, as several scholars including Kloosterman have pointed out, many immigrants enter self-employment out of economic necessity, often setting up shop in markets with low entry barriers in terms of capital costs and required educational qualifications (Aldrich & Waldinger, 1990; Dana, 1997; Fairlie & Meyer, 1996; Waldinger et al., 1990). Consequently, many of these businesses are single-person operations without paid employees (OECD & European Union, 2019; Sanders & Nee, 1996; Waldinger, 1989). Accordingly, I extended the mixed embeddedness approach by differentiating between solo self-employment i.e., a business operated by just one person with no (paid) employees; and self-employment with employees.

Solo Self-Employment

Previous studies that examined solo self-employment found that self-employed individuals without employees differ significantly from those with employees (Barbieri, 2003; Boeri et al., 2020; Hipp et al., 2015; Millán et al., 2014). For example, Dvoulety (2018) based on three waves of the *European Survey of Working Conditions* found that immigrants were significantly less likely to be self-employed with employees. While individuals with more labor market experience, higher levels of education, and more financial capital were significantly more likely to be self-employed with employees. Moreover, Van Stel and de Vries (2015) found that in the Netherlands approximately twenty-five percent of solo self-employed individuals started their business for lack of alternative employment options. Lastly, Nanda (2008)

exploiting a tax reform in Denmark found causal evidence that financing constraints had the largest impact on individuals' decisions to start a business with employees. These studies demonstrate that starting a business with employees is costlier than going into business alone. Although financial costs seem to be the biggest hurdle, having employees also comes with additional bureaucratic costs e.g., compulsory registration of all employees for social security benefits (for an overview see Ganserer, 2021). Accordingly, starting a business with employees also requires additional receiving country-specific knowledge and skills e.g., language skills and knowledge of the legal system. Hence, starting a business with employees requires additional resources compared to going into business alone. Consequently, I assume that differences in the decision to start a business without or with employees will exist based on immigrants' resource constraints.

Women's Self-Employment

Along with resource and opportunity constraints, gender differences in self-employment also exist. Overall, gender differences in labor market participation in Germany are largely due to the social welfare state. As a conservative welfare state with a male-breadwinner model, it provides strong incentives to married couples with children and supports husbands and fathers in their breadwinner function (Arpino et al., 2015; England & Browne, 1992; Esping-Andersen, 2000, 2015). Hence, large gender differences in labor force participation, especially self-employment, exist (Apitzsch & Kontos, 2003; Caliendo et al., 2014; Kontos, 2003; Leicht et al., 2017). Along with these institutional factors, there are several other explanations for women's labor market disadvantage in general and self-employment (for an overview see McManus, 2001). For example, the *resource* approach posits that women's self-employment disadvantage can be attributed to their lack of necessary resources i.e., human, financial, and social capital (Becker, 1985; McManus, 2001). Furthermore, *devaluation* theory and *occupational segregation* approaches assert that female-dominated occupations and work are

valued less in society and therefore less economically rewarding (England, 1992; Paula England & Nancy Folbre, 2005; Petersen & Saporta, 2004). Similarly, the *power resource* approach emphasizes how power inequalities between male-dominated and female-dominated occupations lead to disadvantages (Minkus, 2019). Lastly, the *incentive* approach asserts that women and men have different incentive structures regarding self-employment and that this explains gender differences in self-employment outcomes. For example, women are more likely to enter self-employment because of familial reasons and flexibility rather than earnings and economic self-sufficiency (Bögenhold & Klinglmair, 2015; McManus, 2001). These approaches demonstrate that women generally face additional constraints in their self-employment decisions as compared to men. Therefore, existing labor market theories, based largely on men's labor market activity, may not efficiently explain women's self-employment decisions. Accordingly, I expect that women and men will have different self-employment outcomes given the same opportunity.

Furthermore, recent studies have also found that immigrant women face a double disadvantage on the labor market: one for gender and another for migration status (Ballarino & Panichella, 2018; Donato et al., 2014; Fleischmann & Höhne, 2013). One possible explanation of this double disadvantage in the destination country is the effect of country-of-origin gender role attitudes and female labor force participation (Blau et al., 2011; Röder & Mühlau, 2014). For example, Fleischmann and Höhne (2013) found that in Germany the gender gap in labor force participation between first-generation immigrant women and men from non-European and less developed countries was larger than the gender gap among West German natives. While immigrants from post-socialist countries (including former East Germany) had similar or smaller gender gaps in labor force participation than native West Germans. Similarly, Frank and Hou (2016) found that the female labor force participation rate in the country of origin was a strong predictor of immigrant women's earnings in Canada. These findings suggest that

origin country gender role attitudes and labor force participation rates affect immigrant women's labor market outcomes in the destination country. Hence, many immigrant women face additional constraints in their labor market integration and self-employment decisions. How removing institutional barriers, such as occupational licensure, affects immigrant women's self-employment decisions is largely unexplored. This chapter provides some first causal evidence in this regard.

Human Capital Approach

Lastly, a traditional human capital approach assumes that net of other characteristics, such as ethnicity and gender, the higher one's human capital investment is, the larger their economic returns will be (Becker, 1993). Furthermore, Sorensen (1983) argued that the more open an occupational structure becomes, in terms of open versus closed positions, the more important the role of individual qualifications in occupational attainment will be. Following a traditional human capital approach, therefore, assumes that individuals with more training and education in general should experience larger returns to opening formerly closed positions, in this case self-employment. However, more recent studies on task-specific human capital demonstrate that this may not be the case across all occupations (Gathmann & Schönberg, 2010; Gibbons & Waldman, 2004; Schulz et al., 2013; Takii et al., 2020). For example, Gathmann and Schönberg (2010) found that in Germany task-specific human capital explained up to fifty percent of wage growth across occupations, especially for high-skilled workers. Moreover, Sullivan (2010) found that in the United States occupation-specific human capital accounted for the largest wage gains among craftspeople, whereas more general skills had no effect. The German skilled crafts and trades require very specialized training and skills (Bol, 2014; DiPrete et al., 2017; Elbers et al., 2021). Accordingly, this suggests that individuals with more specific human capital, such as vocational training, should have higher returns to occu-

pational deregulation in the German skilled crafts and trades. Accordingly, I tested these competing assumptions, by estimating the causal effect of occupational deregulation on self-employment across varying education levels.

Theoretical Model & Hypotheses

By incorporating Elster's model of decision-making into the mixed embeddedness approach, I modeled immigrant self-employment as follows:

*Immigrant self-employment = Opportunities [Reform] * Constraints [Resources] * Preferences [Self-Employment]*

Whereby, the outcome of immigrants' self-employment corresponds to an opportunity to enter self-employment (presented by the 2004 reform) conditional on one's available resources and their preference towards self-employment.[5] Hence, although the 2004 reform provides a universal self-employment opportunity, due to resource constraints self-employment is not feasible for everyone and for those of whom it is, some may not prefer it.[6]

In summary, immigrants are embedded in different sociocultural, economic, and institutional contexts. These various contexts provide resources but also inflict constraints that affect their self-employment decisions. These constraints determine the feasibility of self-employment for every individual including whether they open a business with or without employees. Furthermore, women in general and immigrant women in particular face additional constraints in their self-employment decisions. These group-specific constraints lead to different feasible choices and outcomes across groups. Accordingly, I expect that immigrant groups with

[5] In this model I do not postulate *how* or *when* preferences are formed, but rather illustrate that one's preferences are part of the decision-making process. Nonetheless, there are several alternative approaches to the role of preferences on social action (for an overview see Freese 2011; for *adaptive preference formation* see Elster 1983; for a critique and new proposal see Colburn 2011).

[6] I assume that given the opportunity, individuals will maximize their earnings and occupational status conditional on their resources and constraints. Admittedly, due to differing migration causes e.g., economic, political, or family reunification, this assumption may be more plausible for some groups than others.

more resources (less constraints) will be overall more likely to choose self-employment (*hypothesis 1*), particularly self-employment with employees (*hypothesis 2*), whereas groups with limited resources (more constraints) will be more likely to start a business without employees (*hypothesis 3*). I used the 2004 reform of the German Crafts Code as a quasi-experimental self-employment opportunity to causally test these claims.

The Setting

German Context

In recent decades self-employment has experienced an economic and political revival in Germany, with researchers and politicians alike once again taking up interest in the topic (Arum & Müller, 2004; Brüderl, 2007; Constant & Zimmermann, 2006, 2014; McManus, 2000). Nonetheless, with roughly ten percent, Germany still has one of the lowest overall self-employment rates in the European Union (EU); Denmark and Luxembourg have lower levels (OECD, 2020). This is not surprising as Germany's labor market is highly regulated with strict access to self-employment (DiPrete & McManus, 1996; Esping-Andersen & Regini, 2000; Luber et al., 2000). Furthermore, with over 13 million migrants in 2019, Germany had the largest foreign-born population of any country in Europe and the second largest number of residing international migrants worldwide (McAuliffe & Binod, 2019). The integration of immigrants in Germany, especially economic integration, has become a politically salient topic that has garnered much attention in recent decades (Constant & Massey, 2005; Kalter, 2006; Kalter & Kogan, 2014; Kogan, 2006, 2007a, 2007b; Kogan & Weißmann, 2013; Kosyakova & Brücker, 2020). Most of these studies found that immigrants fare worse on the German labor market than their native counterparts. Studies on immigrants' self-employment, however, found that self-employed immigrants generally fare better than their dependent employed

(henceforth referred to as employed) counterparts (Block et al., 2011; Constant & Zimmermann, 2006, 2014; Leicht, 2005; Leicht et al., 2017; Özcan & Seifert, 2000; Struminskaya, 2011). Easing access to self-employment may, therefore, be an effective way of promoting labor market integration.

The 2004 Reform of the German Crafts Code

In 2019 the German skilled crafts sector comprised twenty-seven percent of all businesses, twelve percent of all employees, and twenty-eight percent of all apprentices, making it one of Germany's most important economic sectors (Zentralverband Deutsches Handwerk, 2020). In 2000 the Court of Justice of the European Union (CJEU) ruled that the German Crafts Code (*Handwerksordnung*) was incompatible with the principles of a single European market e.g., free movement of services (Monopolkommission, 2001). In response, the German government liberalized entry regulations in the skilled crafts and trades sector on January 1, 2004 (Entwurf eines Dritten Gesetzes zur Änderung der Handwerksordnung und anderer handwerksrechtlicher Vorschriften., 2003). Until then only individuals with a master craftsman's certificate (*Meisterbrief*) were legally permitted to establish and operate a business in the 94 registered crafts and trades (*Handwerksrolle*). To obtain a master craftsman's certificate a craftsperson is required to complete several years of additional training after their initial three-year apprenticeship, pass state examinations, and cover all the required costs, which range from two to ten thousand EUR (Lergetporer et al., 2018). Since the reform, a master craftsman's certificate is no longer required to open a business in 53 of the 94 registered crafts, in the remaining

41 it still is.[7] Furthermore, since there were no similar entry restrictions for dependent employment (henceforth referred to as employment), the reform exclusively concerned self-employment.[8]

Table A1.1 in the appendix lists the 94 crafts and trades and whether they were deregulated in 2004. The ultimate decision of which crafts to deregulate took several years and involved numerous actors including politicians, corporate lobbyists, union representatives, and the Chamber of Crafts. Furthermore, the selection criteria included, among other things, a risk-assessment of each craft e.g., potential risk of harm to customers. Therefore, as becomes evident from table A1.1, the list of deregulated and regulated skilled crafts is somewhat heterogeneous.[9] Nonetheless, the reform abolished entry restrictions for the deregulated occupations and should therefore have increased self-employment and created new job opportunities.

Previous evidence, however, suggests that this may not be as clear-cut as it seems. For example, Rostam-Afschar (2014) found that the reform increased entry into self-employment among the deregulated occupations and that exits out of self-employment remained virtually unchanged. Sonntag and Lutter (2018) found little to no effect of the reform on the earnings of self-employed individuals for either group. Damelang, Haupt, and Abraham (2018), however, found that employees in the deregulated crafts had lower wages after the reform. Bol (2014), on the other hand, found that self-employed workers with comparable levels of human capital and demographic characteristics earned more in the regulated occupations. Furthermore, Lergetporer and colleagues (2018) found that it was largely solo self-employment that had increased after reform and that wages decreased for incumbent craftspeople in the deregulated

[7] There are a few exceptions to this rule, however, none as timesaving and cost-reducing as the full deregulation of the other 53 crafts (for an overview see Lembcke, 2020).

[8] There are differences in occupational qualification requirements regarding employment. For example, a completed apprenticeship is required to work as a skilled craftsperson (*Facharbeiter*), however, one can work without such a qualification, albeit, as an unskilled craftsperson (*Hilfsarbeiter*).

[9] I describe the methodological implications of this and how I used it to test the robustness of my results in the methodology section.

crafts. None of these studies, however, specifically focused on immigrants. The only study, to my knowledge, to have done so thus far is the study by Runst (2018) that investigated the effect of the reform on immigrants' employment in the skilled crafts sector. Runst (2018), using a binary dependent variable indicating migration status, found that the reform increased the probability of immigrants' employment in the deregulated trades. Unfortunately, Runst did not further discern between different immigrant groups, leaving several questions concerning group-specific determinants in employment outcomes unanswered. I begin to answer some of these questions in this chapter.

Economic and institutional context

Country-specific occupational regulations such as licensure e.g., a master craftsman's certificate,[10] restrict entry into certain occupations. Licensure is the most restrictive form of occupational regulation. Only a licensed individual is permitted to practice a licensed profession (Damelang, Stops, et al., 2018; Kleiner & Krueger, 2013; Kleiner & Kudrle, 2000; Redbird, 2017; Weeden, 2002). In the German skilled crafts sector licensure legally governs entry through self-employment (Bol, 2014). The regulations make it difficult, if not impossible, for individuals without such a license to gain access to the affected occupations. Since immigrants often bring foreign qualifications with them, they are unlikely to possess receiving country-specific labor market requirements (C. M. Schmidt, 1997). Therefore, immigrants are often disproportionately affected by such restrictions (Redbird & Escamilla-García, 2020). In general, these occupational restrictions affect all immigrant groups. Nonetheless, foreign qualifications from certain countries e.g., EU member states, are recognized more willingly than others. Hence, I considered how this, and other group-specific policies affect immigrants' self-employment decisions.

[10]The English translation of *Meisterbrief* unfortunately labels it as a "certificate" although it functions as an occupational license (for an overview see Bol 2014).

Immigration policies concerning employment and residence permits differ between groups depending on their country of origin. These policies stipulate the occupations and jobs that immigrants are permitted to work in or prohibit them from working or residing in a country altogether. These policies function as a protectionist mechanism for the domestic workforce, favoring natives and hindering immigrants (Aldrich & Waldinger, 1990; Baldi & Goodman, 2015; Kogan, 2007a; Torrini, 2005). Accordingly, group-specific variations in employment and residency regulations affect which immigrant groups can use the reform as an opportunity to start their own business.

For example, citizens of one of the other 26 EU[11] or four EFTA[12] member countries enjoy employment and residence advantages in Germany. EU regulations on the freedom of establishment and the free movement of services legally allow EU and EFTA citizens to reside, work, and establish their own business in Germany (Huntoon, 1998; Wagner & Hassel, 2015). Citizens of other countries (so-called third-country nationals), on the other hand, must meet a long list of requirements before they are granted an employment permit. Namely, they must have a position, or a binding job offer, their foreign educational degree or training must be accredited, and there must be a demand for employees in that specific occupation (*Engpassberuf*). Regarding self-employment, there must be economic interest or a regional need, the activity should be expected to have a positive impact on the local economy, and the financing for the implementation of the activity must already be secured either through equity or credit approval (Leicht et al., 2017). Accordingly, third-country nationals face clear institutional disadvantages as compared to EU and EFTA citizens. Hence, they face additional constraints regarding their employment decision.

[11] As of 31.01.2020: Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romanian, Sweden, Slovakia, Slovenia, and Spain.

[12] The European Free Trade Association: Island, Lichtenstein, Norway, and Switzerland.

Sociocultural context

Occupational licensure and employment permits are not the only constraints concerning immigrants' self-employment decisions. Group-specific characteristics and resources also influence immigrants' employment strategies and shape their self-employment decisions. Although all EU, EFTA, and non-EU immigrants are subject to the same group-specific institutional restrictions, immigrant groups from the individual countries differ in their sociocultural resources.[13]

For example, the countries of the former "guest-workers" (*Gastarbeiter*) such as Greece, Italy, Portugal, Spain (EU member states), Turkey and the former Yugoslavia (non-EU member states)[14] have long and established histories of migration and settlement in Germany.[15] They have established businesses, secured employment positions, and developed communities. Belonging to a group with an established ethnic community aids members in their labor market endeavors. Initial receiving country-specific labor market deficits are overcome quicker, for instance, through resources such as information diffusion regarding the peculiarities of the German labor market and job vacancies (Lancee, 2012). On the one hand, members of these groups should therefore have less difficulty finding a job. This produces less of a push into self-employment out of economic necessity i.e., solo self-employment. On the other hand, they can rely on their ethnic communities to help them start a business, find employees, and establish a customer base. This should pull them into self-employment, since they can utilize these ethnic resources and maximize their economic returns i.e., self-employment with employees (see Pécoud, 2002 for Turkish self-employment; Storti, 2014 for Italian self-employment). However, on average this group lacks financial and human capital (Höhne et al., 2014),

[13] In the following I describe several different immigrant groups, based largely on group-size and political salience. Naturally, this is not an exhaustive list of all immigrant groups in Germany.

[14] Slovenia joined the EU in 2004 and Croatia in 2013.

[15] Beginning in 1955 with the first guest-worker recruitment treaty signed with Italy (Schmidt 1997).

which may also constrain them from opening their own business, especially one with employees.

In contrast to the former guest-workers, immigrants from Eastern Europe, particularly from the EU accession countries of 2004[16] and 2007,[17] just recently started migrating to Germany in large numbers (Leicht, et al., 2015).[18] Hence, they have less group-specific resources at their disposal, which makes it more difficult for them to find employment. Furthermore, several EU member states, including Germany, restricted the immediate and full labor market access of these new member states. Instead, a system of gradual measures spanning over seven years was put into place. Most of these restrictions, however, did not pertain to self-employment. Instead, self-employed persons were granted immediate access to the German labor market (Ochel, 2007).[19] The lack of financial, human, and social capital and the prospect of immediate access to the German labor market is likely to push Eastern Europeans into self-employment. However, due to their resource constraints this will likely be out of necessity and in the form of solo self-employment.

Northern and Western European countries do not have long established histories of labor migration to Germany. Nor are immigrants from these countries currently migrating to Germany in substantial numbers (Kogan, 2011). Hence, they never established notable ethnic communities such as the former guest-workers. Yet, this group has the longest EU and EFTA membership tenure[20] and many of these countries have existing bilateral arrangements with

[16] On 01/05/2004 Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia joined the European Union.

[17] On 01/01/2007 Bulgaria and Romania joined the European Union.

[18] Apart from Poles, who have a much longer history of migration to Germany and well-established ethnic communities (for an overview see Miera, 2008).

[19] I am aware that the 2004 EU accession and the German crafts reform correspond. I take conceptual and methodological steps to combat any possible confounding effects; the details of which I present in the methodology section.

[20] Ranging from 01/01/1958 to 01/01/1995.

Germany regarding occupational and educational recognition (Tulmets, 2003). The longstanding benefits of EU and EFTA membership, and existing bilateral arrangements lowered the constraints of self-employment and residency in Germany many years prior to 2004. Therefore, the reform will be less likely to push members of this group into solo self-employment out of necessity. Rather, members of this group will be pulled into self-employment at the prospects of economic gain and the freedom of being one's own boss (Leicht, 2005).

Lastly, ethnic German resettlers (*Aussiedler*) and so-called Jewish Quota Refugees (JQR) from the former Soviet Union have notable group-specific features that should affect their self-employment decisions. The historical and political manifestation of these groups are a result of Germany's role in World War II and the collapse of the Soviet Union. More specifically, there are two historically and politically distinct groups of ethnic German resettlers: those who emigrated from the former Soviet Union starting in the 1990s (often referred to as "late" resettlers: *Spätaussiedler*) and those who arrived from former German territories in Poland, Romania, and the Czech Republic in various waves after World War II (Joppke & Rosenhek, 2002; C. M. Schmidt, 1997). Upon arrival in Germany, ethnic German resettlers are awarded a special settlement status that grants them access to German citizenship and other privileges, such as recognition of their foreign educational qualifications and extensive retraining opportunities. They are also offered special integration programs that provide information and guidance regarding the features of the German labor market and the education and health care systems (Kalter & Kogan, 2014). Yet, comparably, *Spätaussiedler* have faced greater difficulties integrating in Germany than earlier resettlers (Panagiotidis, 2019).

In addition to ethnic German resettlers, more than 200,000 Jews from the former Soviet Union have immigrated to Germany since 1991 (Cohen & Kogan, 2007). They immigrated under the premise of a fixed yearly quota allocated by the German government, hence the name

"Jewish Quota Refugees." Jewish Quota Refugees also receive permanent residency and extensive integration support far beyond that to which other immigrant groups in Germany are entitled to e.g., unrestricted labor market access and social assistance. However, it is less comprehensive than the support provided to ethnic German resettlers, for example, Jewish Quota Refugees are not entitled to German citizenship (Cohen & Kogan, 2007; Dietz, 2000). Lastly, both groups arrived with higher-than-average levels of education compared to other immigrant groups (Kogan, 2011). What these two groups lack in established communities and longstanding bilateral agreements they make up for in governmental support, education level, and receiving country-specific knowledge and skills. On the one hand, this will likely pull them into self-employment, especially businesses with employees. On the other hand, this should also make it less difficult for them to find employment.

Methodology

Quasi-Experimental Design

I used the 2004 reform of the German Crafts Code as a quasi-experiment to test the causal effect of occupational deregulation on immigrants' self-employment decisions. Prior to the reform the two groups were restricted by the same occupational regulations. After the reform, however, 53 of the 94 crafts and trades no longer required a master craftsman's certificate to start a business, while the remaining 41 still did. Hence, the reform resembles an experimental setting in which the deregulation acts as a treatment and the 53 deregulated crafts represent the treatment group and the 41 (still) regulated the control group. This allowed me to use a difference-in-difference-in-differences (DDD) approach to isolate the causal effect of the 2004 reform on immigrants' self-employment (Gangl, 2010; Meyer, 1995; Roth & Siegert, 2016).

Accordingly, I estimated linear probability models based on variants of the following regression equation:

Equation 1.1

$$Y[Self\text{-}employment] = \beta 0[Constant] + \gamma[Nationality*Treatment*Time] + \beta 1[Treatment] + \beta 2[Time] + \beta 3[Nationality] + \beta 4[Treatment*Time] + \beta 5[Nationality*Treatment] + \beta 6[Nationality*Time] + \beta 7[Covariates] + \varepsilon[Random\ Error\ Term]$$

In which the binary outcome variable *Y* indicates whether someone is employed (0) or self-employed (1).[21] To test my hypothesis regarding different self-employment types, I also varied *Y* between being self-employed with or without employees in certain models. γ provides the causal effect of interest and is represented by a three-way interaction between the binary *nationality* variable (other nationality/respondent's nationality); the binary *treatment* variable (control group/treatment group); and the binary *time* variable (pre-reform/post-reform). This three-way interaction predicts the probability of self-employment for each nationality group working in one of the 53 deregulated occupations after the reform. Thus, following a DDD approach it predicts the causal effect of the 2004 German Crafts Code reform on each nationality groups' probability of self-employment. To test the causal effect of education on self-employment, I replaced the *nationality* variable in equation 1.1 with a binary *education* variable (other education/respondent's education) in model 6 (see Table A1.2 in the appendix for an overview of the education levels). Furthermore, to control for any possible confounding trends I included fixed-effects for occupation, industrial sector, year, federal state, and used clustered standard errors by occupations.[22] Lastly, I included several control variables that may influence immigrants' self-employment, such as the relative group size of each immigrant group, for

[21] Respondents were asked to define their current occupational status.

[22] I also estimated all models using individual yearly federal state fixed effects (year*state). The results did not significantly differ.

each given year, and in each German federal state (see Table A1.2 in the appendix for a complete list).

Data

I used the German micro-census for my analyses. The German micro-census is an annually administered repeated cross-sectional survey consisting of a 1% representative random sample of all German households. It is carried out by the statistical offices of the German states and prepared by the Federal Statistical Office of Germany. I used the Scientific Use File (SUF), which is an anonymized 70% subsample of the surveyed households (Schimpl-Neimanns, 2002). The micro-census has a large sample size as well as detailed information regarding both self-employment status and occupational classification. Based on the three-digit German occupational classification (*Klassifikation der Berufe 1992*) found in the micro-census, I was able to identify 79 occupational codes: 43 in the treatment and 36 in the control group. All the 94 crafts are covered within the 79 identified codes, however, due to the semi-aggregated structure of the classification scheme, there is some clustering (S. Schmidt, 2000).

The large sample size and detailed information regarding occupations make the micro-census a suitable data set for analyzing the impact of the 2004 crafts reform on immigrants' self-employment decisions. Nonetheless, the micro-census has some shortcomings. For example, information regarding migration background is limited i.e. I was only able to construct individuals' migration background by means of their current citizenship(s), information regarding if they were born in Germany or not, and year of arrival (for an overview see Gresch & Kristen, 2011). Moreover, additional information that has been shown to affect immigrants' self-employment outcomes, such as parents' country of origin and occupational status, language skills, employment preferences, and social network ties is also unavailable. That being taken into consideration, to my knowledge the micro-census is still the best available dataset

to study immigrants' self-employment, since its large sample size and detailed occupational information allows for more fine-grained group analyses.

Sample

My sample consisted of the years 2000 to 2008 and included all native Germans and first-generation immigrants (arrived in Germany at age 19 or older) who were employed in one of the 94 crafts and trades in that year (see Table 1.1 for an overview of all nationalities). To avoid any issues concerning individuals who were still in training or that had entered early retirement, I restricted the sample to actively employed individuals between 20 and 60 years old. Actively employed individuals were self-employed (with or without employees), civil servants, or blue- or white-collar workers; they were not on parental or sick leave, apprentices, in the military, family workers, or marginally employed at the time. This resulted in 182,734 observations in the overall sample. To test my hypothesis regarding gender differences in self-employment outcomes, I split the sample by gender. This resulted in 42,022 craftswomen and 140,712 craftsmen. Lastly, to mitigate any confounding effect that the 2004 EU enlargement may have had on immigrants' self-employment decisions I restricted the main analyses (models 3 through 9) to immigrants who arrived in 2003 or earlier.[23] This resulted in 41,820 crafts-women and 140,215 craftsmen.

[23]Additionally, until 2005 the micro-census applied a so-called "reference week concept". This means that the information provided by respondents refers to a specific week each year (Lengerer & Shahla, 2006). All the information for 2004 is based on the last week of March 2004. Since the EU enlargement came into force on May 1, 2004, the information from the 2004 micro-census survey does not include individuals who arrived as a direct consequence of the EU accession.

Table 1.1: Nationality Groups

Name	Overall (%)	Operationalization
German	172,220 (94.25)	Born in Germany with (only) German citizenship.
Former Yugoslav Republic	1,882 (1.03)	Citizens of Bosnia Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia, and Slovenia.
Remaining EU15 and EFTA	951 (0.52)	Citizens of Austria, Belgium, Denmark, Finland, France, Ireland, Island, Liechtenstein, Luxembourg, the Netherlands, Norway, Sweden, Switzerland, and United Kingdom
Southern Europe	961 (0.53)	Citizens of Cyprus, Greece, Malta, Portugal, and Spain.
Jewish Quota Refugee	419 (0.23)	Based on Cohen and Kogan 2007.
Eastern European	404 (0.22)	Citizens of Albania, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia.
Turkey	2,057 (1.13)	Turkish citizenship.
Italy	937 (0.51)	Italian citizenship.
Poland	671 (0.37)	Polish citizenship.
Africa	400 (0.22)	Citizens of one of the 54 African countries.
Americas	184 (0.10)	Citizens of one of the 35 sovereign states or dependent territories in the Americas.
West Asia aka Middle East	322 (0.18)	Citizens of one of the Western Asian countries (Middle East) including Afghanistan and Pakistan.
Asia	405 (0.22)	Citizens of one of the 23 Eastern, Southern, and South-Eastern Asian countries.
Rest of the World (non-EU)	115 (0.06)	Citizens of any of the remaining countries worldwide including Oceania.
Aussiedler	441 (0.24)	Dual citizens: German and Polish or Romanian; and arrived between 1945 and 1989.
Spaetaussiedler	365 (0.20)	Dual citizens: German and Armenian, Azerbaijani, Belarusian, Georgian, Kazak, Kyrgyzstan, Moldovan, Russian, Tajikistani, Turkmen, Ukrainian, or Uzbekistani, and arrived after 1991 (see Cohen & Kogan 2007).
Total	182,734 (100.00)	

German micro-census: 2000 - 2008; own calculations.

Assumptions

By employing a difference-in-difference-in-differences (DDD) design I assumed that without the reform, all other things being equal, the self-employment activity of the treatment and control groups would have continued along similar pre-reform trajectories. This is known as the parallel or common trend assumption (Gangl, 2010). Another crucial assumption of the DDD approach is that no external factors besides the treatment of interest (policy reformation) affected the activity of the two groups (Meyer, 1995). Additionally, since I implemented three-way interactions featuring nationality, I also assumed that no other group-specific changes in the opportunity structure besides the 2004 reform affected immigrants' self-employment. Although there is no statistical test for these assumptions, there are a few ways to assess their validity. One of which is estimating so-called placebo tests in which the year of treatment is altered (Bertrand et al., 2004). Accordingly, I estimated several additional models in which I altered the year of the reform. Lastly, I assumed that given the opportunity, individuals will

maximize their earnings and occupational status conditional on their resources and constraints. Admittedly, due to differing migration causes e.g., economic, political, or family reunification, this assumption may be more plausible for some groups than others. Nevertheless, since the micro-census does not contain information concerning employment preferences or migration causes, I assumed that individuals will generally aim to maximize their labor market returns. Furthermore, by restricting the sample to actively employed individuals, estimating separate models for women and men, and including sixteen nationality groups in the analyses I attempted to minimize as much unobserved heterogeneity as possible.

Furthermore, and independent of the sociocultural, economic, or institutional context, one of the fundamental assumptions of an (quasi-)experimental design is random assignment to the treatment (Athey & Imbens, 2018). If the assignment to the treatment is nonrandom this may lead to non-equivalent groups, meaning that any effect of the treatment might be caused by the groups being different at the outset rather than because of the actual treatment (Athey & Imbens, 2017). For example, if the 53 deregulated crafts and trades were not randomly assigned to deregulation, then the findings presented in this chapter might be a result of nonrandom assignment rather than the reform itself. Unfortunately, there seems to be some truth to this. For example, there are six occupations that were classified as having a high potential risk of harm and therefore protected from any form of deregulation.[24] Therefore, the question arises if the forthcoming results are indeed a causal effect of the reform or (partially) a statistical artifact. To test the random assignment assumption, I implemented a second quasi-experimental design by exploiting an opportunity presented by the political wrangling of the reform.

[24] Audiologist, chimney sweep, dental technician, optician, orthopedic shoemaker, and orthopedic technician.

The original draft bill presented in the German Federal Parliament on June 24, 2003, included a list of 65 occupations that were going to be deregulated.[25] However, due to opposition from several parties, 12 of these 65 occupations were ultimately *not* deregulated in the final amendment passed six months later.[26] This scenario allowed me to implement another quasi-experimental design to test the random assignment to treatment assumption. To do so, I applied the logic of a regression-discontinuity design (RDD). A RDD is a quasi-experimental design in which a cutoff or threshold is assigned above or below that of the intervention and the observations lying closely on either side of the threshold are compared. This makes it possible to estimate the average treatment effect in environments in which randomization is unfeasible (Athey & Imbens, 2017; Imbens & Lemieux, 2008; Lee & Lemieux, 2010). Accordingly, I estimated additional models in which I treated the 12 almost deregulated occupations as lying just above the "deregulation threshold" and dropped all the remaining occupations from the control group. I assumed that these 12 almost deregulated occupations are more equivalent to the 53 deregulated occupations and therefore a better indicator of the treatment effect of the reform.

Results

Descriptive Results

To uncover how eliminating occupational restrictions affects immigrants' self-employment decisions, I began with a few descriptive statistics. The summary statistics presented in table 1.2 provide some first insights on the reform's impact on the German crafts and trades sector. To get a better understanding of this, I separated the summary statistics by craftswomen

[25] For the original draft bill (in German) please refer to *Entwurf eines Dritten Gesetzes zur Änderung der Handwerksordnung und anderer handwerksrechtlicher Vorschriften.*

[26] Baker; butcher; communication technician; gunsmith; hairdresser; painter and varnisher; pastry chef; plasterer; stonemason and stone sculptor; surgical instrument maker; thermal and acoustic insulation fitter; and well builder.

and craftsmen; treatment and control group; and pre-reform and post-reform. It is important to note that the descriptive results are based on the main analysis sample, and therefore, do not include immigrants who arrived after 2003.

Table 1.2: Summary Statistics

Craftswomen	N	Mean	Min.	Max.	SD		N	Mean	Min.	Max.	SD
Pre-Reform Treatment						**Pre-Reform Control**					
Solo self-employment	13,170	0.03	0.00	1.00	0.18	Solo self-employment	7,211	0.05	0.00	1.00	0.22
Employer	13,170	0.01	0.00	1.00	0.11	Employer	7,211	0.11	0.00	1.00	0.31
Foreign-born	13,170	0.15	0.00	1.00	0.36	Foreign-born	7,211	0.03	0.00	1.00	0.17
Age	13,170	43.71	20.00	60.00	9.40	Age	7,211	36.91	20.00	60.00	10.42
No degree	12,623	0.05	0.00	1.00	0.22	No degree	6,957	0.01	0.00	1.00	0.08
No post-secondary	12,623	0.36	0.00	1.00	0.48	No post-secondary	6,957	0.10	0.00	1.00	0.30
Vocational	12,623	0.57	0.00	1.00	0.49	Vocational	6,957	0.88	0.00	1.00	0.32
Tertiary	12,623	0.02	0.00	1.00	0.12	Tertiary	6,957	0.02	0.00	1.00	0.12
Log monthly earnings	12,711	6.51	4.35	9.60	0.59	Log monthly earnings	6,840	6.78	4.35	10.04	0.59
Post-Reform Treatment						**Post-Reform Control**					
Solo self-employment	13,746	0.05	0.00	1.00	0.22	Solo self-employment	7,693	0.07	0.00	1.00	0.26
Employer	13,746	0.02	0.00	1.00	0.13	Employer	7,693	0.12	0.00	1.00	0.33
Foreign-born	13,746	0.25	0.00	1.00	0.43	Foreign-born	7,693	0.04	0.00	1.00	0.19
Age	13,746	45.31	20.00	60.00	9.09	Age	7,693	37.87	20.00	60.00	10.82
No degree	13,531	0.06	0.00	1.00	0.24	No degree	7,607	0.01	0.00	1.00	0.08
No post-secondary	13,531	0.32	0.00	1.00	0.47	No post-secondary	7,607	0.07	0.00	1.00	0.26
Vocational	13,531	0.59	0.00	1.00	0.49	Vocational	7,607	0.90	0.00	1.00	0.30
Tertiary	13,531	0.02	0.00	1.00	0.15	Tertiary	7,607	0.02	0.00	1.00	0.14
Log monthly earnings	13,179	6.56	4.25	9.96	0.56	Log monthly earnings	7,248	6.80	4.25	10.01	0.54
Craftsmen	N	Mean	Min.	Max.	SD		N	Mean	Min.	Max.	SD
Pre-Reform Treatment						**Pre-Reform Control**					
Solo self-employment	14,423	0.06	0.00	1.00	0.24	Solo self-employment	53,545	0.05	0.00	1.00	0.21
Employer	14,423	0.07	0.00	1.00	0.26	Employer	53,545	0.09	0.00	1.00	0.29
Foreign-born	14,423	0.09	0.00	1.00	0.29	Foreign-born	53,545	0.05	0.00	1.00	0.22
Age	14,423	40.32	20.00	60.00	10.14	Age	53,545	39.03	20.00	60.00	10.21
No degree	13,885	0.02	0.00	1.00	0.15	No degree	51,897	0.01	0.00	1.00	0.10
No post-secondary	13,885	0.15	0.00	1.00	0.36	No post-secondary	51,897	0.09	0.00	1.00	0.28
Vocational	13,885	0.81	0.00	1.00	0.40	Vocational	51,897	0.88	0.00	1.00	0.32
Tertiary	13,885	0.02	0.00	1.00	0.15	Tertiary	51,897	0.02	0.00	1.00	0.14
Log monthly earnings	13,823	7.33	4.35	10.07	0.46	Log monthly earnings	51,064	7.32	4.35	10.07	0.45
Post-Reform Treatment						**Post-Reform Control**					
Solo self-employment	15,874	0.09	0.00	1.00	0.29	Solo self-employment	56,373	0.06	0.00	1.00	0.24
Employer	15,874	0.08	0.00	1.00	0.26	Employer	56,373	0.10	0.00	1.00	0.30
Foreign-born	15,874	0.13	0.00	1.00	0.33	Foreign-born	56,373	0.07	0.00	1.00	0.26
Age	15,874	41.39	20.00	60.00	10.09	Age	56,373	40.44	20.00	60.00	10.19
No degree	15,676	0.02	0.00	1.00	0.16	No degree	55,806	0.01	0.00	1.00	0.11
No post-secondary	15,676	0.13	0.00	1.00	0.34	No post-secondary	55,806	0.07	0.00	1.00	0.25
Vocational	15,676	0.82	0.00	1.00	0.39	Vocational	55,806	0.90	0.00	1.00	0.30
Tertiary	15,676	0.03	0.00	1.00	0.16	Tertiary	55,806	0.02	0.00	1.00	0.15
Log monthly earnings	15,046	7.30	4.25	10.01	0.46	Log monthly earnings	53,133	7.31	4.25	10.01	0.46

German micro-census: 2000-2008; own calculations.

There are three aspects in table 1.2 that seem to have been particularly affected by the reform and in which craftswomen and craftsmen also significantly differ: solo self-employment, foreign-born craftspeople, and net monthly earnings (shown as the logarithmic value of adjusted real earnings based on the Consumer Price Index 2005). Starting with solo self-employment, craftswomen are generally less likely to be solo self-employed than craftsmen both before and after the reform. This difference is larger in the treatment group, in which roughly

twice as many craftsmen have a solo business compared to craftswomen. After the reform, nine percent of all craftsmen operated a solo business in one of the 53 deregulated crafts and trades compared to just five percent of all craftswomen. Nonetheless, each of the groups i.e., craftswomen, craftsmen, treatment, and control, have a higher proportion of solo self-employment after the reform. Furthermore, each of these groups also experienced a one percent increase in self-employment with employees after the reform. This suggests that there was an overall upward trend in self-employment irrespective of the reform. This overall increase in self-employment may be explained by the general increase in foreign-born craftspeople that is also evident across all the groups.

The proportion of foreign-born craftspeople generally increased after the reform across all groups. This increase was, however, twice as large for craftsmen and ten times as large for craftswomen working in the deregulated crafts compared to the regulated crafts. The soon-to-be deregulated occupations already had a much larger proportion of foreign-born craftspeople before the reform: fifteen percent of all craftswomen in the treatment group were born abroad compared to three percent in the control group and nine percent of all craftsmen in the treatment group were born abroad compared to five percent in the control group. Yet, the disproportionate increase in the proportion of immigrants working in the deregulated crafts and trades after the reform widened this gap even further, especially among craftswomen: twenty-one percent difference between the two occupational groups after the reform. This indicates that immigrant women disproportionately benefit from occupational deregulation and suggests that additional constraints to labor market access, such as occupational licensure, are especially harmful to more vulnerable groups.

This large increase in foreign-born craftswomen, however, did not result in lower monthly earnings, but rather, quite the opposite. The increase in net monthly earnings was

twice as large for craftswomen in the deregulated occupations as it was for those in the regulated ones, increasing by approximately 35 EUR respectively 20 EUR. The same cannot be said for craftsmen who experienced a decline in net monthly earnings in both occupational groups; approximately 45 EUR in the treatment and 15 EUR in the control group. The difference in pre- and post-reform earnings is, however, larger for both women and men in the deregulated than the still regulated occupations i.e., approximately twice as large of an increase for craftswomen and three times as large of a decrease for craftsmen. The results for craftsmen are in line with previous research that found a decrease in wages after the reform (Damelang, Haupt, et al., 2018; Sonntag & Lutter, 2018). The increase in earnings for craftswomen is, however, not evident and incomparable with these studies since they did not specifically focus on craftswomen. Instead, they controlled for gender in various ways e.g., fixed effects, to determine the net effect of the reform. The results in table 1.2 suggest that using such a strategy misses important differences between women's and men's employment decisions; especially among immigrant women who seem to disproportionately benefit from occupational deregulation.

Although the summary statistics in table 1.2 illustrate that the overall self-employment rate and the immigrant workforce increased after 2004, it is still unclear if immigrants' self-employment increased. To investigate this, figure 1.1 depicts the yearly self-employment rate for each nationality group separated by treatment and control for craftswomen; figure 1.2 presents the same for craftsmen. Beginning with craftswomen in figure 1.1 the first thing that stands out is the large variation in self-employment between the different groups. Some groups such as Italians and Southern Europeans seem to have experienced little to no change in self-employment after the reform. While others, such as Asians, EU-15 & EFTA, and Poles experienced a large increase in self-employment after the reform. Furthermore, in line with the summary statistics in table 1.2, figure 1.1 shows that for several groups e.g., Aussiedler and

Jewish Quota Refugees, self-employment in the control group also increased after 2004. Yet, it should be noted that due to a relatively small number of self-employed immigrant craftswomen, a small shift has a large impact on the self-employment rate. This is, however, not true for German craftswomen who constitute over ninety percent of all craftswomen in the sample. Looking at German craftswomen in figure 1.1, it seems that the reform slightly increased self-employment for the treatment group and remained rather steady in the control group.[27]

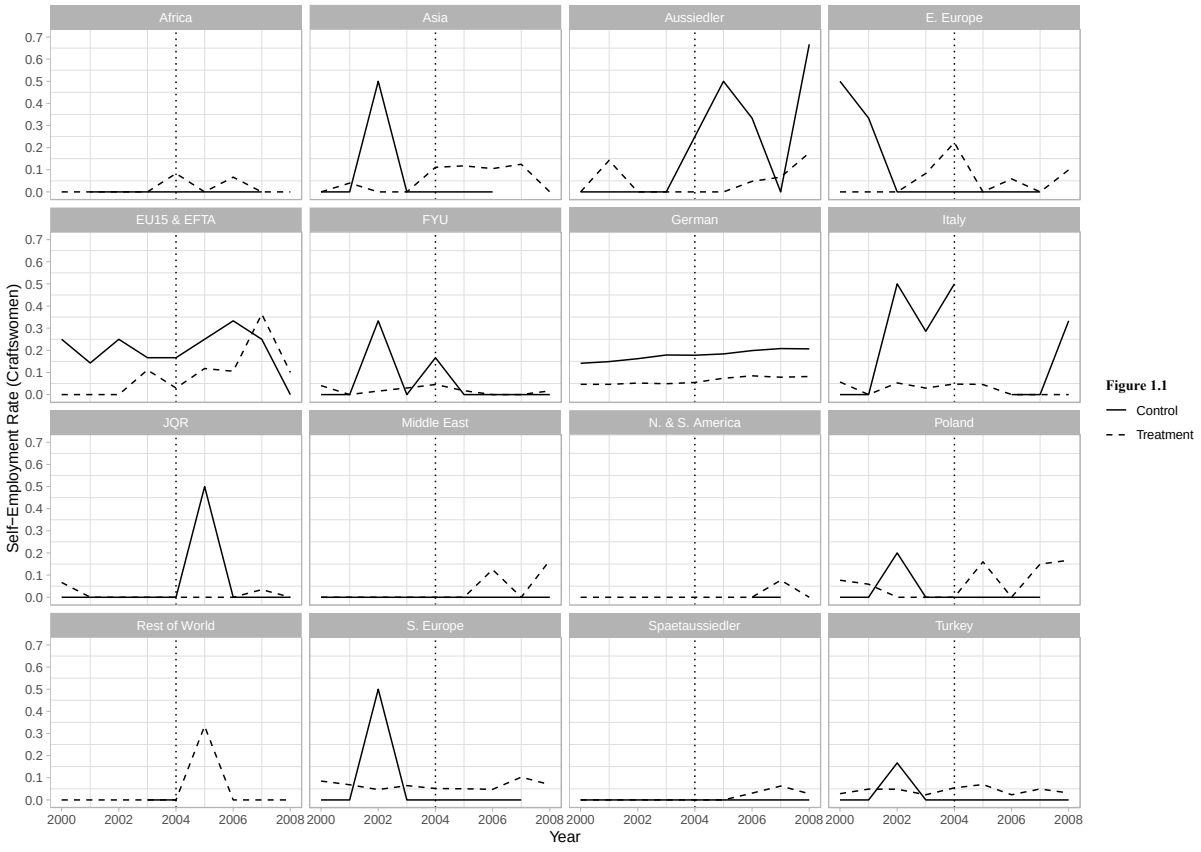


Figure 1.1

Turning to craftsmen, figure 1.2 paints a similar picture to figure 1.1. There is large variation in the self-employment rate between the immigrant groups. Certain groups experienced a larger increase after the reform e.g., former Yugoslavians, Middle Easterners, and Poles, while others experienced moderate to no change after the reform e.g., Germans, Southern Europeans, and Turks. Consistent with the findings in table 1.2 and figure 1.1, the self-

[27] Furthermore, figure 1.1 also serves as a visual inspection of the parallel trend assumption, which seems to be confirmed for German craftswomen but less so for some of the other nationality groups e.g., Former Yugoslavians.

employment activity of several groups increased for both treated and controlled occupations after the reform e.g., Middle Easterners. Nonetheless, again looking at the largest group, native Germans, it seems that the reform had little to no effect on their self-employment activity.[28]

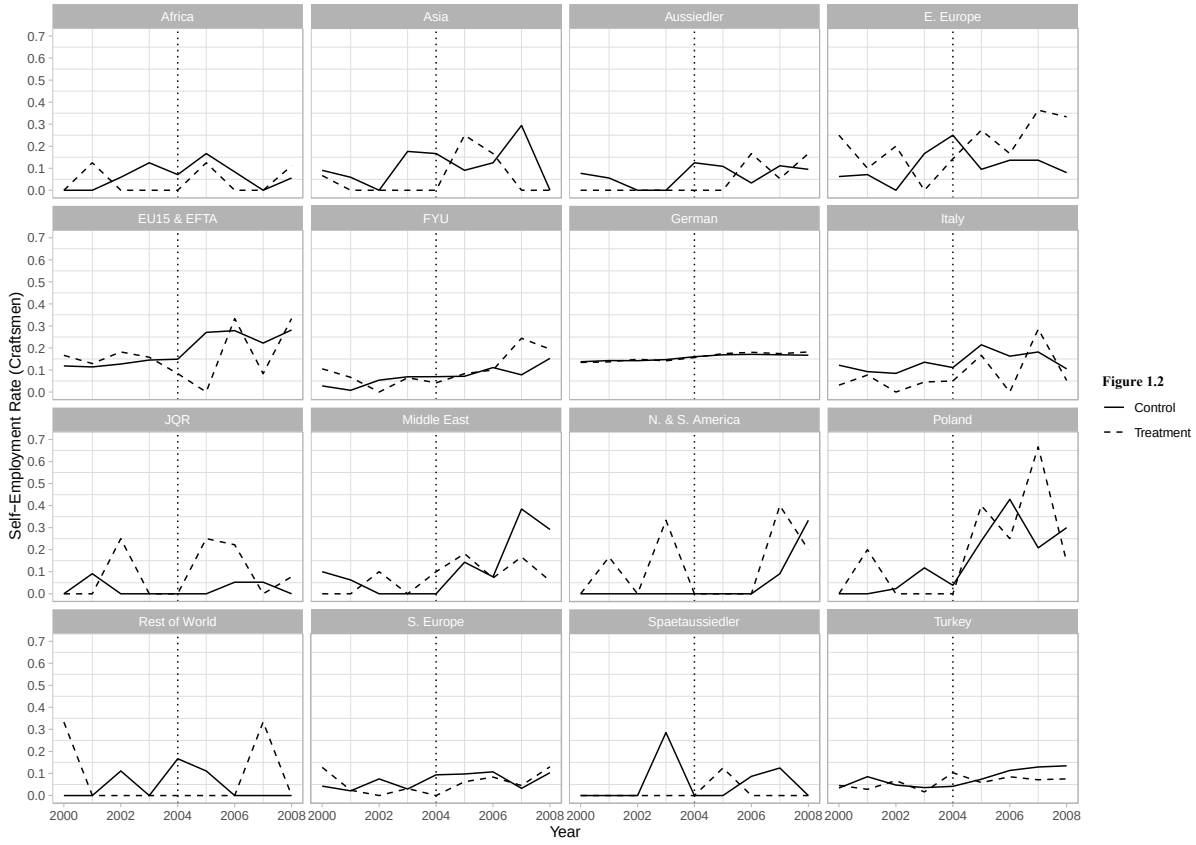


Figure 1.2

Considering the descriptive evidence, it seems that self-employment generally increased across the skilled crafts and trades and for most groups since 2004. Yet, figures 1 and 2 also illustrate that there is considerable variation in self-employment across nationalities and by gender. The results also reveal that removing occupational restrictions does not seem to have influenced native German craftspeople' self-employment decisions. Overall, the descriptive evidence shows that removing occupational restrictions seems to affect the self-employment decisions of immigrants much more than natives. However, the results also show that the

[28] The parallel trend assumption, however, seems to again hold for native Germans, whereas the same cannot be said for all other nationality groups e.g., JQRs.

effect of occupational deregulation varies considerably between groups and by gender. To uncover how the 2004 reform affected the self-employment decisions of these various groups, I now turn to the DDD models.

Triple Difference-in-Differences Results

To test the overall effect of the 2004 reform on self-employment in the skilled crafts sector, I estimated a standard difference-in-differences regression in model 1 i.e., no three-way interactions. All results for craftswomen are illustrated in figure 1.3 and those for craftsmen in figure 1.4. Model 1 demonstrates that there is no overall effect of the reform on the self-employment probability of either gender. This is in line with Sonntag and Lutter (2018) who found little to no effect of the reform on various economic outcomes. Furthermore, the results of model 1 are consistent with the descriptive evidence showing that German craftswomen's and craftsmen's self-employment decisions were not affected by the reform. To determine how the reform causally affected the self-employment decisions of the various immigrant groups, I estimated DDD regressions for each nationality group starting with model 2 (refer to equation 1.1 above).

To test the general effect of the reform on immigrants' self-employment decisions, I included all immigrants in model 2, regardless of when they arrived in Germany. This also allowed me to excess what effect the 2004 EU enlargement had on immigrants' self-employment decisions. The results of model 2 for craftswomen in figure 1.3 show that Polish craftswomen are 38.6 percentage points more likely to be self-employed after the reform than before. Since German restrictions concerning new EU member countries incentivized self-employment, this large increase is likely caused through a combination of the 2004 crafts reform and the EU enlargement. Nevertheless, an increase of almost forty percentage points is noteworthy even if it is not solely caused by the 2004 crafts reform. Furthermore, ethnic German resettler craftswomen (*Aussiedler*) are 26.6 percentage points less likely to be self-employed after the

reform; or to put it differently, they are significantly likelier to be dependently employed after the reform. Interestingly, the vast majority of *Aussiedler* women from this group are originally from Poland. Therefore, it seems plausible that this group's increase in dependent employment is connected to the large increase in self-employment among Polish women. These results suggest that sharing a common language and cultural background may have led these two groups to work together. The upcoming analyses shed more light on how this employment relationship is connected.

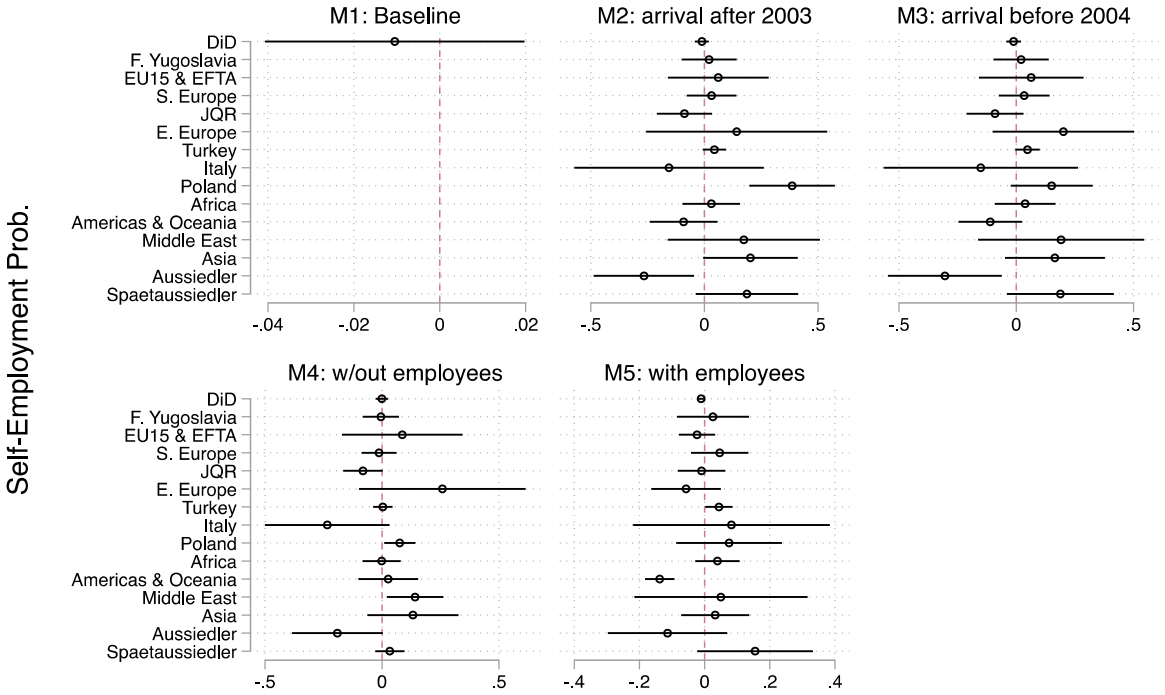


Figure 1.3 (Craftswomen)

Turning now to craftsmen in figure 1.4, Jewish quota refugees (JQR) and late ethnic German resettlers from the former USSR (*Spätaussiedler*) are both roughly fourteen percentage points more likely to open a business after the reform. The self-employment probability of all other craftsmen did not significantly change after the reform. Out of all the analyzed immigrant groups, JQRs and ethnic German resettlers have the largest structural advantage and most comprehensive government assistance. The results of model 2 demonstrate that craftsmen belonging to these groups were able to use their advantage to open a business once occupational

restrictions had been removed. Whereas *Aussiedler* craftswomen seem to lack the necessary resources needed to open their own business but possess the ones needed to obtain a job. Accordingly, all three of these groups' self-employment decisions were altered by the opportunity presented by the 2004 reform. To further examine this and minimize the confounding effect of the 2004 EU enlargement, I excluded all immigrants who arrived in Germany after 2003 in the remaining models.

Once again beginning with craftswomen, the results of model 3 show that Polish craftswomen's large significant increase in self-employment present in model 2 is driven by immigrant women who arrived after 2003. This strongly suggests that their migration was caused by the internal migration advantages that came with EU membership. The significant decline in self-employment among *Aussiedler* craftswomen is, however, still present in model 3 and even decreased by four percentage points. These results strengthen my interpretation that these two groups are working together. Germany largely restricted immediate access to residency and employment rights for new EU citizens, except for self-employment. Hence, the large increase in self-employment for Polish craftswomen found in model 2 disappeared once I restricted the sample to immigrants who arrived before 2004. However, the large decline in self-employment i.e., increase in employment found for *Aussiedler* craftswomen was not driven by newcomers. But rather by *Aussiedler* women already residing in Germany who took advantage of the employment opportunities presented by the new businesses that recent Polish immigrants opened. German restrictions hindered Poles seeking employment from immediately immigrating to Germany after 2004, therefore, the newly arrived Polish entrepreneurs hired *Aussiedler* craftswomen who both speak Polish and are German citizens (for similar findings see Miera, 2008).

Returning to craftsmen, there was no apparent effect of the 2004 EU enlargement present in model 2. Nonetheless, restricting the sample to immigrants who arrived before 2004

serves as a good robustness test of the results found for JQRs and *Spätaussiedler* in model 2. A longer duration of residency should allow other immigrant groups to acquire necessary receiving country-specific resources e.g., language skills and economic capital, and may, therefore, level the playing field between the groups. The results of model 3, however, illustrate that this is not the case. Once again, the only craftsmen that significantly increased their self-employment probability after the reform were JQRs and *Spätaussiedler*. These results again suggest that JQRs and *Spätaussiedler* can use their initial advantages to accumulate more advantage. Even when considering a longer duration of residency, other immigrant groups were unable to significantly change their self-employment decisions after the reform. Instead, the increase in self-employment among JQRs and *Spätaussiedler* found in model 2 is confirmed. The results of model 3 demonstrate that occupational deregulation largely benefits the occupational decisions of already advantaged groups while having no effect on the decisions of other groups. This result points towards a cumulative advantage effect, whereby immigrants that are already advantaged beget more advantage (DiPrete & Eirich, 2006).

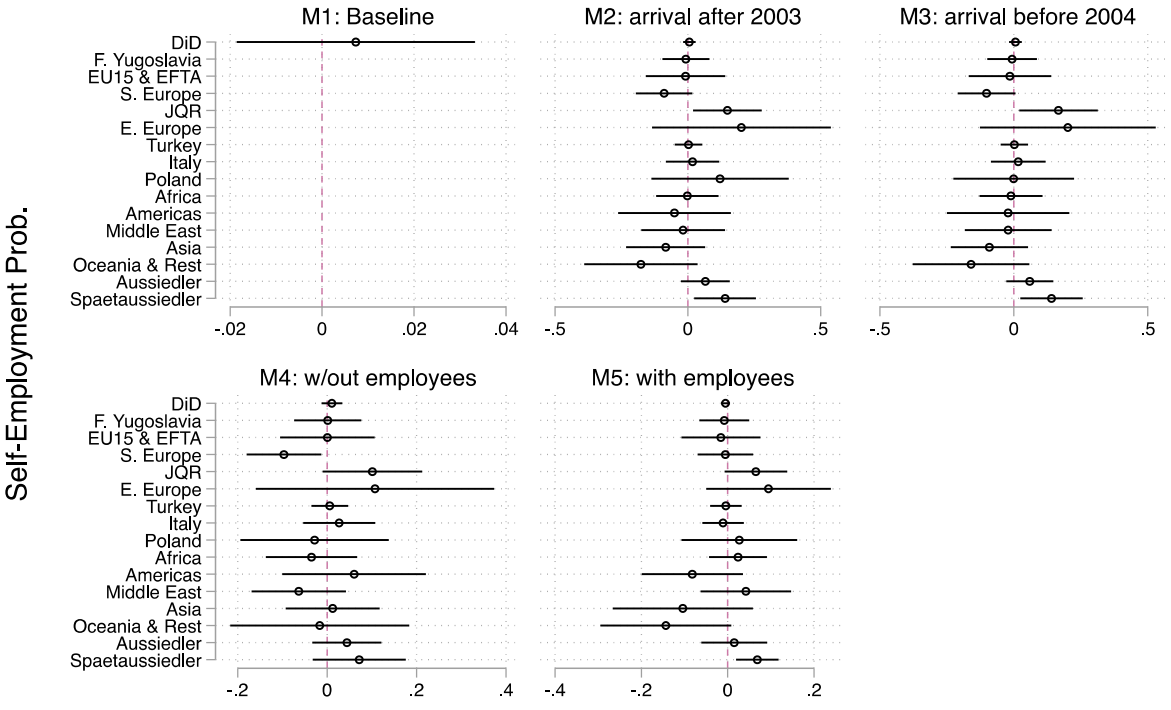


Figure 1.4 (Craftsmen)

Models 1 through 3 addressed self-employment in general without differentiating between solo self-employment and self-employment with employees. Yet, many immigrants enter self-employment out of economic necessity i.e., to avoid under- or unemployment and this often leads to solo self-employment (Dana, 1997; Dvoulety, 2018). However, previous research has also shown that some women use solo self-employment as a more family-friendly alternative to dependent employment (Bögenhold & Klinglmair, 2015). Furthermore, it is still unclear how occupational deregulation affects the types of businesses that immigrants open. To develop a better understanding of the effect of occupational deregulation on immigrants' business decisions, I estimated the effect of the 2004 reform on starting a business without (model 4) and with employees (model 5).

Starting with craftswomen, the results of model 4 illustrate that Polish and Middle Eastern craftswomen are both significantly more likely to start a one-women business after the reform. Furthermore, the significant decrease in the likelihood of starting a business among *Aussiedler* craftswomen is no longer evident. These results demonstrate that once occupational restrictions were removed, Polish and Middle Eastern craftswomen were on average more likely to open a one-women business. Unfortunately, I can only speculate whether these two groups did so out of economic necessity or as a more flexible employment alternative. However, Polish craftswomen residing in Germany did acquire EU citizenship in 2004 and may therefore have chosen to start their own business to avoid the restrictions that Germany imposed on new EU citizens. Furthermore, recent evidence on self-employment in Germany found that immigrants from the Middle East often use self-employment as an alternative to unemployment (Berwing, 2019). This suggests that the increase in Middle Eastern craftswomen's solo self-employment is likely out of economic necessity. Concerning *Aussiedler* craftswomen, the results of model 4 show that there is no significant difference in their solo

self-employment after the reform. This suggests that their decline in self-employment found in models 2 and 3 was not due to a decline in solo self-employment.

Turning again to craftsmen, the results of model 4 demonstrate that the significant increase in self-employment among JQR and *Spätaussiedler* craftsmen found in models 2 and 3 was not driven by a change in solo self-employment. Neither group's solo self-employment decisions significantly changed after the reform. Furthermore, no other groups increased their probability of opening a one-man business either. Instead, Southern Europeans are now significantly less likely to open a one-man shop after the reform i.e., more likely to be employed rather than solo self-employed. This finding is in line with the theoretical expectation that given the opportunity immigrants belonging to large established communities will be able to use their group-specific resources to find a job instead of being forced into solo self-employment out of economic necessity. Furthermore, these results also illustrate that on average solo self-employment does not increase among immigrant men after occupational restrictions have been removed, even among those groups with less available resources. To investigate if immigrants take advantage of occupational deregulation by deciding to open a business with employees, I estimated the probability of starting a business with at least one paid employee in model 5.[29]

The results of model 5 demonstrate that German craftswomen (represented by the two-way interaction: *DD*) are less likely to operate a business with employees after the reform, albeit by roughly one percentage point. Nevertheless, this suggests that native German craftswomen's business decisions were negatively affected by occupational deregulation. Yet, Turkish craftswomen used the opportunity provided by the reform to open businesses with employees, increasing their probability of doing so by 4.4 percentage points. These results suggest that

[29] I estimated several different models that varied the number of employees in a business between 1 and more than 19. The overall results of the models remained largely unchanged. Therefore, the outcome variable in model 5 is equal to 1 if an individual is self-employed with at least 1 paid employee. The average number of employees per business in the sample is 5.26.

removing occupational licensure allows doubly disadvantaged groups, such as Turkish women, to venture into self-employment. Thereby creating a level of economic flexibility that they would otherwise not have. It also suggests that social and ethnic capital play a decisive role in immigrant women's self-employment decisions. On average, Turks have less human capital and financial capital than most other immigrant groups in Germany (Höhne et al., 2014), yet Turkish women are still able to start a business with employees given the opportunity. This result contradicts previous evidence that found that human capital and financial capital were the largest determinants of self-employment with employees. However, most previous studies also neglected to explicitly focus on women's self-employment, much less immigrant women's self-employment.

The results of model 5 for craftsmen show that *Spätaussiedler* are significantly more likely to start a business with employees after the reform. The significant increase in self-employment found for JQRs in the previous models is, however, no longer present. Nevertheless, this result underpins the notion that *Spätaussiedler* men's advantaged conditions upon arrival lead to future advantages. This result, unlike the one found for Turkish craftswomen, is in line with previous studies that found that human capital and access to financial capital are decisive in self-employment with employees. Furthermore, the decline in solo self-employment found for Southern European craftsmen in model 4 did not carry over to self-employment with employees. This suggests that given the opportunity Southern European craftsmen can use their group-specific resources to find jobs rather than go into business alone.

The results of models 1 through 5 demonstrate that immigrant groups with more resources can use the opportunity provided by the 2004 reform to leave solo self-employment or start businesses with employees. These results are in line with cumulative advantage theory i.e., a favorable relative position becomes a resource that produces further relative gains (DiPrete & Eirich, 2006). However, the cumulative advantage mechanisms seem to differ between

immigrant women and men regarding self-employment. Whereas immigrant men with higher levels of education, government assistance, and receiving country-specific resources denote the advantaged group, immigrant women with more social and ethnic capital have a more 'favorable position.' Previous studies have found that Turkish immigrants largely rely on familial and ethnic networks when making, among other things, economic decisions (for an overview see Haug & Pointner, 2007). Furthermore, women's networks tend to contain a larger proportion of kin in them, and women seem to benefit more economically from strong ties as compared to men (for an overview see Paula England & Nancy Folbre, 2005). Lastly, as Kloosterman (2010) has shown, immigrants often rely on their social and ethnic embeddedness when starting a business. Hence, Turkish women seem to have an advantage that accumulates to a self-employment advantage when given the opportunity.

Alternative Explanations

Models 1 through 5 show the importance of considering the varied contexts that immigrants are embedded in and different forms of self-employment. Furthermore, the results demonstrate that groups with structural advantages, such as governmental support programs, are more likely to start their own business given the opportunity, particularly immigrant men. Whereas immigrant women with more sociocultural resources e.g., large established ethnic communities, are more likely to open a business. Yet could these results also be summed up by a traditional human capital approach. Previous studies found that the higher one's level of education is, the more likely they are to start their own business (Robinson & Sexton, 1994; Sanders & Nee, 1996). However, more recent studies have found that this may not be true for all occupations (for task-specific human capital see Gathmann & Schönberg, 2010; for occupation-specific human capital see Sullivan, 2010). Recall that before the reform no matter how qualified someone was, they could not open their own business without a master craftsman's

certificate. After the reform, this occupational restriction has been removed, allowing everyone, regardless of their qualification, the opportunity to start their own business. To test the human capital hypothesis, I estimated the effect of education level on the probability of self-employment in model 6 (see figure 1.5 for craftswomen and figure 1.6 for craftsmen) with vocational education as the reference category (*education*treatment*post-reform*).

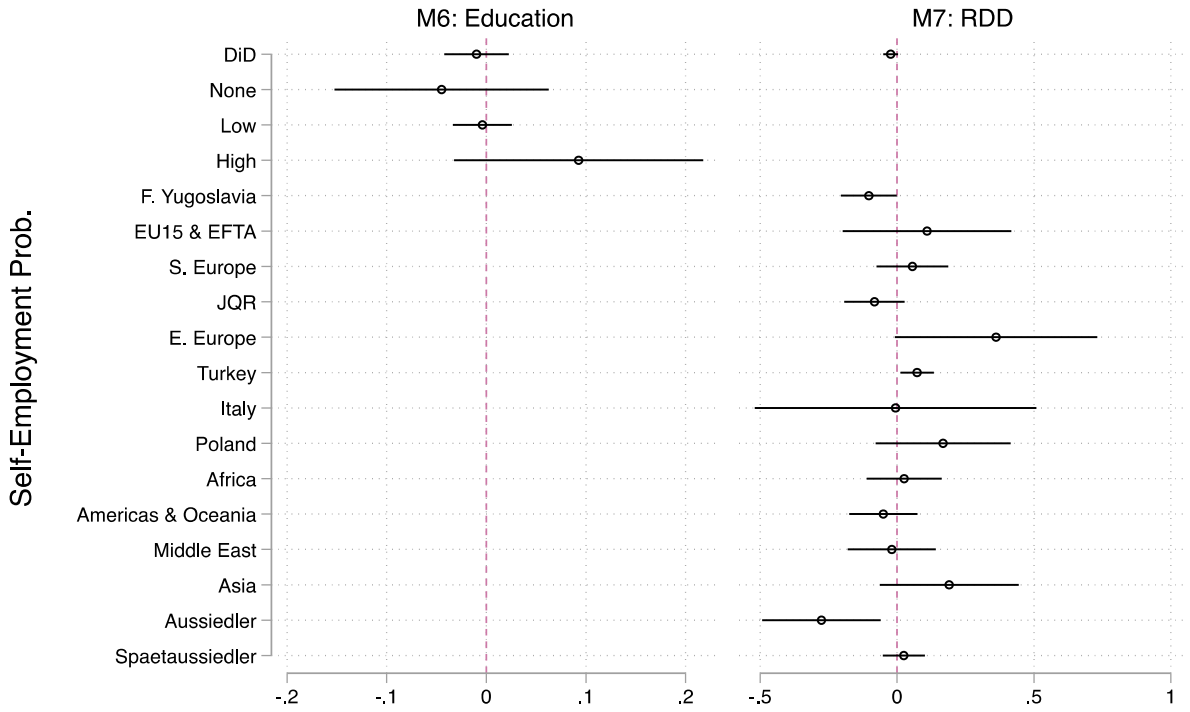


Figure 1.5 (Craftswomen)

The results for craftswomen suggest that simply looking at or explaining women's self-employment through educational qualifications is insufficient. None of the education levels show a significant difference in their self-employment probability after the reform. This suggests that on average, women's education level cannot fully explain their self-employment decisions. This seems to be especially true for immigrant women when considering the results found in models 3 through 5. Nevertheless, the results for craftsmen in model 6 are in line with general human capital theory. Men with a tertiary education were significantly more likely to start their own business after the reform as compared to craftsmen with vocational training.

Whereas individuals without a school-leaving or post-secondary qualification showed no significant difference in their self-employment probability after the reform. JQR and *Spätaussiedler* craftsmen are among the groups with the highest education levels, therefore, these results are in accordance with the results found above. Nevertheless, there are also other groups that have similarly high levels of education, such as EU-15 immigrants, whose probability of self-employment did not significantly change. Therefore, education alone seems to explain immigrants' self-employment decisions only partially. Considering the larger sociocultural, economic, and institutional context that groups are embedded explains the rest. Nevertheless, these results suggest that occupational restrictions constrain highly educated individuals' self-employment decisions and hinder them from starting their own business.

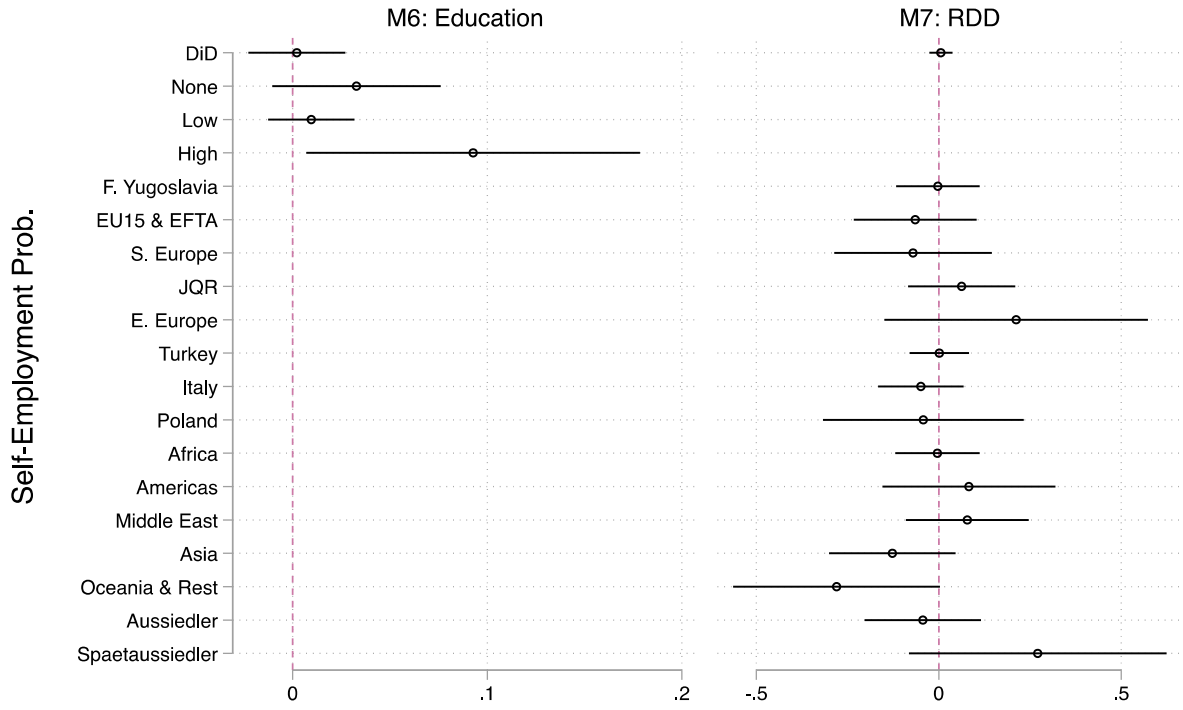


Figure 1.6 (Craftsmen)

Furthermore, one of the fundamental assumptions of an (quasi-)experimental design is random assignment to the treatment (Athey & Imbens, 2018). To test this, I implemented a regression discontinuity design (RDD) by treating the twelve almost deregulated occupations as lying just above the "deregulation threshold" and dropping all the remaining occupations

from the control group in model 7. As a result of this I lost approximately four thousand craftswomen and sixty thousand craftsmen from the respective samples.

The results of model 7 for craftswomen in figure 1.5, demonstrate that the decrease in self-employment found for *Aussiedler* and the increase for Turkish craftswomen were indeed caused by the 2004 reform. Comparing the more similar treatment and control groups resulted in a 27.6 percentage point decrease in self-employment among *Aussiedler* craftswomen and a 7.3 percentage point increase for Turkish craftswomen. Therefore, model 7 confirms that by removing occupational barriers to self-employment the 2004 reform of the skilled crafts sector affected the self-employment decisions of immigrant craftswomen.

Turning to craftsmen, the results suggest that the effects found in the previous models may in fact be due to the heterogeneity of the two occupational groups and not the reform. There are no longer any statistically significant effects present for craftsmen. This suggests that the reform had no significant effect on self-employment in comparably similar occupations, but rather that the occupational heterogeneity between the treatment and control groups caused the differences in self-employment found in previous models. However, considering the large reduction in the sample size, it is also not surprising that statistical significance at the 95% confidence level is no longer reached. The previous effects for JQR, *Spätaussiedler*, and Southern European craftsmen are still obtained; albeit no longer statistically significant. Nevertheless, the results of model 7 do cast some doubt on the actual effect of the reform on immigrant craftsmen's self-employment decisions.

Placebo Test

Lastly, another crucial assumption of a difference-in-differences design is that no external factors besides the intended treatment affected the outcome of interest during the observed period (Gangl, 2010). One way to indirectly test this assumption is to estimate placebo tests in which the year of treatment is altered, and the models are re-estimated. To test the

robustness of the results presented in this chapter, I estimated placebo tests in which I altered the year of treatment to 2003 for models 3 and 6; the results of which can be found in figures A1.1 and A1.2 in the appendix.[30] The results of model 8 and 9 for craftswomen illustrate that *Aussiedler* were already less likely to start their own business before the crafts code was de-regulated in 2004. This implies that the decline in self-employment found for *Aussiedler* crafts-women in the previous models is not a direct outcome of the crafts reform, but rather that some other exogenous factor(s) influenced their self-employment probability before the reform was passed. Turning to model 9, changing the year of treatment to 2003 did not alter the effect (or lack thereof) of education level found in model 6. This result underpins that with or without occupational regulations, education level is not an accurate determinant of women's self-employment outcomes.

The increase in self-employment among JQR and *Spätaussiedler* craftsmen is no longer present when the year of treatment is altered to 2003. This indicates that their self-employment decisions were directly affected by the reform. Furthermore, the increase in self-employment among highly educated craftsmen is also no longer present in model 9. This indicates that the increase in self-employment among craftsmen with a tertiary education significantly increased after occupational licensure requirements were removed. This confirms that occupational restrictions, such as licensure, constrain potential entrepreneurs from starting their own business, especially highly educated men.

Discussion and Conclusion

Approximately twenty years ago Kloosterman, van der Leun, and Rath (1999) developed the *mixed embeddedness* approach to better understand immigrants' self-employment. In this novel approach they argued that immigrants' self-employment was not solely the outcome

[30] I estimated additional models in which I changed the year of treatment to 2002; results were similar and are available upon request.

of immigrants' resource endowment; but rather that it was an interaction of both supply and demand side factors i.e., immigrants' resources and the opportunity structure in which they acted. Until now, however, causal evidence of this has been limited. To examine how the opportunity structure affects immigrants' self-employment outcomes, I used a quasi-experimental design based on the 2004 reform of the German Crafts Code. The 2004 reform removed occupational licensure requirements for approximately half of all skilled crafts in Germany. This setting allowed me to estimate difference-in-difference-in-differences (DDD) models in which I uncovered the causal effect of occupational deregulation on immigrants' self-employment decisions. Using a DDD approach allowed me to evaluate how different immigrant groups respond to the same self-employment opportunity. As was demonstrated in the past, equal opportunity does not always result in equal outcomes. Individuals presented with the same opportunity may choose different outcomes based on their resource constraints. Therefore, even if all immigrants were presented with the same self-employment opportunity not all of them will start their own business. Accordingly, finding out which groups choose self-employment given the opportunity was the aim of this chapter.

According to Elster's decision-making model (1979), individual opportunities are a result of a two-step filtering process. In a first step individuals filter out feasible choice-sets from all possible opportunities based on their resource constraints. In a second step, they choose the most feasible action based on their desires and beliefs. I incorporated this model of decision-making into the mixed embeddedness approach to better explain why when provided with the same self-employment opportunity certain immigrant groups choose self-employment while others do not. The results presented here are a tale of two stories. On the one hand, they demonstrate that removing occupational regulations allows traditionally disadvantaged groups, such as Turkish women, to open businesses with employees. This gives them a certain level of economic independence that they previously did not have. On the other hand, the results also

demonstrate that occupational deregulation exacerbates existing inequalities, especially among immigrant men. Jewish Quota Refugees (JQR) and ethnic German resettlers, the two groups with the most comprehensive governmental support e.g., language and training programs, increased their probability of being self-employed after the reform. Furthermore, neither one of these groups used the reform to simply start a solo operation, instead German resettlers were significantly more likely to open a business with employees after the reform. Certain ethnic groups with less structural advantages, however, can rely on their sociocultural resources to help them find a job and avoid entering solo self-employment. For example, the results show that Southern European craftsmen (Cypriots, Greeks, Maltese, Portuguese, and Spaniards) are significantly less likely to open a one-man business after the reform. These results suggest that cumulative advantage mechanisms play a role in immigrants' business decisions i.e., those with more advantage, get more advantage. Although Turkish women and Southern European men lack the structural advantages that JQRs and ethnic German resettlers have, they belong to large and well-established immigrant communities, which provide a valuable resource.

The results demonstrate that equal opportunity does not result in equal outcomes. Rather, given the same self-employment opportunity immigrant groups with more resources alter their self-employment decisions, while those with less cannot. Although this increases economic inequalities between immigrant groups, it also allows certain groups to begin narrowing the gap to natives. Accordingly, the results show that just providing an opportunity without necessary resources exacerbates existing inequalities between disadvantaged groups. To truly begin diminishing social inequalities, groups must be provided with the resources needed to take advantage of given opportunities, otherwise current (dis)advantages will create future (dis)advantages. Therefore, the policy implications based on the results presented in this chapter are two-parted. On the one hand, removing occupational restrictions increases immigrants'

self-employment, particularly businesses with employees. Hence, removing occupational restrictions creates employment opportunities not just for potential entrepreneurs but also for others. This in turn decreases the necessity of solo self-employment, which allows immigrants to quit their precarious one-person operations for more secure dependent employment. Consequently, occupational deregulation improves the labor market position of several immigrant groups and can therefore be considered a useful policy tool in combating labor market disadvantages. On the other hand, individuals' decisions to alter their employment situation are largely based on their resource constraints. Hence, vulnerable groups with limited resources are constrained in their decision-making processes and thereby 'trapped' in their current employment situation. This leads to a cumulative disadvantage of already more disadvantaged groups. Hence, providing an opportunity for self-employment without access to the necessary resources needed to start a business will exacerbate existing inequalities. Therefore, future policy measures concerning self-employment need to do more than just provide an opportunity. They also need to provide individuals with the tools and resources needed to seize that opportunity. In other words, future policies should aim for equality of outcome instead of equality of opportunity.

Finally, the current study suffers from some drawbacks that should be addressed in future research. Firstly, the German micro-census is a repeated cross-sectional survey. This hindered me from following specific individuals over time and estimating the individual level effects of the reform on their labor market outcomes. Instead, the results presented here are average group level effects and should be interpreted as such. Furthermore, information regarding migration background in the micro-census is rather limited. I was only able to construct an individual's ethnicity by means of their current citizenship(s); information regarding if they were born in Germany or not, and year of arrival. Moreover, additional information that has shown to affect immigrants' self-employment outcomes, such as parents' country of origin and

occupational status, language skills, and social network ties is also unavailable. Furthermore, the micro-census does not include information on migration causes or employment preferences. Unfortunately, this means that I was unable to directly incorporate individual preferences in the decision-making process. However, previous research has shown that preferences play a key role in individuals' decisions and social action (for an overview see Freese, 2011; for *adaptive preference formation* see Elster, 1983; for a critique and new proposal see Colburn, 2011). Therefore, to develop a better understanding of why some immigrants decide to start their own business while others do not, future research should consider using longitudinal data that contains information on individuals' migration causes and employment preferences.

Chapter Two

Introduction

In chapter one I examined which historically disadvantaged groups, namely women and ethnic minorities, were more likely to start their own business given the opportunity. The results for both immigrant women and men showed that equal opportunity does not result in equal outcomes - in this case self-employment. Rather, a pattern of cumulative advantage emerged in which immigrants who were endowed with more resources were able to seize new opportunities, while those with less resources were not. The decision of whether to open one's own business is dependent on both individual constraints and the opportunity structure in which individuals are embedded. The results of chapter one demonstrate that immigrant women belonging to larger established ethnic communities possess the necessary resources to open their own business once occupational licensure requirements were removed. Conversely, immigrant men with higher levels of human capital and more governmental support were more likely to open their own business once licensure requirements were removed. These findings highlight the importance of considering gender differences in individual resources (supply side) and the opportunity structure (demand side) when explaining immigrants' self-employment decisions. Nevertheless, these results do not tell us anything about how the expansion and restriction of employment opportunities affects the economic returns of immigrant women and men. This current chapter, therefore, examines the causal effect of expanding occupational opportunities by removing licensing requirements on women's and immigrants' earnings. The effect of removing occupational requirements on immigrant women's earnings is largely unknown. This chapter provides some first causal evidence in this regard.

In recent decades, the classic sociological concept of social closure has gained renewed interest among sociologists. First presented by Max Weber (1968) to conceptualize how power

is derived from processes of exclusion, more recent empirical studies have concentrated on its effect on economic and occupational inequality (Bol, 2014; Bol & Weeden, 2015; Murphy, 1988; Sørensen, 1983a, 1983b; Tilly, 1998; Weeden, 2002). These studies generally found that occupational closure has a positive effect on economic returns e.g., incumbents in closed positions outearn their equivalent counterparts in open positions. However, most of these studies focused on the average effect of closure across all occupations by comparing all closed occupations to all open ones. More recent studies, therefore, began to take a differentiated look at the topic by examining the effect of closure on earnings and employment across various groups and professions. For example, Bol and Drange (2017) examined the returns to closure for different social classes in Norway. They found that licensure produced higher returns for high-skilled occupations, such as lawyers, while unionization was more rewarding for low-skilled occupations, such as brick masons. Witte and Haupt (2020) also found that returns to occupational closure were larger for professions (e.g., medical doctors) as compared to semi-professions (e.g., nurses) and that this contributed to a lower wage return for semi-professional occupations in Germany. Historically disadvantaged groups, such as women and ethnic/racial minorities, are disproportionately located in low-skilled occupations and semi-professions (Redbird, 2017; Witte, 2020).

Therefore, scholars have started to investigate the effect of occupational closure on minority groups' economic outcomes (Alecu & Drange, 2019; Drange & Helland, 2019; Redbird, 2017; Redbird & Escamilla-García, 2020; Witte, 2020). For example, Drange and Helland (2019) found that in Norway immigrants who worked in licensed or unionized occupations experienced less wage inequality than immigrants that worked in non-licensed and non-unionized occupations. They concluded that licensed and unionized occupations function as a 'labor market shelter' for immigrants in Norway. Furthermore, Redbird and Escamilla-Garcia (2020) showed that the decades-long increase in licensure in the United States has created institutional

mechanisms (e.g., vocational schools) that facilitate immigrants' entry into licensed occupations and mitigate their human, social, and cultural capital deficits. Nevertheless, they also pointed out that closure benefits those select minorities that get their foot in the door, while it disproportionately harms those already more marginalized groups that do not have the necessary resources to do so. Hence, occupational closure creates professional barriers that enable occupations to hoard opportunities and create economic benefits that would otherwise not exist. On the one hand, this often extrapolates existing inequalities, since many minorities lack the required resources needed to access these closed positions. On the other hand, closure may reduce economic discrimination for minorities that overcome those initial barriers.

Most of these studies compared regulated to unregulated occupations or examined the effect of introducing new regulations in formerly unregulated occupations on labor market outcomes. Far less is known about the effect of removing occupational regulations and entry restrictions. Moreover, even less is known about how this affects minority group members. Previous research has demonstrated that closure may shelter minorities from labor market discrimination. Yet, these studies also showed that more vulnerable groups i.e., those with a shortage of human, social, and cultural capital often suffer negative consequences of closure. So, what happens when these barriers are removed? Are certain groups more affected by occupational deregulation than others? To my knowledge, the current study is the first to date that has examined the causal effect of occupational deregulation on minorities' economic returns. I used the 2004 reform of the German Crafts Code as a quasi-experiment and implemented difference-in-difference-in-differences (DDD) estimators based on German micro-census data to determine the causal effect of removing occupational regulations on minorities' economic returns. The 2004 reform abolished occupational licensure requirements for self-employment in approximately half of all skilled crafts and trades in Germany. This allowed me to investigate how opening formerly closed occupations causally affects women's and immigrants' earnings.

The results show that women have higher returns to occupation-specific human capital and lower returns to general human capital once occupational licensure was removed, whereas, immigrant men have higher returns to social and ethnic capital, albeit in solo self-employment. This demonstrates that (i) expanding occupational opportunities does not lead to equal outcomes for all groups, but rather that (ii) individual resources become more important as the occupational structure becomes less rigid.

Theoretical Background

Occupational closure

Occupational closure is a central mechanism in explaining the rise of professions (Abbott, 1988, 1993; Abraham & Hinz, 2018; Tilly, 1998). Successful professionalization implies that occupations can establish entry barriers to keep outsiders and competitors at bay, establish the exclusiveness of their services, and secure benefits for occupational members (Abraham et al., 2011; Tilly, 1998; Weeden, 2002). In his classic work on bureaucratic organizations, Weber (1968) already described these strategies as social closure. Beyond its role in the establishment of modern-day professions, occupational closure has long been considered as an institutionalized form of social closure that contributes to observed inequalities in the labor market (Collins, 1990; Murphy, 1988; Parkin, 1974; Roscigno et al., 2007, 2009; Sørensen, 1996, 1999; Weeden, 2002). According to Weeden (2002, 60) there are four central mechanisms that link occupational closure to rewards: restricting the supply of practitioners, increasing diffuse demand for services, channeling demand to the occupation, and signaling quality of service.

Self-employment in the German skilled crafts and trades is governed by licensure. Licensure is considered the strictest form of occupational closure because the government prohibits individuals without a license from working in such occupations (for an overview see Kleiner, 2000). Weeden (2002) found that in the United States licensure generated the largest

return on earnings because it restricts the tangible supply of labor in an occupation. She also found that more restrictive licensing requirements generated larger earnings rewards. Haupt (2012) studied the effects of licensing on wage inequality in Germany. He demonstrated that wage differentials with respect to tenure, gender, or education were muted within regulated occupations. Yet, at the same time, occupational closure increased wage inequality between occupations by pushing up wages in licensed professions relative to those without licenses (see also Bol, 2014; Bol & Weeden, 2015; Kleiner, 2006; Kleiner & Krueger, 2013; Kleiner & Kudrle, 2000).

Minorities and Closure

None of these studies explicitly focused on minorities, instead they established the net effect of occupational closure on economic returns. Yet, previous research has consistently shown that ethnic/racial minorities and women fare worse on the labor market compared to native men (e.g., Algan et al., 2010; Barbieri et al., 2019; Kogan, 2007a, 2011; Petersen & Saporta, 2004; Rosenfeld & Kalleberg, 1990). Therefore, more recent studies have begun to examine the effect of occupational closure on earnings and employment across diverse groups. For example, Redbird (2017) reexamined the effect of licensure in the United States by differentiating between various demographic groups and occupations. Conversely to previous studies, she did not find a wage premium (economic rent) for licensed occupations, nor did she find a decrease in labor supply, measured by occupational entries, or quality measured in incumbent's human capital. Instead, she found that licensure increased occupational entry among women and black Americans. Following up on this, Redbird and Escamilla-Garcia (2020) examined the effect of increasing licensure in the United States on immigrants' labor market incorporation. They found that licensure generally had a more inclusionary than exclusionary effect on immigrants' occupational incorporation i.e., immigrants were more likely to work in licensed occupations than non-licensed ones. However, they also emphasized that the most

vulnerable groups, those with insufficient human, social, and cultural capital, were disproportionately excluded from licensed occupations. Similarly, Gomez and colleagues (2015) found that immigrants were less likely to work in licensed occupations in Canada. However, they also found that the earnings return associated with a licensed occupation were significantly higher for immigrants as compared to natives i.e., immigrants disproportionately benefited from working in a licensed occupation.

These studies focused on minorities in North America and found that licensure is not universally disadvantageous nor exclusionary but that group-specific differences in access to and returns from licensed occupations exist. However, these scholars also emphasized the importance of considering country-specific institutional contexts when investigating the effect of licensure. Since the current study focuses on Germany, I now turn my attention to studies that investigated licensure in Europe.

Beginning with Norway, Drange and Helland (2019) found that occupational licensure 'shelters' ethnic minorities from wage discrimination. Namely that immigrants who were able to access occupations through licensure and unionization experienced less wage discrimination than their equivalent counterparts who worked in non-licensed or non-unionized occupations. The authors concluded that licensure and unionization help equalize the immigrant-native wage gap in Norway. Following up on this, Alecu and Drange (2019) examined the probability of immigrants working in a licensed job in Norway. Their results show that there were no significant differences in access to closed occupations between immigrant groups with a Norwegian (domestic) degree compared to native Norwegians. Yet, immigrants with foreign degrees were significantly less likely to work in licensed occupations compared to natives, except for immigrants from Nordic and EU-15 countries. They concluded that cross-national occupational recognition programs and institutional similarities between education systems and labor market

structures ease immigrants' access to closed occupations, particularly those with foreign qualifications.

Turning to Germany, Witte (2020) found that an increase in closed occupations from 1992 to 2012 compressed overall wage inequality i.e., wages increased across the wage distribution. However, this was much more pronounced at the bottom half of the wage distribution and disproportionately contributed to wage increases in the lower half. He shows that this was due to an improving wage structure in female-dominated occupations, which lifted the lower half of the wage distribution. Lastly, he found that wages in male-dominated occupations decreased disproportionately at the top half of the distribution. He concluded that women's increased labor market participation and the homogenization of occupational requirements contributed to relative wage gains in female-dominated and closed occupations below the median. Similarly, Witte and Haupt (2020) examined the effect of occupational licensure on the gender wage gap in Germany. Comparing licensure from 1993 to 2015, they found that more than twice as many women worked in licensed occupations in 1993 than men and that this continued to disproportionately increase until 2015. However, they also found that women were much more likely to work in less economically rewarding semi-professions (e.g., nurses) than professions (e.g., medical doctor). Therefore, women's overall returns to closure were less substantial than men's returns. Lastly, they demonstrated that with the increase in women's employment in licensed occupations, all other things held constant, the gender wage gap would have decreased by roughly eight percent between 1993 and 2015. However, several additional factors e.g., occupational segregation, also play a role and hindered this from happening.

These studies demonstrate that minorities, both in North America and Europe, generally have a challenging time accessing closed occupations. However, those select minorities that can access closed occupations are rewarded economically. Furthermore, these studies also

show that access to closed occupations is largely dependent on group-specific capital endowments i.e., groups with more human, social, and cultural capital are more likely to work in closed occupations. This extrapolates existing inequalities between groups and leads to a cumulative disadvantage for more vulnerable groups (DiPrete & Eirich, 2006). However, what happens when these occupational barriers are removed? Are the formerly protected minorities harmed by deregulation? Is deregulation helpful for those more vulnerable groups that lack the resources necessary to access these formerly closed occupations? To examine these questions and develop a better understanding of group-specific returns to occupational deregulation through self-employment, I applied the *analytical framework of migrant entrepreneurship* developed by Kloosterman (2010).

Analytical Framework of Migrant Entrepreneurship

Based on the *mixed embeddedness* approach (Kloosterman et al., 1999; Kloosterman & Rath, 2001) Kloosterman developed an analytical framework of migrant entrepreneurship to better understand and explain differences in immigrant entrepreneurship in modern societies (2010). This framework considers both the local opportunity structure (markets) and immigrants' resources (financial, human, social, and ethnic capital) to explain different outcomes in immigrant entrepreneurship. Based on the accessibility and growth potential of markets, Kloosterman developed a typology of the opportunity structure for self-employment (see figure 2.1). The accessibility of a market is determined by the resources that an entrepreneur needs to access that market, with a specific focus on human capital. The growth potential is based on structural trends in total employment and turnover to define a market as expanding or stagnating. This results in a typology of four markets in which immigrant entrepreneurs can set up shop: *stagnating, high-skilled; vacancy-chain openings; post-industrial, low-skilled;* and *post-industrial, high-skilled*.

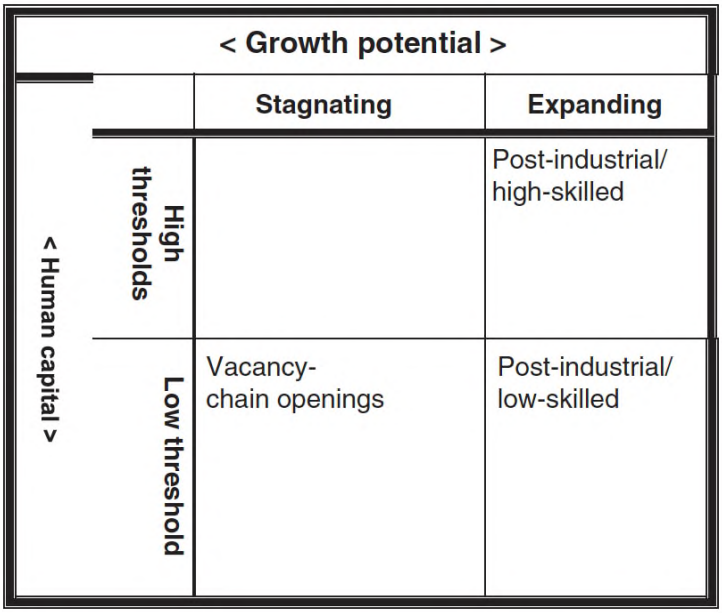


Figure 2.1: Typology of the opportunity structure (Kloosterman 2010)

Following this typology, the German skilled crafts sector is located on the left-side of the matrix. Prior to the 2004 reform, which abolished licensing requirements for 53 out of 94 occupations, the German skilled crafts sector was a stagnating high-skilled market. After the reform, 53 of these formerly licensed occupations shifted into the bottom left-hand quadrant becoming a stagnating low threshold market of "vacancy-chain openings". Hence, the German skilled crafts and trades are now divided into two markets: one with a high human capital threshold (still regulated crafts) and one with a low threshold (deregulated crafts). As with most typologies, there is no perfect fit and there may be some overlap between classifications, however, overall, the German skilled crafts and trades fit into these two market types. According to Kloosterman (2010), a stagnating high-skilled market is not likely to attract many immigrant entrepreneurs due to its high entry barriers (e.g., occupational licensure) and slim chances of upward mobility. A vacancy-chain openings market, however, attracts immigrant entrepreneurs with limited financial and human capital but plenty of social and ethnic capital. Accordingly, entrepreneurs in this type of market tend to be strongly embedded in their ethnic community and rely on their homogeneous social and ethnic capital both as a source of labor and

as a customer base. In Germany, immigrants originating from the former "guest-worker" (*Gastarbeiter*) countries i.e., Greece, Italy, Portugal, Spain, Turkey, and the former Yugoslavia fit this description well. They have long histories of migration to Germany[31] and large established ethnic communities, yet they lack financial and human capital (Höhne et al., 2014).

Lastly, although Kloosterman never explicitly states that immigrants in a vacancy-chain market are likely to start one-person operations, he does point out that many of them enter self-employment out of economic necessity. Consequently, as previous studies have shown, many of these businesses are likely to be one-person operations without paid employees (Apitzsch, 2003; Dvoulety, 2018; OECD & European Union, 2019; Sanders & Nee, 1996; Waldinger, 1989). Furthermore, as the results of chapter 1 demonstrated, starting a business with employees requires additional resources, such as access to financial capital and knowledge of the receiving country's legal system. Accordingly, I assume that many of the immigrant businesses located in a vacancy-chain market will be one-person operations. To get a better understanding of how occupational deregulation affects the earnings returns of distinct types of self-employment, I differentiated between solo self-employment i.e., a business operated by just one person without (paid) employees; and self-employment with employees (for an overview see chapter 1).

Women and Occupational Closure

The effect of removing occupational requirements on women's earnings, especially immigrant women, is largely unknown. However, previous studies have demonstrated that gender differences in returns to occupational closure exist. For example, Witte and Haupt (2020) found that in Germany more than twice as many women than men work in licensed occupations. Yet,

[31] Beginning in 1955 with the first guest-worker recruitment treaty signed with Italy (Schmidt 1997).

because they are also much more likely to work in less economically rewarding semi-professions (e.g., nurses) than professions (e.g., medical doctor), their overall returns to closure are less substantial. The authors concluded that several additional factors, such as occupational segregation, influence women's earnings return and that their returns to closure are therefore mitigated. Accordingly, women's labor market disadvantages must also be considered when examining the effects of occupational closure on their earnings returns.

Several different explanations for women's labor market disadvantage exist. For example, the *resource* approach posits that women's economic disadvantage can be attributed to their lack of necessary resources i.e., human, financial, and social capital (Becker, 1985; McManus, 2001). Furthermore, *devaluation* theory and *occupational segregation* approaches assert that female-dominated occupations and work are less valued in society and therefore less economically rewarding (England, 1992; Petersen & Saporta, 2004). Similarly, the *power resource* approach emphasizes how power inequalities between male-dominated and female-dominated occupations lead to disadvantages (Minkus, 2019). Lastly, in addition to overall labor market disadvantages, gender differences in self-employment also exist. One key explanation for these differences is the *incentive* approach, which asserts that women and men have different incentive structures and that this leads to differences in self-employment outcomes. For example, women are more likely to enter self-employment because of familial reasons and flexibility, rather than earnings and economic self-sufficiency (Bögenhold & Klinglmair, 2015; McManus, 2001). Accordingly, women face additional earnings disadvantages compared to men. On the one hand, occupational closure may therefore work as a 'sheltering' mechanism and protect women from labor market discrimination. On the other hand, women may face a more challenging time accessing closed occupations or their returns to closure may be smaller.

Additionally, recent studies have also found that immigrant women face a double disadvantage on the labor market: one for gender and another for migration status (Ballarino &

Panichella, 2018; Donato et al., 2014; Fleischmann & Höhne, 2013). One possible explanation of this double disadvantage is the effect of gender role attitudes and female labor force participation in the country of origin (Blau et al., 2011; Röder & Mühlau, 2014). For example, Fleischmann and Höhne (2013) found that in Germany the gender gap in labor force participation between first-generation immigrant women and men from non-European and less developed countries was larger than the gender gap among West German natives. While immigrants from post-socialist countries (including former East Germany) had similar or smaller gender gaps in labor force participation than native West Germans. Similarly, Frank and Hou (2016) found that the female labor force participation rate in the country of origin was a strong predictor of immigrant women's earnings in Canada. These findings suggest that country of origin gender role attitudes and labor force participation rates affect immigrant women's labor market outcomes in the destination country. Hence, many immigrant women face additional constraints in their labor market integration. The effect of removing occupational restrictions, such as occupational licensure, on immigrant women's earnings is largely unknown. This chapter provides some first causal evidence in this regard.

Human Capital Approach

Lastly, a traditional human capital approach assumes that net of other characteristics, such as ethnicity and gender, the higher one's human capital investment is, the larger their economic returns will be (Becker, 1993). Furthermore, Sorensen (1983a) argued that the more open an occupational structure becomes, in terms of open versus closed positions, the more important the role of individual qualifications in occupational attainment will be. Therefore, a traditional human capital approach assumes that individuals with more general training and education will experience larger returns to opening formerly closed positions. However, more recent studies on task-specific human capital demonstrate that this may not be the case across all occupations (Gathmann & Schönberg, 2010; Gibbons & Waldman, 2004; Schulz et al.,

2013; Takii et al., 2020). For example, Gathmann and Schönberg (2010) found that in Germany task-specific human capital explained up to fifty percent of wage growth across occupations, especially for high-skilled workers. Moreover, Sullivan (2010) found that in the United States occupation-specific human capital accounted for the largest wage gains among craftspeople, whereas more general skills had no effect. The German skilled crafts and trades require very specialized training and skills (Bol, 2014; DiPrete et al., 2017; Elbers et al., 2021). Accordingly, this approach assumes that individuals with more specific human capital, such as vocational training, will have higher returns to occupational deregulation in the German skilled crafts and trades. Accordingly, I tested these competing assumptions, by estimating the causal effect of occupational deregulation on earnings for different education levels.

Hypotheses

In summary, occupational closure creates economic rewards by restricting the supply of practitioners, increasing diffuse demand for services, channeling demand to the occupation, and signaling quality of service (Weeden, 2002). Previous studies have shown that women and immigrants disproportionately benefit from working in closed occupations. However, they also found that the most vulnerable among them, those with limited resources, are much less likely to work in closed occupations. This extrapolates existing inequalities between minorities. Removing occupational restrictions, such as licensure, may therefore disproportionately benefit vulnerable groups. However, when occupational licensure is tied to self-employment, as is the case in the German skilled crafts and trades, the resources needed to operate a business must also be considered i.e., groups with limited resources will have a challenging time starting and operating a business. Therefore, following Kloosterman's (2010) analytical framework for migrant entrepreneurship, I assume that immigrant entrepreneurs with limited financial and human capital, but sufficient social and ethnic capital will have the largest earnings returns from occupational deregulation (*hypothesis 1*). However, due to their lack of financial and human

capital, many of these businesses will be one-person operations. Accordingly, I also assume that solo self-employed immigrants will have larger earnings returns from occupational deregulation than those with employees (*hypothesis 2*). Lastly, many immigrant women are doubly disadvantaged on the labor market. On the one hand, this should lead to larger earnings returns once occupational restrictions are removed (*hypothesis 3a*). On the other hand, removing occupational licensure may exacerbate these disadvantages and result in lower earnings returns (*hypothesis 3b*).

The Setting

The German Skilled Crafts and Trades

In 2019 the German skilled crafts sector comprised twenty-seven percent of all businesses, twelve percent of all employees, and twenty-eight percent of all apprentices, making it one of Germany's most important economic sectors (Zentralverband Deutsches Handwerk, 2020). In 2000 the Court of Justice of the European Union (CJEU) ruled that the German Crafts Code (*Handwerksordnung)*, which governs the skilled crafts and trades, was incompatible with the principles of a single European market (Monopolkommission, 2001). In response, the German government liberalized entry regulations in the skilled crafts sector on January 1, 2004 (Entwurf eines Dritten Gesetzes zur Änderung der Handwerksordnung und anderer handwerksrechtlicher Vorschriften., 2003). Prior to this, only individuals with a master craftsman's certificate (*Meisterbrief*) were legally permitted to establish and operate a business in the 94 registered crafts and trades (*Handwerksrolle*). To obtain a master craftsman's certificate a craftsperson is required to complete several years of additional training after their initial three-year apprenticeship, pass state examinations, and cover all the required costs, which range from two to ten thousand EUR (Lergetporer et al., 2018). These entry requirements and training prereq-

uisites are closely monitored by the local Chamber of Crafts (*Handwerkskammer*). Every business in the crafts sector in Germany is required by law to be listed in the register of qualified craftsmen (*Handwerksrolle*). The register is maintained by the local Chamber of Crafts, of which every master craftsperson must be a member. A craftsperson who opens a business without registering or fulfilling the prerequisites must pay a fine of up to ten thousand EUR and may be prosecuted for illegal employment.

Since the reform in 2004 a master craftsman's certificate is no longer required to open a business in 53 of the 94 registered crafts, in the remaining 41 it still is.[32] Furthermore, since there were no similar occupational restrictions for dependent employment, the reform exclusively deregulated self-employment.[33] Accordingly, since the licensing requirements only pertain to self-employment, the German skilled crafts and trades are an example of partially closed occupations. However, this partial closure is also considered strictly closed because of the high costs associated with a master craftsman's certificate, which is required for self-employment (Redbird, 2017). Table A2.1 lists the 94 crafts and trades and whether they were deregulated in 2004. The ultimate decision of which crafts to deregulate took several years and involved numerous actors including politicians, corporate lobbyists, union representatives, and the Chamber of Crafts. Furthermore, the selection criteria included, among other things, a risk-assessment of each craft e.g., potential risk of harm to customers. Ultimately, the reform abolished licensing requirements for 53 crafts and trades. Hence, this should have increased self-employment and created new job opportunities.

[32] At the same time, the entry restrictions in 35 of the 41 trades that kept the master craftsman's certificate as a licensing requirement became less restrictive after 2004. A companion who had at least six years of work experience in a trade, of which four had to be in a leading position, also became eligible to register a business at the local Chamber of Crafts (the so-called *Altgesellenregel*). This, however, did not apply to "high-risk" trades i.e., audiologist, chimney sweep, dental technician, optician, orthopedic shoemaker, and orthopedic technician (Lembcke, 2020).

[33] There are differences in occupational requirements concerning employment i.e., a completed apprenticeship is required to work as a skilled craftsperson (*Facharbeiter*), however, one can still work without such a qualification, albeit, as an unskilled craftsperson (*Hilfsarbeiter*).

Previous evidence, however, suggests that this may not be as clear-cut as it seems. For example, Rostam-Afschar (2014) found that the reform increased entry into self-employment among the deregulated occupations and that exits out of self-employment remained virtually unchanged. Sonntag and Lutter (2018) found little to no effect of the reform on the earnings of self-employed individuals for either group. Damelang, Haupt, and Abraham (2018), however, found that employees in the deregulated crafts had lower wages after the reform. Bol (2014), on the other hand, found that self-employed workers with comparable levels of human capital and demographic characteristics, earned more in the regulated occupations. Furthermore, Lergetporer and colleagues (2018) found that it was largely solo self-employment that increased after reform and that wages decreased for incumbent craftspeople in the deregulated crafts. None of these studies, however, specifically focused on immigrants. The only study to my knowledge to have done so prior to the current one, is the study by Runst (2018) that investigated the effect of the reform on immigrants' employment in the skilled crafts sector. Runst (2018), using a binary dependent variable indicating migration status, found that the reform increased the probability of immigrants' employment in the deregulated trades. Unfortunately, Runst did not further discern between different immigrant groups, nor did he examine earnings. This leaves several questions concerning group-specific returns to occupational deregulation unanswered. I address some of these questions in this chapter.

Labor market integration and self-employment

With over thirteen million migrants in 2019, Germany had the largest foreign-born population of any European country and the second largest number of residing international migrants worldwide (McAuliffe & Binod, 2019). The integration of immigrants in Germany, especially structural integration, has become a politically salient topic that has garnered much attention in recent decades (e.g., Constant & Massey, 2005; Granato & Kalter, 2001; Kalter, 2005; Kalter & Granato, 2002; Kogan, 2004, 2006, 2007a, 2007b, 2011; Kogan & Weißmann,

2013; Kosyakova & Brücker, 2020). Most of these studies found that immigrants fare worse on the German labor market than their native counterparts. Studies on immigrants' self-employment, however, found that self-employed immigrants generally fare better than their employed counterparts and oftentimes natives (e.g., Block et al., 2011; Constant & Zimmermann, 2006; Özcan & Seifert, 2000; Struminskaya, 2011). Easing access to self-employment may, therefore, be an effective way of promoting labor market integration.

Methodology

Quasi-Experimental Design

I used a similar identification strategy as the one presented in chapter 1. Namely, I used the 2004 reform of the German Crafts Code as a quasi-experiment to test the causal effect of occupational deregulation on immigrants' earnings. Prior to the reform all 94 registered skilled crafts and trades were restricted by the same occupational regulations. After the reform, however, 53 of the 94 crafts and trades no longer required a master craftsman's certificate to start a business, while the remaining 41 still did. Hence, the 2004 reform resembles an experimental setting in which deregulation acts as the treatment. The 53 deregulated crafts represent the treatment group and the 41 (still) regulated the control group. This setting allowed me to use a difference-in-difference-in-differences (DDD) approach to isolate the causal effect of the 2004 reform on immigrants' earnings (for a similar approach see Roth & Siegert, 2016).

Accordingly, I estimated linear regression models based on variants of the following regression equation:

Equation 2.1

$$Y[Log\ Earnings] = \beta 0[Constant] + \gamma[Nationality*Treatment*Time] + \beta 1[Treatment] + \beta 2[Time] + \beta 3[Nationality] + \beta 4[Treatment*Time] + \beta 5[Nationality*Treatment] + \beta 6[Nationality*Time] + \beta 7[Covariates] + \varepsilon[Random\ Error\ Term]$$

In which the outcome variable *Y* is the logarithm of real individual net monthly earnings adjusted for the Consumer Price Index 2005.[34] γ provides the causal effect of interest and is represented by a three-way interaction between the binary *nationality* variable: other nationality/respondent's nationality; the binary *treatment* variable: control group/treatment group; and the binary *time* variable: pre-reform/post-reform. This three-way interaction estimates the change in net monthly earnings for each nationality group working in one of the 53 deregulated occupations after the reform. Thus, following a DDD approach it predicts the causal effect of the 2004 German Crafts Code reform on each nationality groups' net monthly earnings. I estimated separate regression models for women and men to examine if gender differences in immigrants' returns to occupational deregulation exist. To test the competing assumptions regarding the effect of general and specific human capital on earnings, I replaced the *nationality* variable in equation 2.1 with a binary *education* variable (other education/respondent's education) in model 6 (see Table A2.2 in the appendix for an overview of the education levels). Furthermore, to control for any possible confounding trends I included occupation, industrial sector, year, and federal state fixed effects, and used clustered standard errors by occupations.[35] Lastly, I included several control variables that could influence immigrants' earnings, such as the relative group size of each immigrant group in every German federal state for each year (see Table A2.2 in the appendix for a complete list of control variables).

Data

Consistent with chapter 1, the current analyses are based on German micro-census data. The German micro-census is an annually administered repeated cross-sectional survey consisting of a 1% representative random sample of all German households. It is conducted by the

[34] Respondents were asked what their personal net income was in the month prior to the interview.

[35] I also estimated all models using individual yearly federal state fixed effects (year*state). The results did not significantly differ.

statistical offices of the German states and prepared by the Federal Statistical Office of Germany(Lengerer & Shahla, 2006). I used the Scientific Use Files, which are anonymized 70% subsamples of the surveyed households and contain approximately 500,000 observations per year (Schimpl-Neimanns, 2002). Based on the 3-digit German occupational classification (*Klassifikation der Berufe 1992*) found in the micro-census, I was able to identify 79 occupational codes: 43 in the treatment and 36 in the control group. All the 94 crafts and trades are covered within the 79 identified codes, however, due to the semi-aggregated structure of the classification scheme, there is some clustering (S. Schmidt, 2000).

The large sample size and detailed occupational information contained in the micro-census make it suitable to analyze the effect of the 2004 German Crafts Code reform on immigrants' earnings. Nonetheless, the micro-census has some shortcomings. For example, information regarding migration background is limited. I was only able to construct individuals' migration background by means of their current citizenship(s), information regarding if they were born in Germany or not, and year of arrival (for an overview see Gresch & Kristen, 2011). Moreover, additional information that has been shown to affect immigrants' earnings, such as parents' country of origin and occupational status, language skills, and social network ties is also unavailable. Lastly, the micro-census does not contain exact information regarding individual income. Instead, respondents are asked what their personal income was one month prior to the survey i.e., total earnings from wages, investment enterprises, retirement funds, and other ventures. Accordingly, I only considered individuals who stated that their main source of income was derived from employment. Nevertheless, a certain degree of uncertainty remains. That being taken into consideration, to my knowledge the micro-census is still the best available data source to study self-employed immigrants, since its large sample size and detailed occupational information allows for more fine-grained group analyses.

Sample

Finally, the analysis sample consisted of the years 2000 to 2008, included all native Germans and first-generation immigrants who arrived in Germany at age 19 or older, and were self-employed in one of the 94 crafts and trades at the time of the survey. To avoid any issues concerning individuals who were still in training or that had entered early retirement, I restricted the sample to actively employed individuals between 20 and 65 years old. Actively employed individuals were self-employed with or without employees and were not on parental or sick leave, apprentices, in the military, family workers, or marginally employed at the time. This resulted in 27,206 total observations. However, to test the hypotheses regarding gender differences on returns to occupational deregulation, I split the sample by gender. This resulted in 4,171 self-employed craftswomen and 23,035 self-employed craftsmen. Furthermore, to mitigate any confounding effect that the 2004 EU enlargement may have had on immigrants' earnings, I restricted the main analysis to immigrants who arrived in 2003 or earlier.[36] Lastly, following Runst and colleagues (2019) I dropped all individuals who were classified as 'cleaners' (*Gebaeudereiniger; Raumpfleger*) from the main analysis.[37] This resulted in 3,957 craftswomen and 22,454 craftsmen. Consequently, due to the small sample of self-employed women, I was only able to differentiate women's nationality on the EU level i.e., German, EU citizen, and non-EU citizen (see Table 2.1 for an overview of all nationalities).

[36] Additionally, until 2005 the micro-census applied a so-called "reference week concept". This means that the information provided by respondents refers to a specific week each year (Lengerer & Shahla, 2006). All the information for 2004 is based on the last week of March 2004. Since the EU enlargement came into force on May 1, 2004, the information from the 2004 micro-census survey does not include individuals who arrived as a direct consequence of the accession.

[37] The study by Runst et al., (2019) found that several occupations classified within the 3-digit German occupational classification as 'cleaners' did not correspond to the skilled trade of 'cleaners' regulated by the German Crafts Code (for an overview see Runst et al., 2019).

Table 2.1: Immigrant Groups

Name	Overall (%)	Operationalization
Craftswomen		
German	3,989 (95.64)	Citizens of Germany.
European Union (EU)	105 (2.52)	Citizens of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, or United Kingdom.
Non-EU	77 (1.85)	Citizens of remaining countries.
Total	4,171 (100.00)	
Craftsmen		
German	22,225 (96.61)	Born in Germany with (only) German citizenship.
Former Yugoslav Republic	102 (0.44)	Citizens of Bosnia Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia, or Slovenia.
Remaining EU15 & EFTA	132 (0.57)	Citizens of Austria, Belgium, Denmark, Finland, France, Ireland, Island, Liechtenstein, Luxembourg, the Netherlands, Norway, Sweden, Switzerland, or United Kingdom.
Southern Europe	46 (0.20)	Citizens of Cyprus, Greece, Malta, Portugal, or Spain.
Jewish Quota Refugee; (Spaet)Aussiedler	41 (0.18)	German & Polish or Romanian citizens & arrived between 1945 & 1989; German & Armenian, Azerbaijani, Belarusian, Georgian, Kazak, Kyrgyzstan, Moldovan, Russian, Tajikistani, Turkmen, Ukrainian, or Uzbekistani citizens & arrived after 1991 (see Cohen & Kogan 2007).
Eastern European	187 (0.81)	Citizens of Albania, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, or Slovakia.
Turkey	104 (0.45)	Turkish citizenship.
Italy	91 (0.40)	Italian citizenship.
Rest of World	77 (0.33)	Citizens of one of the 54 African countries; 35 sovereign states or dependent territories in the Americas; remaining Eastern, Southern, South-Eastern, & Western Asian countries; remaining countries worldwide including Oceania.
Total	23,035 (100.00)	

German micro-census: 2000 - 2008; own calculations.

Assumptions

By employing a difference-in-difference-in-differences (DDD) design I assumed that without the reform, all other things being equal, the earnings of the treatment and control groups would have continued along similar pre-reform trajectories. This is known as the parallel or common trend assumption (Gangl, 2010; Meyer, 1995). Another crucial assumption of the DDD approach is that no external factors besides the treatment of interest (policy reformation) affected the activity of the two groups (Gangl, 2010; Meyer, 1995). Additionally, since I implemented three-way interactions featuring nationality, I also assumed that no other group-specific changes in the opportunity structure besides the 2004 reform affected immigrants' earnings. Although there is no statistical test for these assumptions, there are a few ways to assess their validity. One of which is estimating so-called placebo tests in which the year of treatment is altered (Bertrand et al., 2004). Accordingly, I estimated additional models in which I altered the year of the reform. Lastly, I assumed that given the opportunity, individuals will maximize their income and occupational status conditional on their resources and constraints.

Admittedly, due to differing migration causes e.g., economic, political, or family reunification, this assumption may be more plausible for some groups than others. Nevertheless, the micro-census does not contain information concerning employment preferences or migration causes, therefore, I assumed that individuals will generally aim to maximize their labor market returns.

Furthermore, one of the fundamental assumptions of an (quasi-)experimental design is random assignment to the treatment (Athey & Imbens, 2018; Gangl, 2010; Meyer, 1995). If the assignment to the treatment is nonrandom this may lead to non-equivalent groups, meaning that any effect of the treatment might be caused by the groups being different at the outset rather than because of the actual treatment. For example, if the 53 deregulated crafts and trades were not randomly assigned to deregulation, then the findings presented in this chapter might be a result of nonrandom assignment rather than the reform itself. Unfortunately, there seems to be some truth to this. For example, there are six crafts and trades that were classified as having a high potential risk of harm and therefore protected from any form of deregulation.[38] Hence, the question arises if the forthcoming results are indeed a causal effect of the reform or (partially) a statistical artifact. To test the random assignment assumption, I implemented a second quasi-experimental design by exploiting a unique opportunity presented by the political wrangling of the reform.

The original draft bill presented in the German Federal Parliament on June 24, 2003, included a list of 65 occupations that were set to be deregulated. However, due to opposition from several parties, 12 of these 65 occupations were ultimately *not* deregulated in the final amendment passed six months later: *baker, butcher, communication technician, gunsmith, hairdresser, painter and varnisher, pastry chef, plasterer, stonemason and stone sculptor, surgical instrument maker, thermal and acoustic insulation fitter,* and *well builder*.[39] This scenario

[38] Audiologist, chimney sweep, dental technician, optician, orthopedic shoemaker, and orthopedic technician.
[39] *Entwurf eines Dritten Gesetzes zur Änderung der Handwerksordnung und anderer handwerksrechtlicher Vorschriften.*

allowed me to implement another quasi-experimental design to test the random assignment to treatment assumption. To do so, I applied the logic of a regression-discontinuity design (RDD).

A RDD is a quasi-experimental design in which a cutoff or threshold is assigned above or below that of the intervention and the observations lying closely on either side of the threshold are compared. This makes it possible to estimate the average treatment effect in environments in which randomization is unfeasible (Imbens & Lemieux, 2008; Lee & Lemieux, 2010). Accordingly, I estimated additional models in which I treated the 12 "almost deregulated" occupations as lying just above the "deregulation threshold" and dropped all the remaining occupations from the control group. I assumed that these 12 almost deregulated occupations are more equivalent to the 53 deregulated occupations and therefore a better indicator of the treatment effect of the reform.

Results

Descriptive Evidence

To get a first impression of the effect of opening formerly closed occupations on immigrants' earnings, I started with some descriptive statistics. Beginning with the summary statistics in table 2.2, it quickly becomes apparent that men are overall much more likely to be self-employed than women in the German skilled crafts and trades. In total, there are six times as many self-employed craftsmen, approximately twenty-four thousand, as there are craftswomen, approximately four thousand. Moreover, there are three further aspects in which the deregulated and regulated occupations noticeably differ, both within as well as between craftswomen and craftsmen: solo self-employment, foreign-born entrepreneurs, and log monthly earnings.

Starting with craftswomen before the reform, sixty-eight percent of the treatment group is solo self-employed, which is more than twice as high as the thirty percent in the control

group. Furthermore, the proportion of foreign-born entrepreneurs is four times as high in the treatment group (eight percent) than the control group (two percent). Lastly, self-employed craftswomen in the control group earned approximately three hundred euros more a month than their soon-to-be deregulated counterparts. These results illustrate that the craftswomen comprising the two occupational groups significantly differed before the reform. Self-employed craftswomen in the regulated occupations were much likelier to have a business with employees and less likely to be foreign-born. This may also explain their three-hundred-euro income advantage. What happens to these differences after the reform? Looking at the bottom-half of the summary statistics for craftswomen, it is evident that the reform increased the proportion of solo self-employed craftswomen in both occupational groups. The proportion of foreign-born women, however, only increased in the treatment group and remained unchanged in the control group. Furthermore, both groups experienced a relatively similar decrease in log monthly earnings after the reform. This suggests that lower monthly earnings are likely a product of increased solo self-employment, rather than foreign-born entrepreneurs. Furthermore, these results are in line with those found in chapter 1 and suggest that immigrant women's self-employment increases after occupational deregulation. The proportion of foreign-born female business owners increased by five percent in the deregulated occupations after the reform, whereas it remained unchanged in the still regulated occupations.

Table 2.2: Summary Statistics

Craftswomen	N	Mean	Min.	Max.	SD		N	Mean	Min.	Max.	SD
Pre-Reform Treatment						**Pre-Reform Control**					
Solo self-employment	522	0.68	0.00	1.00	0.47	Solo self-employment	1,126	0.30	0.00	1.00	0.46
Employer	522	0.32	0.00	1.00	0.47	Employer	1,126	0.70	0.00	1.00	0.46
Foreign-born	522	0.08	0.00	1.00	0.28	Foreign-born	1,126	0.02	0.00	1.00	0.13
Age	522	45.89	20.00	65.00	9.56	Age	1,126	42.95	22.00	65.00	9.65
No degree	498	0.00	0.00	1.00	0.06	No degree	1,067	0.00	0.00	1.00	0.04
No Post-Secondary	498	0.13	0.00	1.00	0.34	No Post-Secondary	1,067	0.05	0.00	1.00	0.22
Vocational	498	0.80	0.00	1.00	0.40	Vocational	1,067	0.93	0.00	1.00	0.26
Tertiary	498	0.07	0.00	1.00	0.25	Tertiary	1,067	0.02	0.00	1.00	0.15
Log monthly earnings	474	6.75	4.35	9.58	0.82	Log monthly earnings	990	7.05	4.35	10.04	0.68
Post-Reform Treatment						**Post-Reform Control**					
Solo self-employment	801	0.74	0.00	1.00	0.44	Solo self-employment	1,508	0.35	0.00	1.00	0.48
Employer	801	0.26	0.00	1.00	0.44	Employer	1,508	0.65	0.00	1.00	0.48
Foreign-born	801	0.13	0.00	1.00	0.33	Foreign-born	1,508	0.02	0.00	1.00	0.15
Age	801	45.57	20.00	65.00	9.42	Age	1,508	43.80	20.00	65.00	9.43
No degree	785	0.01	0.00	1.00	0.08	No degree	1,492	0.00	0.00	1.00	0.05
No Post-Secondary	785	0.12	0.00	1.00	0.32	No Post-Secondary	1,492	0.03	0.00	1.00	0.17
Vocational	785	0.78	0.00	1.00	0.41	Vocational	1,492	0.94	0.00	1.00	0.23
Tertiary	785	0.09	0.00	1.00	0.29	Tertiary	1,492	0.02	0.00	1.00	0.14
Log monthly earnings	742	6.73	4.25	9.96	0.81	Log monthly earnings	1,339	7.02	4.25	10.01	0.69
Craftsmen	N	Mean	Min.	Max.	SD		N	Mean	Min.	Max.	SD
Pre-Reform Treatment						**Pre-Reform Control**					
Solo self-employment	1,968	0.47	0.00	1.00	0.50	Solo self-employment	8,053	0.33	0.00	1.00	0.47
Employer	1,968	0.53	0.00	1.00	0.50	Employer	8,053	0.67	0.00	1.00	0.47
Foreign-born	1,968	0.04	0.00	1.00	0.19	Foreign-born	8,053	0.02	0.00	1.00	0.14
Age	1,968	45.40	21.00	65.00	10.35	Age	8,053	44.60	20.00	65.00	10.09
No degree	1,895	0.00	0.00	1.00	0.05	No degree	7,765	0.00	0.00	1.00	0.06
No Post-Secondary	1,895	0.08	0.00	1.00	0.27	No Post-Secondary	7,765	0.05	0.00	1.00	0.22
Vocational	1,895	0.87	0.00	1.00	0.34	Vocational	7,765	0.92	0.00	1.00	0.28
Tertiary	1,895	0.05	0.00	1.00	0.22	Tertiary	7,765	0.03	0.00	1.00	0.17
Log monthly earnings	1,764	7.48	4.35	10.07	0.71	Log monthly earnings	7,167	7.52	4.35	10.07	0.70
Post-Reform Treatment						**Post-Reform Control**					
Solo self-employment	2,572	0.55	0.00	1.00	0.50	Solo self-employment	9,861	0.38	0.00	1.00	0.49
Employer	2,572	0.45	0.00	1.00	0.50	Employer	9,861	0.62	0.00	1.00	0.49
Foreign-born	2,572	0.07	0.00	1.00	0.26	Foreign-born	9,861	0.04	0.00	1.00	0.21
Age	2,572	45.41	20.00	65.00	9.69	Age	9,861	45.08	20.00	65.00	9.45
No degree	2,542	0.01	0.00	1.00	0.09	No degree	9,752	0.00	0.00	1.00	0.07
No Post-Secondary	2,542	0.08	0.00	1.00	0.27	No Post-Secondary	9,752	0.04	0.00	1.00	0.20
Vocational	2,542	0.83	0.00	1.00	0.37	Vocational	9,752	0.93	0.00	1.00	0.26
Tertiary	2,542	0.08	0.00	1.00	0.27	Tertiary	9,752	0.03	0.00	1.00	0.17
Log monthly earnings	2,299	7.38	4.25	10.01	0.69	Log monthly earnings	8,662	7.44	4.25	10.01	0.69

German micro-census: 2000-2008; own calculations.

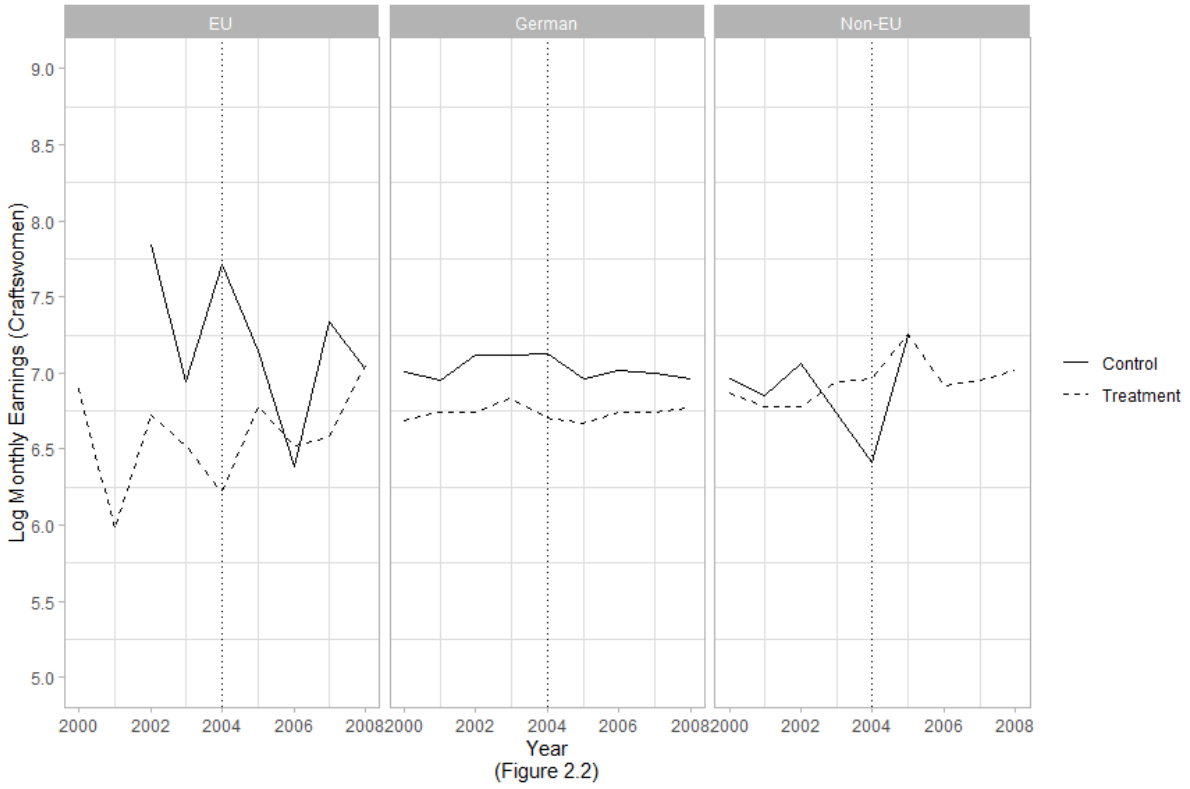
Turning to craftsmen, a similar picture emerges as with craftswomen. Forty-seven percent of self-employed craftsmen in the treatment group ran a one-man operation before the reform, whereas only thirty-three percent did so in the control group. Furthermore, craftsmen in the soon-to-be deregulated occupations are twice as likely to be foreign-born (four percent) as craftsmen in the regulated occupations (two percent). Consistent with craftswomen, craftsmen in the treatment group earned less than those in the control group, however, at approximately seventy euros the difference is not nearly as large as it is with craftswomen. How did the reform affect these differences among craftsmen? Turning to the bottom half of the results

for craftsmen, the narrative is again like the one found for craftswomen. Both groups experienced an increase in solo self-employment and a decrease in monthly earnings after the reform. However, unlike craftswomen the proportion of foreign-born entrepreneurs increased in both the treatment and control group. This suggests that the reform affected the proportion of foreign-born entrepreneurs across the German skilled crafts sector not just in the deregulated occupations.

The results of table 2.2 illustrate that overall, the two occupational groups significantly differed regarding solo self-employment, foreign-born entrepreneurs, and earnings before the reform. The soon-to-be deregulated occupations had much higher levels of solo self-employment and foreign-born craftspeople but lower monthly earnings than their occupational counterparts. The gender differences within the occupational groups are also much starker for the treatment group. Craftswomen in the treatment group are much more likely to be solo self-employed and foreign-born, and they earn significantly less than their male counterparts. These differences remained largely consistent after the reform across occupational groups and gender. The exception being the proportion of foreign-born craftswomen in the treatment group, which increased from eight to thirteen percent after the reform but did not change among craftswomen in the control group, remaining at two percent. In line with the results from chapter 1, this suggests that removing occupational restrictions particularly affects immigrant women's self-employment. Hence, removing occupational barriers may allow doubly disadvantaged immigrant women the opportunity they need to garner some economic independence.

To take a more detailed look at the effect of occupational deregulation on self-employed immigrants' earnings, I plotted the average log monthly earnings of immigrant women and men between 2000 and 2008 in figures 2.2 and 2.3. Beginning with craftswomen in figure 2.2, it is evident that native German craftswomen's earnings decreased after 2004. However, their earnings decreased in both the treatment and control group, suggesting that the 2004 reform

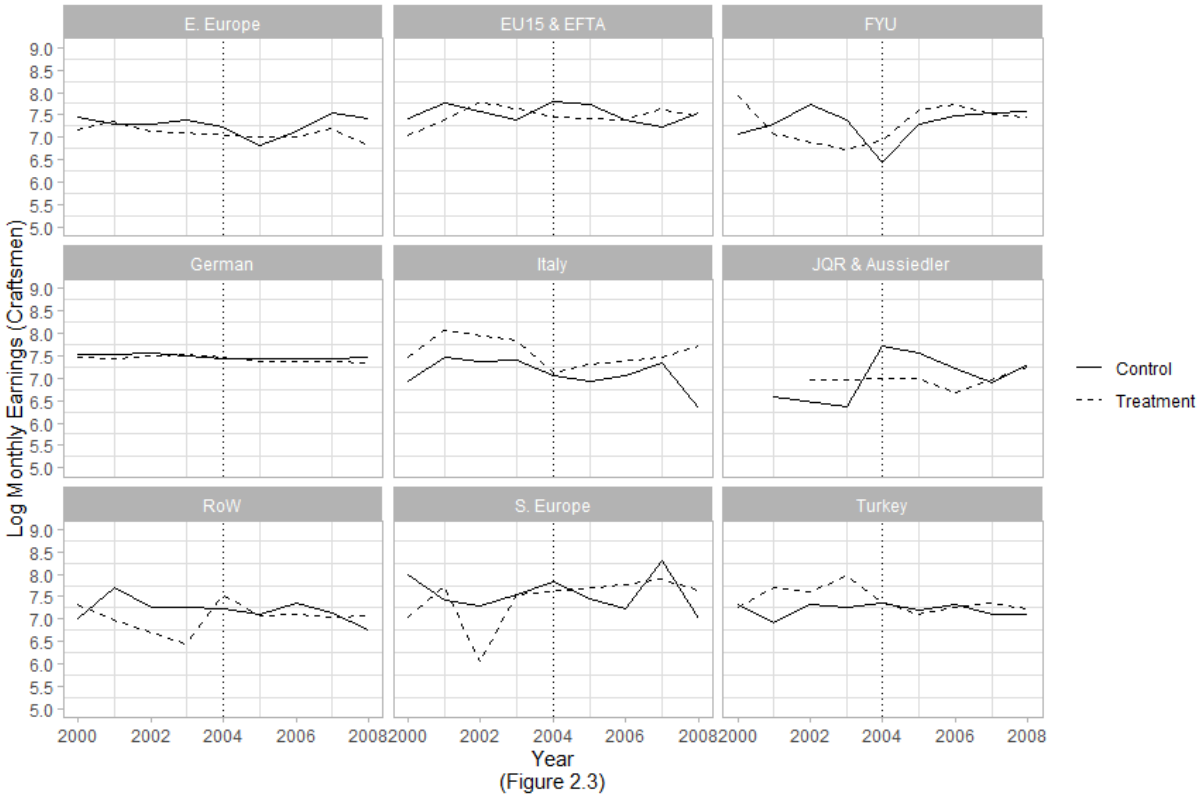
affected self-employed native women's earnings across the board. The same is not true for craftswomen from non-EU countries. Those working in the deregulated occupations experienced a stark increase in earnings after the reform, whereas those working in the control group experienced a stark decrease in earnings directly after the reform, followed by a sharp increase in the following years. Lastly, the earnings of craftswomen from EU countries seems to be rather erratic over the years for both occupational groups. However, due to the small sample size of immigrant women, the results in figure 2.2 should be interpreted with caution. Nevertheless, the results for native German craftswomen do not suffer from the same problem and suggest that the 2004 reform negatively affected self-employed German women's earnings in both groups. This is in line with previous research that found that women working in closed occupations in Germany had higher wages than their non-licensed counterparts (Witte, 2020; Witte & Haupt, 2020).



(Figure 2.2)

Looking at native German craftsmen in figure 2.3, their earnings do not seem to have been affected as strongly as their female counterparts. Figure 2.3 shows that native German

craftsmen's earnings in the control group seem to have remained quite stable after the reform, whereas the treatment group experienced a slight decrease in earnings. Furthermore, it becomes apparent that several immigrant groups experienced starker changes in earnings after the reform than others. For example, Italian and Turkish craftsmen working in the deregulated occupations both experienced a sharp decline in monthly earnings after 2004. On the contrary, craftsmen originating from the countries of the former Yugoslavia experienced a steady increase in earnings following the reform. Furthermore, Italian, and Turkish craftsmen working in the deregulated occupations earned more than their co-ethnic counterparts in the control group and native Germans prior to deregulation. The deregulation of these occupations, however, equalized this advantage. This suggests that Italian and Turkish craftsmen are harmed by removing the "shelter" of occupational barriers, whereas the opposite is true for former Yugoslavian craftsmen.



(Figure 2.3)

In line with previous results for women (Witte, 2020; Witte & Haupt, 2020), figure 2.2 illustrates that native women's earnings are negatively affected by removing occupational licensure. Furthermore, the result for non-EU craftswomen[40] also suggests that occupational deregulation allows doubly disadvantaged immigrant women to access formerly closed occupations, thereby increasing their average earnings. This is consistent with previous research that found that licensure negatively affects the labor market outcomes of vulnerable groups i.e., those with limited resources (Redbird, 2017; Redbird & Escamilla-García, 2020). Conversely, native German craftsmen's average earnings are not affected by occupational deregulation. This is also consistent with previous evidence that demonstrated that returns to occupational licensure are less substantial for less skilled occupations (Bol & Drange, 2017). Therefore, removing occupational licensure does not significantly affect the earnings returns of native craftsmen. Lastly, figure 2.3 illustrates that immigrant craftsmen belonging to the two largest ethnic groups, Italians, and Turks, are negatively affected by occupational deregulation. While craftsmen from the former Yugoslavia, one of the largest ethnically heterogeneous immigrant groups in Germany, seem to benefit from removing licensing requirements. The results for Italians and Turks contradict my theoretical expectation that immigrant groups with limited human and financial capital but plenty of social and ethnic capital will benefit from removing occupational licensure. The results for craftsmen from the former Yugoslavia, however, are in line with this theoretical expectation. Accordingly, the descriptive results are somewhat ambiguous regarding the effect of occupational deregulation on immigrants' earnings. The forthcoming DDD analyses test these theoretical expectations.

[40] This group is largely composed of Turkish women.

Causal Evidence

Figures 2.4 and 2.5 depict the results of the regression models for craftswomen and craftsmen separately. In model 1 I estimated standard difference-in-differences regressions to test the overall effect of the reform on earnings in the German skilled crafts sector i.e., without a third interaction term for nationality. The results of model 1 for both craftswomen and craftsmen demonstrate that removing occupational licensing requirements did not significantly affect average monthly earnings in the German skilled crafts and trades. This is consistent with the study by Sonntag and Lutter (2018) that found no effect of the reform on earnings. Furthermore, these results underpin the findings of Bol and Drange (2017) in Norway, which demonstrated that more low-skilled occupations have lower returns to occupational licensure. Overall, the 2004 reform of the German Crafts Code does not significantly affect the earnings of self-employed craftspeople. Nevertheless, the focus of this chapter is to determine how opening formerly closed occupations affects the earnings of historically disadvantaged groups. Therefore, model 2 includes the three-way interaction term of interest, represented by γ in equation 2.1. Moreover, beginning with model 2 all immigrants who arrived after 2003 were removed from the sample to mitigate any effects of the 2004 EU enlargement.

The results of model 2 in figure 2.4 for craftswomen illustrate that removing occupational regulations does not affect self-employed craftswomen's earnings, regardless of their immigration status. Southern European craftsmen, however, increased their monthly earnings after the reform. This result is in line with hypothesis 1, demonstrating that immigrants with limited financial and human capital but sufficient social and ethnic capital take advantage of occupational deregulation. To ensure that these and the forthcoming results are not biased by false classification, I followed Runst et al. (2019) and removed all cleaners from the sample. Accordingly, model 3 has the same specifications as model 2 just without cleaners.

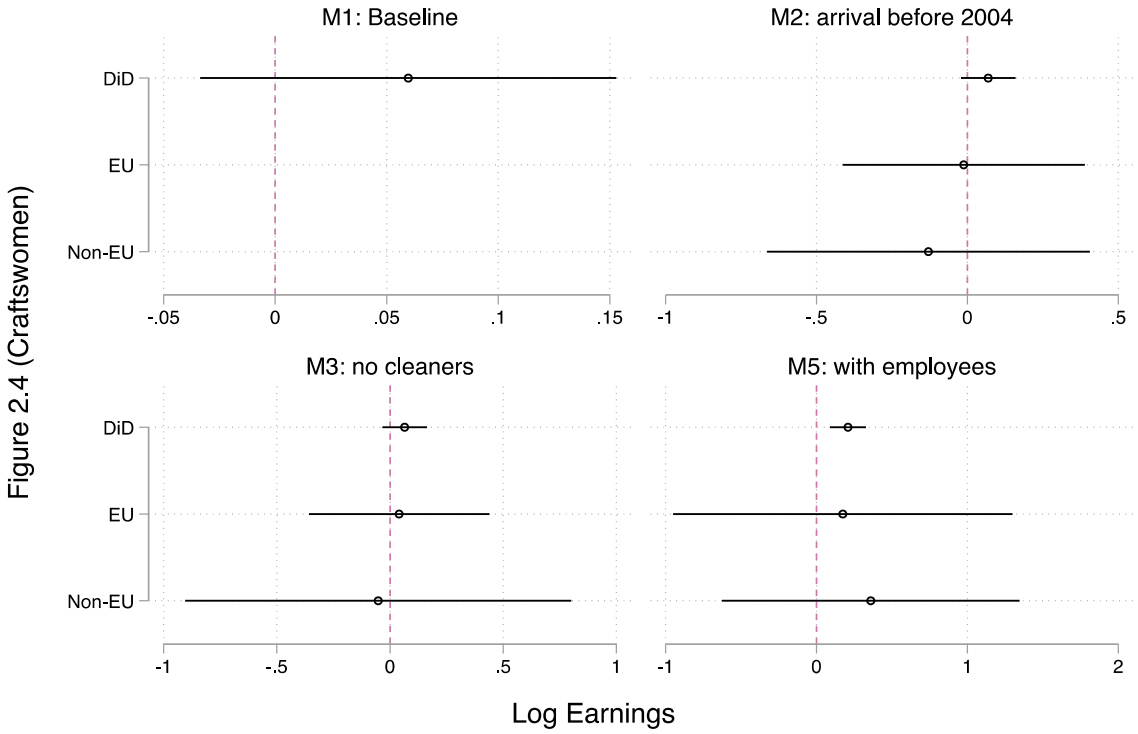
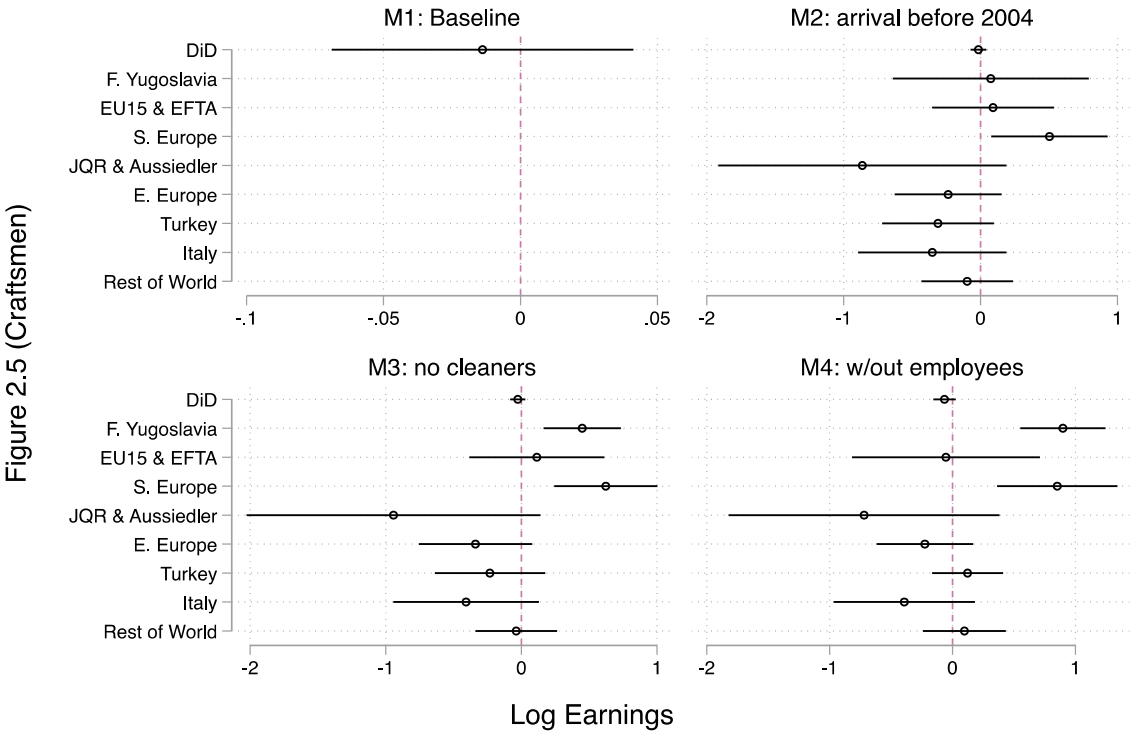


Figure 2.4 (Craftswomen)

The results of model 3 for craftswomen confirm the findings in model 2, namely that the 2004 reform did not affect self-employed immigrant craftswomen's earnings. The increase in earnings found for Southern European craftsmen in model 2 are also present in model 3, affirming that Southern European craftsmen profited from occupational deregulation. Moreover, craftsmen from the former Yugoslavia also show a significant increase in monthly earnings once the misclassification of cleaners was accounted for in model 3. Both results are in line with hypothesis 1, demonstrating that immigrants with limited financial and human capital who were previously hindered from entering closed occupations profit from their social and ethnic capital once occupational barriers have been removed. To test hypothesis 2 regarding solo self-employment, model 4 only included solo self-employed craftspeople.

Due to issues of collinearity, most solo self-employed immigrant craftswomen are found in time 2 (after 2004), I was unable to estimate model 4 for craftswomen. This is consistent with the evidence found in table 2.2 showing the significant increase in solo self-employment among craftswomen after the reform. Turning to solo self-employed craftsmen in model 4, the results illustrate that the effects found for Southern European and former Yugoslavian craftsmen in model 3 are likely driven by solo self-employment. Both groups significantly increased their earnings in solo self-employment after 2004. These results demonstrate that socially embedded solo self-employed immigrants who faced difficulty entering closed occupations due to insufficient financial and human capital benefit from occupational deregulation. To investigate how occupational deregulation affects the earnings of immigrant employers, I only included self-employed craftspeople with at least one paid employee in model 5.[41]



[41] I estimated several additional models in which I varied the number of employees from one to twenty or more, the results did not significantly differ. On average, craftswomen employers had approximately four employees, while craftsmen had approximately five.

The results of model 5 demonstrate that German craftswomen with employees significantly increased their earnings after the reform. There is no significant difference in the earnings for immigrant women employers after the reform. These results illustrate that native women employers profit from removing occupational entry restrictions. Approximately, ninety percent of German craftswomen in the sample completed vocational training. Accordingly, the increase in earnings found in model 5 is likely a positive return on their occupation-specific human capital. I directly test this assumption in model 6 (see figures 2.6 and 2.7). Like craftswomen in model 4, due to collinearity I was unable to estimate model 5 for craftsmen.

In Model 6 I tested the competing assumptions regarding earnings returns on general and occupation-specific human capital. The results for craftswomen in model 6 are consistent with an occupation-specific human capital argument. The earnings of craftswomen without a post-secondary education and those with a tertiary degree significantly decrease compared to craftswomen with completed vocational training after the reform. These results demonstrate that craftswomen with occupation-specific human capital, namely vocational training, profit from removing occupational licensure requirements. Between 1991 and 2013 approximately five times more men completed a master craftsman's certificate than women (Haverkamp et al., 2015). Therefore, according to the results in model 6 craftswomen with completed vocational training, but likely not a master craftsman's certificate,[42] profited once this requirement had been removed. A similar picture emerges among craftsmen, albeit only for those without a post-secondary education. The monthly earnings of craftsmen with no post-secondary education significantly decreased after the reform. The earnings of tertiary educated craftsmen, however, did not significantly change after the reform. The results for craftswomen and craftsmen in model 6 demonstrate that craftspeople without completed vocational training suffer an

[42] It is not possible to clearly identify individuals who completed a master craftsman's certificate in the German micro-census 2000-2008.

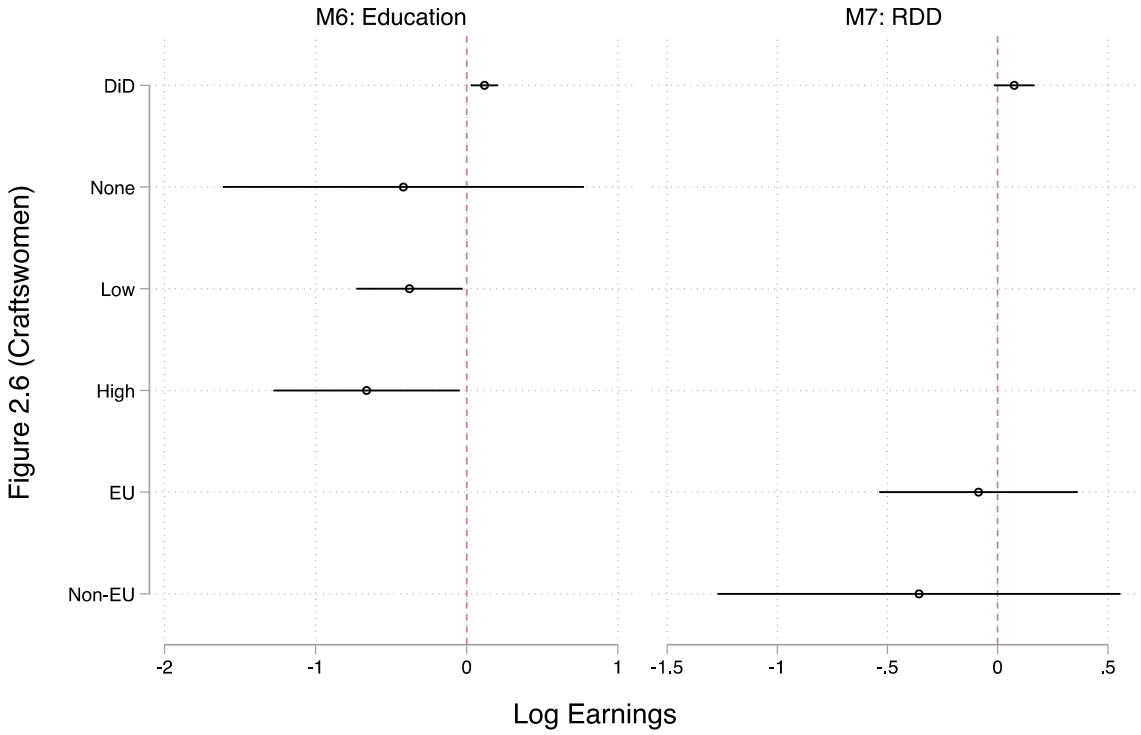
earnings penalty after occupational licensing requirements were removed. These results are in line with an occupation-specific human capital approach and consistent with findings for craftspeople in the United States (Sullivan, 2010).

Robustness Tests

One of the fundamental assumptions of an (quasi-)experimental design is random assignment to the treatment (Athey & Imbens, 2017, 2018; Gangl, 2010; Meyer, 1995). As this assumption may be partially violated regarding the 2004 reform of the German Crafts Code, I implemented a regression discontinuity design (RDD) to test the robustness of the presented results. Accordingly, I treated the twelve almost deregulated occupations as lying just above the "deregulation threshold" and dropped all the remaining occupations from the control group in model 7 (see figures 2.6 and 2.7). Consequently, the sample was reduced to approximately three thousand craftswomen and nine thousand craftsmen.

The results of model 7 for craftswomen remain the same and confirm that the 2004 reform did not significantly affect native or immigrant craftswomen's earnings. The results for craftsmen underpin that removing occupational restrictions significantly increased Southern European craftsmen's earnings. Furthermore, once possible issues of random assignment to treatment were accounted for, Turkish craftsmen display a significant decrease in net monthly earnings after the 2004 reform. Both results are consistent with the descriptive evidence found in figure 2.3. The increase in monthly earnings found for craftsmen from the former Yugoslavia is still present in model 7, however, no longer statistically significant. This is not surprising considering that the sample of craftsmen was reduced by approximately fifty percent. Nevertheless, this may also imply that the effect for former Yugoslavian craftsmen found in previous models is driven by a design flaw rather than the reform itself.

Lastly, another crucial assumption of a difference-in-differences design is that no external factors besides the intended treatment affected the outcome of interest during the observed period (Gangl, 2010; Meyer, 1995). One way to indirectly test this assumption is to estimate placebo tests in which the year of treatment is altered, and the models are re-estimated (Bertrand et al., 2004). Accordingly, I estimated placebo tests in which I altered the year of treatment to 2003 and re-estimated models 3 and 6 (see figures A2.1 and A2.2 in the appendix).[43]



The results of the placebo test for craftswomen confirm that removing occupational licensing requirements in the German skilled crafts and trades did not influence immigrant and native women's earnings. Furthermore, the results of model 9 show that craftswomen without a post-secondary education were already more likely to earn less compared to craftswomen with a completed vocational training before the reform. However, the significant decrease in

[43] I estimated additional models in which I changed the year of treatment to 2002; results were similar and are available upon request.

net monthly earnings found for tertiary educated craftswomen in model 6 is no longer present in model 9. This demonstrates that the decrease in earnings for tertiary educated craftswomen is a direct effect of the 2004 reform. Furthermore, this confirms that occupation-specific human capital i.e., vocational training, leads to higher returns than general human capital i.e., tertiary degree, in specialized occupations such as the skilled crafts and trades.

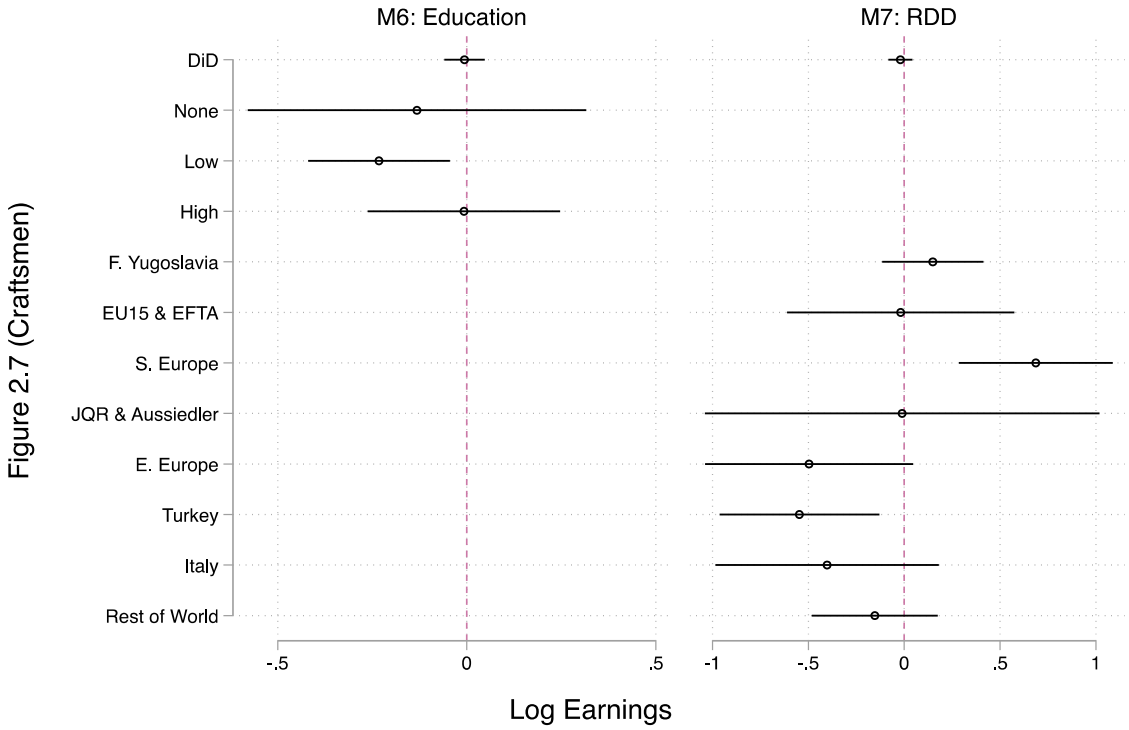


Figure 2.7 (Craftsmen)

Turning to the placebo results for craftsmen, figure A2.2 shows that Southern European craftsmen already increased their net monthly earnings prior to 2004. This implies that the increase in net monthly earnings found in model 3 is likely not a direct outcome of the crafts reform, but rather some other exogenous factor(s). Nonetheless, the effects for former Yugoslavian craftsmen found in model 3 are not present in model 8, validating that the increase in net monthly earnings for this group is a direct result of the 2004 reform. Finally, model 9 illustrates that craftsmen with no post-secondary education earned less than craftsmen with completed vocational training prior to the reform. Therefore, the findings of model 6 are not a direct

effect of the 2004 reform, but rather a continuation of preexisting differences. The results of models 8 and 9 confirm that tertiary educated craftswomen experienced a significant decrease in earnings once formerly closed occupations were opened. Furthermore, craftsmen from the former Yugoslavia benefited from occupational deregulation and increased their net monthly earnings after the 2004 reform of the German Crafts Code.

Discussion and Conclusion

Previous evidence regarding the effects of occupational closure on economic inequality is somewhat ambiguous. On the one hand, studies have shown that occupational closure shelters women and ethnic minorities from labor market discrimination. On the other hand, occupational closure also prevents many historically disadvantaged groups from entering closed occupations. Accordingly, minority groups with adequate resources can access closed occupations and disproportionately benefit from working in them, while groups with limited resources are barred from entering them. This exacerbates existing inequalities between groups and fosters cumulative advantage i.e., advantaged positions produce further advantage. However, what happens when occupational barriers are removed? Are formerly sheltered minorities harmed by removing occupational restrictions? Does opening previously closed occupations disproportionately benefit vulnerable groups with limited resources? The current chapter examined these questions by using the 2004 reform of the German Crafts Code as a quasi-experiment and implementing difference-in-difference-in-differences (DDD) estimators based on German micro-census data. To my knowledge, this is the first study to date that has examined the causal effect of occupational deregulation on minorities' earnings.

Removing occupational regulation opens occupations to competition. Accordingly, the distribution of inequality should closely mirror the distribution of individual resources in open occupations. The results of the DDD analyses demonstrate that this is the case for women in

the German skilled crafts and trades. Women with occupation-specific training and skills increased their earnings after licensing requirements were removed, while women with more general training and skills experienced a decrease in earnings. The German skilled crafts and trades require specialized training and skills. Therefore, women with these necessary skills increased their earnings once these positions were opened. While women with general skills experienced a decrease in earnings once these barriers fell and they were no longer protected by occupational licensure. Hence, women with completed vocational training experience a wage premium after the reform. This result is consistent with an occupation-specific human capital approach.

The results for men paint a somewhat different picture. Opening formerly closed occupations did not significantly affect men's earnings return to human capital. However, returns to social and ethnic capital increased once occupational licensing requirements were removed. The monthly earnings of immigrant men from the former Yugoslavia significantly increased after the 2004 reform. Members of this group have limited financial and human capital but are embedded in large and established ethnic communities. Removing occupational licensure allowed them to profit from their social and ethnic resources. Prior to the reform only those members with a master craftsman's certificate could access closed occupations, hindering this group from maximizing the full potential of their social and ethnic resources. After deregulation this group, on average, significantly increased their earnings. However, the results also demonstrate that this earnings increase is derived from solo self-employment. Previous research has shown that immigrants often revert to solo self-employment as an alternative to underemployment or unemployment. On the one hand, removing occupational licensing requirements affords economically vulnerable groups an employment opportunity. On the other hand, solo self-employment reliant on social and ethnic capital may trap these immigrants in their ethnic market and hinder their upward mobility.

Lastly, the 2004 reform of the German Crafts Code did not negatively affect immigrant women or men. However, deregulation of these occupations opened them to competition, which is largely based on individual resources. Accordingly, groups with more resources benefited from occupational deregulation, while those with less did not. Thus, occupational deregulation shifts existing inequalities rather than abolishes them. To truly begin diminishing social inequalities, groups must be provided with the resources needed to take advantage of opportunities, otherwise current (dis)advantages will create future (dis)advantages. The policy implications of these results are like those presented in chapter one. On the one hand, removing occupational licensing requirements increases the earnings of certain historically disadvantaged groups, thereby improving their labor market situation. Occupational deregulation may, therefore, be a useful policy tool in combating labor market disadvantages. On the other hand, economic returns in open occupations are largely based on individual resources. Consequently, vulnerable groups with limited resources remain disadvantaged. Accordingly, providing occupational opportunities without resources will shift rather than abolish existing inequalities. This leads to a cumulative disadvantage of already more disadvantaged groups. Therefore, future policy measures concerning occupational deregulation should do more than just provide opportunity. They should also provide individuals with the tools and resources needed to seize that opportunity.

Finally, the current study suffers from some drawbacks that should be addressed in future research. Firstly, the German micro-census is a repeated cross-sectional survey. This hindered me from following specific individuals over time and estimating the individual level effects of the reform on their earnings. Instead, the results presented here are average group level effects and should be interpreted as such. Furthermore, information regarding migration background in the micro-census is rather limited. I was only able to construct an individual's

ethnicity through their current citizenship(s); information regarding if they were born in Germany or abroad, and year of arrival. Moreover, additional information that has been shown to affect immigrants' earnings, such as socioeconomic background, language skills, and social network ties is also unavailable. Lastly, it is not possible to clearly distinguish individuals with a master craftsman's certificate from those with similar training in the 2000-2008 German micro-census. Therefore, I was unable to examine the economic returns of having a license in a market that no longer requires one. Accordingly, to develop a better understanding of why certain historically disadvantaged groups profit from occupational deregulation while others do not, future research would do well to use longitudinal data that contains more detailed information on individuals' social networks, socio-economic background, and employment history.

Chapter Three

Introduction

The first two chapters of this manuscript hinted at the role of social capital in disadvantaged groups' self-employment decisions and returns to occupational deregulation. For example, the results of chapter one demonstrated that Turkish women were more likely to start their own business with employees given the opportunity. Furthermore, the results of chapter two showed that self-employed immigrant men from the former Yugoslavia had higher earnings returns to occupational deregulation. Both immigrant groups belong to large established ethnic communities in Germany. Hence, I assumed that they have access to (ethnic) resources by virtue of their membership in these communities. However, thus far I have not directly tested the effect of social capital on immigrants' self-employment outcomes. This final chapter, therefore, examines the role of social capital in disadvantaged groups' self-employment decisions and returns to occupational deregulation more directly. I examine how access to native or ethnic resources through marriage, indicated by the ethnicity of one's spouse, shapes immigrant women's and men's self-employment decisions and affects their earnings. Specifically, using the 2004 reform of the German Crafts Code as a quasi-experiment, I analyze the causal effect of occupational deregulation on the self-employment decisions and earnings of immigrants with native and migrant spouses.

As mentioned in the previous two chapters, the German micro-census does not contain information pertaining to individuals' social contacts or networks, however, information on spouses' nationality is available.[44] Therefore, I used the ethnic composition of a marriage to operationalize potential access to group-specific resources and test the role of social capital in

[44] Until 2005 the German micro-census only contained information regarding respondents' current national citizenship and not their ethnic background per se. However, to coincide with the literature on intermarriage, I use the terms *ethnic composition of marriage* and *interethnic marriage* throughout this manuscript.

determining disadvantaged groups' self-employment decisions and earnings returns. Furthermore, I incorporated the concepts of bonding and bridging social capital into the theoretical framework of chapters one and two to develop a better understanding of the role of native and ethnic resources in determining disadvantaged groups' self-employment outcomes. To answer this, I used the same identification strategy as in previous chapters and repeated the difference-in-difference-in-differences (DDD) regressions with marital ethnic composition as the causal variable of interest. The results show that the self-employment decisions and earnings of immigrants with more bridging social capital were not affected by occupational deregulation. Immigrant women with more bonding social capital, however, were more likely to choose employment over solo self-employment given the opportunity to. Nevertheless, self-employed immigrant women with more bonding social capital also suffered an earnings penalty after occupational regulations were removed. These results demonstrate that expanding occupational opportunities does not lead to equal outcomes for all groups, but rather that individual resources become more important as the occupational structure becomes less rigid.

Theoretical Background

Social Capital

Over the years several different definitions of social capital have emerged (for an overview see Portes, 1998). Across most of these definitions, however, social capital can commonly be defined as the ability to gain access to resources by virtue of membership in networks or larger social structures (Portes, 2010). Previous research has largely focused on the types of resources that individuals have access to through their social ties (for an overview of different approaches see Portes, 1998; for a discussion of the strength of weak ties see Granovetter, 1973; for a discussion of structural holes see Burt, 1992). To better understand different outcomes of social capital, scholars have recently begun to differentiate between *bonding* and

bridging social capital (for an overview see Lancee, 2012). Loosely defined, bonding social capital constitutes within-group ties, whereas bridging social capital constitutes between-group ties. Migration scholars have begun to adopt and apply these concepts to better understand the distinct roles of social capital in integration processes (Bates, 1997; Clark & Drinkwater, 2000; Flap et al., 2000; Kanas et al., 2009; Lancee, 2012; Waldinger & Lichter, 2003). From a migrant's perspective, coethnic ties are viewed as bonding social capital, which is characterized by high-density networks within the same ethnic group and with people of similar socioeconomic status. While ties with natives are considered bridging social capital (Putnam, 2000). Whereas bonding social capital provides immigrants access to such resources as ingroup trust and solidarity, bridging social capital provides them access to non-redundant information about destination country-specific opportunities and influence (Portes, 2010).

In his book, Lancee (2012) examined the effect of bonding and bridging ties on immigrants' labor market outcomes in Germany and the Netherlands. He found that connections with natives (bridging social capital) were beneficial for immigrants in both countries, helping them find employment and resulting in higher income and occupational status. On the contrary, he found no significant effects of coethnic ties (bonding social capital) on immigrants' employment outcomes. Kanas, van Tubergen, and van der Lippe (2009) found similar evidence for immigrants' self-employment in the Netherlands. They found that immigrants living with a coethnic partner were much less likely to be self-employed compared to their single counterparts. In contrast, having Dutch social contacts significantly increased immigrants' probability of self-employment. The authors determined that this effect was largely driven by the resources that natives provided e.g., information about the Dutch labor market, and not because of immigrants' improved host-country language skills or better school or work performance. These results demonstrate that having contact with natives benefits immigrants' labor market integra-

tion. Further research concerning the effect of interethnic marriage on immigrants' labor market outcomes also shows that having a native spouse positively affects immigrant's employment and earnings (Dribe & Lundh, 2008; Dribe & Nystedt, 2015; Furtado & Song, 2015; Furtado & Theodoropoulos, 2010; Georgarakos & Tatsiramos, 2009; Kantarevic, 2004; Nottmeyer, 2015).

For example, Georgarakos and Tatsiramos (2009) found that male immigrants with native spouses in the United States were less likely to enter self-employment. However, they also found that among self-employed immigrants, those who were married to a native had a significantly higher business survival rate than their co-ethnic married counterparts. The authors concluded that, on the one hand, having access to native networks facilitates better information regarding employment opportunities, which makes it easier for immigrant men with native spouses to find employment. On the other hand, native networks also facilitate information regarding the destination country's tax system and bureaucratic procedures, which leads to more successful self-employment.

Similarly, Furtado and Theodoropoulos (2010) found that having a native spouse did not significantly affect the probability of self-employment among immigrant men in the United States. Rather, they found that immigrant men with native spouses were more likely to be employed and worked in occupations with a higher proportion of natives than their coethnic married counterparts. They went on to show that the effect of having a native spouse is especially strong for immigrants living in areas without a significant coethnic population and those who are less educated. The authors concluded that net of positive selection bias i.e., immigrants who marry natives are positively selected on various variables, for example education and language ability, being married to a native has a positive effect on immigrants' employment outcomes.

Lastly, Nottmeyer (2015) reviewed existing studies to investigate if the economic success of intermarried immigrants was caused by the benefits of having a native spouse (native

network effect) or if intermarried immigrants are positively selected and intermarriage is a byproduct rather than the cause of their labor market success (positive selection bias). She found that most studies showed that wage or earnings premiums attributed to intermarriage vanished once selectivity and unobservable characteristics were accounted for (Kantarevic, 2004; Nekby, 2010; Nottmeyer, 2010). This suggests that intermarried immigrants are positively selected and would outperform their coethnic married counterparts regardless of their native spouse. She also found, however, that the effects for (self-)employment differed from those of earnings. Previous evidence showed that better access to native networks through intermarriage had a significant effect on immigrants' self-employment outcomes, net of positive selection bias. Nottmeyer concluded that the causality of intermarriage on economic outcomes is difficult to determine, however, there seems to be some evidence that being married to a native is causally beneficial for (self-)employment.[45]

These results demonstrate that being married to a native spouse provides immigrants access to native networks. These native networks provide immigrants with helpful information concerning the destination country's labor market, which aids in their labor market integration. This, however, seems to have more of an effect on immigrants' (self-)employment outcomes rather than their earnings. Yet, none of these studies differentiated between solo self-employment or self-employment with employees and most of them excluded women from the analysis. In line with chapters one and two, I extended these previous approaches by differentiating between solo self-employment and self-employment with employees and estimating separate models for immigrant women and immigrant men. Accordingly, I applied the concepts of bridging and bonding social capital to the theoretical framework developed in chapters one and

[45] The current study used a difference-in-difference-in-differences approach to investigate the causal effect of the 2004 reform of the German Crafts Code. This approach compares within group differences across different groups before and after an event, therefore, the problem of selection bias or reverse causality is less of a concern in the current study.

two to better understand the role of native and ethnic resources in women's and immigrants' self-employment outcomes.

Theoretical Framework and Hypotheses

Beginning with the theoretical framework of chapter one, I incorporated bonding and bridging social capital into Elster's model of decision-making (1979, 1983) and the mixed embeddedness approach (Kloosterman et al., 1999; Kloosterman & Rath, 2001). Accordingly, I applied the following model of immigrant self-employment:

*Immigrant self-employment = Opportunities[Reform] * Constraints[Resources] * Preferences[Self-Employment]*

Whereby, the outcome of immigrants' self-employment corresponds to an opportunity to enter self-employment (presented by the 2004 reform) conditional on one's available resources, specifically native or ethnic resources, and their preference towards self-employment.[46] Hence, although the 2004 reform provided a universal self-employment opportunity, due to resource constraints self-employment is not feasible for everyone and for those of whom it is, some may not prefer it.[47]

The mixed embeddedness approach emphasizes that immigrants' multi-embeddedness in different sociocultural, economic, and institutional contexts offers them resources but also inflicts constraints which affect their self-employment decisions. According to Elster's decision-making model, these constraints determine the feasibility of self-employment for every individual including whether they open a business with or without employees. On the one hand,

[46] In this model I do not postulate *how* or *when* preferences are formed, but rather illustrate that one's preferences are part of the decision-making process. Nonetheless, there are several alternative approaches to the role of preferences on social action (for an overview see Freese, 2011; for *adaptive preference formation* see Elster, 1983; for a critique and new proposal see Colburn, 2011.

[47] I assume that given the opportunity, individuals will maximize their earnings and occupational status conditional on their resources and constraints. Admittedly, due to differing migration causes e.g., economic, political, or family reunification, this assumption may be more plausible for some groups than others.

having access to native networks through interethnic marriage should entail additional resources and prompt self-employment with employees. On the other hand, one's third parties may sanction interethnic marriage, for example the family, and result in further constraints, which may hinder self-employment (for an overview see Kalmijn, 1998). Furthermore, women, particularly immigrant women, face additional constraints in their self-employment decisions, such as gender role attitudes (for a detailed overview refer to chapter one). On the one hand, being married to a native may allow immigrant women to circumvent country-of-origin gender role attitudes and thereby reduce additional constraints. On the other hand, third party sanctioning may be especially strong towards intermarried immigrant women and result in further constraints to self-employment (Kalmijn, 1998). These group-specific constraints lead to different feasible self-employment choices and outcomes across groups.

Accordingly, I expect that immigrants with native spouses have access to native networks and resources (less constraints) and will therefore be more likely to choose self-employment with employees (*hypothesis 1*). While immigrants with migrant spouses have limited access to native resources (more constraints) and are therefore overall, less likely to start their own business (*hypothesis 2a*); but more likely to choose solo self-employment (*hypothesis 2b*). Furthermore, immigrant women with migrant spouses face additional constraints to self-employment and should therefore be overall less likely to start a business given the opportunity (*hypothesis 3*).

Turning to the theoretical framework of chapter two, I applied the concept of bonding and bridging social capital to occupational closure (Weber, 1968; Weeden, 2002) and the analytical framework of migrant entrepreneurship (Kloosterman, 2010). Occupational closure implies that occupations establish entry barriers to keep outsiders and competitors at bay, establish the exclusiveness of their services, and secure benefits for occupational members (Abraham et

al., 2011; Tilly, 1998; Weeden, 2002). On the one hand, occupational closure shelters disadvantaged groups from labor market discrimination. On the other hand, occupational closure prevents many of them from accessing closed occupations. Accordingly, minority groups with adequate resources access closed occupations and disproportionately benefit from working in them, while groups with limited resources are barred from entering them. Removing occupational restrictions, such as licensure, may therefore disproportionately benefit vulnerable groups.

Moreover, when occupational licensure is tied to self-employment, as is the case in the German skilled crafts and trades, the resources needed to operate a business must also be considered i.e., groups with limited resources will have a challenging time starting and operating a business. According to Kloosterman (2010), a vacancy-chain openings market (refer to figure 2.1 in chapter 2), which the deregulated German crafts and trades represent, attracts immigrant entrepreneurs with limited financial and human capital but plenty of social and ethnic capital. Accordingly, immigrant entrepreneurs in this type of market tend to be strongly embedded in their ethnic community and rely on their homogeneous social and ethnic capital both as a source of labor and as a customer base. Hence, I assume that immigrant entrepreneurs with coethnic spouses will increase their earnings after occupational deregulation (*hypothesis 4*). However, due to their lack of destination country-specific resources, many of these businesses will be one-person operations. Accordingly, I assume this increase in earnings will be driven by solo self-employment rather than self-employment with employees (*hypothesis 5*). Lastly, immigrant women are expected to be doubly disadvantaged on the labor market. On the one hand, removing occupational restrictions should therefore increase the earnings of immigrant women, regardless of their spouse's ethnicity (*hypothesis 6a*). On the other hand, removing occupational licensure may exacerbate existing disadvantages and lead to lower earnings for immigrant women with migrant spouses (*hypothesis 6b*).

Following the same identification strategy as in chapters one and two, I used the 2004 reform of the German Crafts Code as a quasi-experiment to causally test these hypotheses.[48]

Methodology

Quasi-Experimental Design

To test the role of social capital in disadvantaged groups' self-employment decisions and earnings returns to occupational deregulation, I applied the same identification strategies presented in chapters one and two. Namely, I used the 2004 reform of the German Crafts Code as a quasi-experiment to test the causal effect of occupational deregulation on immigrants' self-employment decisions and earnings. Prior to the reform all 94 registered skilled crafts and trades were restricted by the same occupational regulations. After the reform, however, 53 of the 94 crafts and trades no longer required a master craftsman's certificate to start a business, while the remaining 41 still did. Hence, the 2004 reform resembles an experimental setting in which deregulation acts as the treatment. The 53 deregulated crafts represent the treatment group and the 41 (still) regulated the control group. This setting allowed me to use a difference-in-difference-in-differences (DDD) approach to isolate the causal effect of the 2004 reform on married immigrants' self-employment decisions and earnings (for a similar approach see Roth & Siegert 2016).

Accordingly, to uncover the causal effect of the reform on the probability of self-employment, I estimated linear regression models based on variants of the following regression equation:

Equation 3.1

$$Y[\text{Self-employment}] = \beta 0[\text{Constant}] + \gamma[\text{Ethnic Composition*Treatment*Time}] + \beta 1[\text{Treatment}] + \beta 2[\text{Time}] + \beta 3[\text{Ethnic Composition}] + \beta 4[\text{Treatment*Time}] + \beta 5[\text{Ethnic Composition*Treatment}] + \beta 6[\text{Ethnic Composition*Time}] + \beta 7[\text{Covariates}] + \varepsilon[\text{Random Error Term}]$$

[48] For an overview of the German skilled crafts and trades and the 2004 reform of the German Crafts Code please refer to chapters one and two.

In which the binary outcome variable *Y* indicates whether someone is employed (0) or self-employed (1).[49] To test my hypothesis regarding different self-employment types, I also varied *Y* between being self-employed with or without employees in certain models. γ represents the causal effect of interest and is represented by a three-way interaction between the binary *ethnic composition of marriage* variable: other ethnic composition of marriage/respondent's marital ethnic composition; the binary *treatment* variable: control group/treatment group; and the binary *time* variable: pre-reform/post-reform. This three-way interaction predicts the probability of self-employment for respondents' belonging to the various ethnic marital composition groups working in one of the 53 deregulated occupations after the reform (for an overview of the marital ethnic composition groups see Table 3.1). Thus, following a DDD approach it predicts the causal effect of the 2004 German Crafts Code reform for each marital groups' probability of self-employment. I estimated separate regression models for women and men to examine if married immigrants' self-employment decisions vary by gender. Furthermore, to control for any possible confounding trends I included fixed effects for occupation, industrial sector, year, federal state, and used clustered standard errors by occupations.[50] Lastly, I included several control variables that may influence married immigrants' self-employment, such as spouse's occupation and income (see Table A3.1 in the appendix for a complete list).

Furthermore, to uncover the causal effect of occupational deregulation on married immigrants' monthly earnings, I estimated linear regression models based on variants of the following regression equation:

Equation 3.2

$$Y[Log\ Earnings] = \beta 0[Constant] + \gamma[Ethnic\ Composition*Treatment*Time] + \beta 1[Treatment] + \beta 2[Time] + \beta 3[Ethnic\ Composition] + \beta 4[Treatment*Time] + \beta 5[Ethnic\ Composition*Treatment] + \beta 6[Ethnic\ Composition*Time] + \beta 7[Covariates] + \varepsilon[Random\ Error\ Term]$$

[49] Respondents were asked to define their current occupational status.

[50] I also estimated all models using individual yearly federal state fixed effects (year*state). The results did not significantly differ.

In which the outcome variable *Y* is the logarithm of real individual net monthly earnings adjusted for the Consumer Price Index 2005.[51] γprovides the causal effect of interest and is represented by a three-way interaction between the binary *ethnic composition of marriage* variable: other ethnic composition of marriage/respondent's marital ethnic composition; the binary *treatment* variable: control group/treatment group; and the binary *time* variable: pre-reform/post-reform. This three-way interaction estimates the change in net monthly earnings for respondents in each ethnic marital group working in one of the 53 deregulated occupations after the reform. Thus, again following a DDD approach it predicts the causal effect of the 2004 German Crafts Code reform on each ethnic marital groups' net monthly earnings. Once again, I estimated separate regression models for women and men to examine if married immigrants' returns to occupational deregulation vary by gender. As in equation 3.1, I included occupation, industrial sector, year, and federal state fixed effects, and used clustered standard errors by occupations as well as several control variables that could influence immigrants' earnings (see Table A3.1 in the appendix for a complete list of control variables).

Data

Consistent with chapters one and two, the current analyses are based on German micro-census data.[52] The large sample size and detailed occupational information contained in the micro-census makes it suitable to analyze the effect of the 2004 German Crafts Code reform on married immigrant women's and men's self-employment outcomes. Nonetheless, the micro-census has some shortcomings. For example, information regarding migration background is limited. Until 2005, information regarding respondents' migration background was limited to their current citizenship(s), if they were born in Germany or not, and their year of arrival (for an overview see Gresch & Kristen, 2011). Furthermore, due to the survey design of the micro-

[51] Respondents were asked what their personal net income was in the month prior to the interview.
[52] Please refer to the methodology section of chapters one and two for a detailed description of the German micro-census.

census, I was only able to accurately identify the nationality of cohabitating heterosexual married couples (for an overview see Schroedter, 2013). Moreover, additional information that has been shown to affect immigrants' self-employment and earnings, such as socioeconomic background, language skills, and social contacts is also unavailable. Lastly, the micro-census does not contain exact information regarding individual income. Instead, respondents are asked what their personal income was one month prior to the survey i.e., total earnings from wages, investment enterprises, retirement funds, and other ventures. Accordingly, I only considered individuals who stated that their main source of income was derived from gainful (self-)employment. Nevertheless, a certain degree of uncertainty remains. All that being taken into consideration, to my knowledge the micro-census is still the best available data source to study self-employed married immigrants, since its large sample size and detailed occupational information allows for more fine-grained group analyses.

Sample

The focus of this chapter is the effect of bonding and bridging social capital, as indicated by the ethnicity of one's spouse, on immigrants' self-employment decisions and earnings. Therefore, the current samples only included married respondents. Apart from that, the sample specifications are the same as chapters one and two (refer to the methodology section of chapters one and two). The results of chapters one and two demonstrated that the EU enlargement in 2004 affected immigrants' self-employment outcomes. Hence, to mitigate any confounding effect of the 2004 EU enlargement on married immigrants' self-employment decisions and earnings, I restricted the current sample to immigrants who arrived in 2003 or earlier.[53] Fur-

[53] Additionally, until 2005 the micro-census applied a so-called "reference week concept". This means that the information provided by respondents refers to a specific week each year (Lengerer & Shahla, 2006). All the information for 2004 is based on the last week of March 2004. Since the EU enlargement came into force on May 1, 2004, the information from the 2004 micro-census survey does not include individuals who arrived as a direct consequence of the accession.

thermore, following Runst et al. (2019) I dropped all individuals who were classified as "cleaners" (*Gebaeudereiniger; Raumpfleger*) from the sample.[54] This resulted in 12,315 craftswomen and 75,357 craftsmen in the first sample for the analysis of equation 3.1 and 2,010 self-employed craftswomen and 13,318 self-employed craftsmen in the second sample for the analysis of equation 3.2. Consequently, due to the small sample size, the second sample did not include marriages composed of immigrant couples with different nationalities e.g., Italian wife married to a Turkish husband.[55]

Table 3.1: Ethnic Composition of Marriages

Name	Overall (%)	Overall (%)	Operationalization
Craftswomen	Sample 1	Sample 2	
Native-Native	12,334 (92.63)	1,963 (93.93)	German wife & husband.
Migrant - Native	177 (1.33	19 (0.92)	Migrant wife & German husband.
Native - Migrant	364 (2.73)	59 (2.86)	German wife & migrant husband.
Coethnic - Migrants	416 (3.12)	47 (2.28)	Coethnic migrant wife & husband.
Interethnic - Migrants	24 (0.18)	0 (0)	Interethnic migrant wife & husband.
Total	13,315 (100)	2,061 (100)	
Craftsmen			
Native-Native	73,872 (91.28)	12,839 (94.45)	German husband & wife.
Migrant - Native	1,360 (1.68)	152 (1.12)	Migrant husband & German wife.
Native - Migrant	2,325 (2.87)	377 (2.77)	German husband & migrant wife.
Coethnic - Migrants	3,126 (3.86)	226 (1.66)	Coethnic migrant husband & wife.
Interethnic - Migrants	245 (0.30)	0 (0)	Interethnic migrant husband & wife.
Total	80,928 (100)	13,594 (100)	

German micro-census: 2000 - 2008; own calculations.

[54] Runst et al. (2019) found that several occupations classified within the 3-digit German occupational classification as 'cleaners' did not correspond to the skilled trade of 'cleaners' regulated by the German Crafts Code (for an overview see Runst et al., 2019).

[55] For a comprehensive overview of immigrants' (inter)marriage trends in Germany see Schroedter 2013.

Assumptions

The current identification strategy is based on chapters one and two. Hence, the same model assumptions presented in chapters one and two apply to the current analysis e.g., the parallel trend assumption (for an overview refer to the methodology section in chapters one and two). Accordingly, I estimated additional models in which I indirectly tested these assumptions by altering the year of treatment (placebo test) and applying a regression-discontinuity design (RDD).

Results

Descriptive Evidence

To investigate the role of bonding and bridging social capital on immigrants' self-employment outcomes, I began with some descriptive analyses.[56] Starting with the effect of bonding and bridging social capital on immigrants' self-employment decisions, figures 3.1 and 3.2 depict the yearly self-employment rate for immigrant women and men. Beginning with craftswomen, the results of figure 3.1 suggest that the 2004 reform increased the self-employment rate of all married craftswomen working in the deregulated crafts and trades except for those with a coethnic spouse. Figure 3.1 illustrates that immigrant craftswomen married to a coethnic spouse experienced a decline in self-employment after the reform. While immigrant craftswomen married to a German spouse and German craftswomen married to a native or an immigrant spouse all increased their self-employment. These results suggest that having access to native resources, either through one's spouse or oneself, aids craftswomen in starting their own business given the opportunity. On the contrary, bonding social capital i.e., access to ethnic resources, seems to deter immigrant women from starting their own business. These results

[56] For the sake of clarity, throughout the remainder of this manuscript I present the results of immigrants' self-employment decisions based on equation 3.1 first, followed by the results of immigrants' earnings based on equation 3.2.

suggest that women with access to native resources are more likely to open their own business, regardless of their spouse's ethnicity. While immigrant women with limited access to native resources are less likely to open their own business.

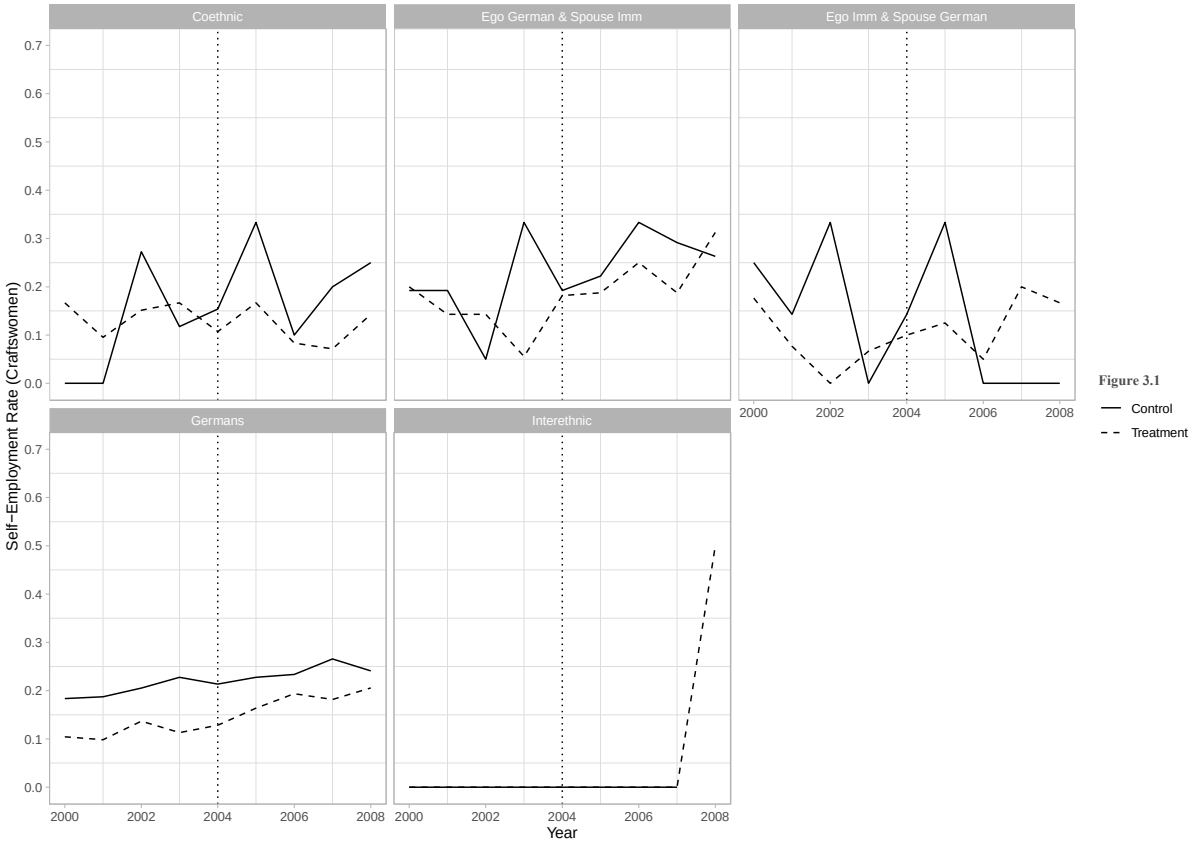


Figure 3.1

The results for craftsmen in figure 3.2 paint a somewhat different picture. According to figure 3.2 all married craftsmen were more likely to start their own business given the opportunity. Contrary to craftswomen, immigrant craftsmen married to a coethnic spouse also increased their self-employment after the 2004 reform. The results of figure 3.2 suggest that all married craftsmen, regardless of their spouse's ethnicity, are more likely to start their own business given the opportunity. This suggests that neither bonding nor bridging social capital play a decisive role in immigrant men's self-employment decisions, or rather there seems to be no clear difference between the two forms of social capital in immigrant men's self-employment decisions. This is in line with the findings of chapter one, which demonstrated that human capital and destination country resources were decisive in immigrant men's self-employment

decisions. Overall, the results of figures 3.1 and 3.2 are in line with the findings of chapter one, namely, that social capital seems to be more decisive in determining immigrant women's self-employment decisions than immigrant men's self-employment decisions.

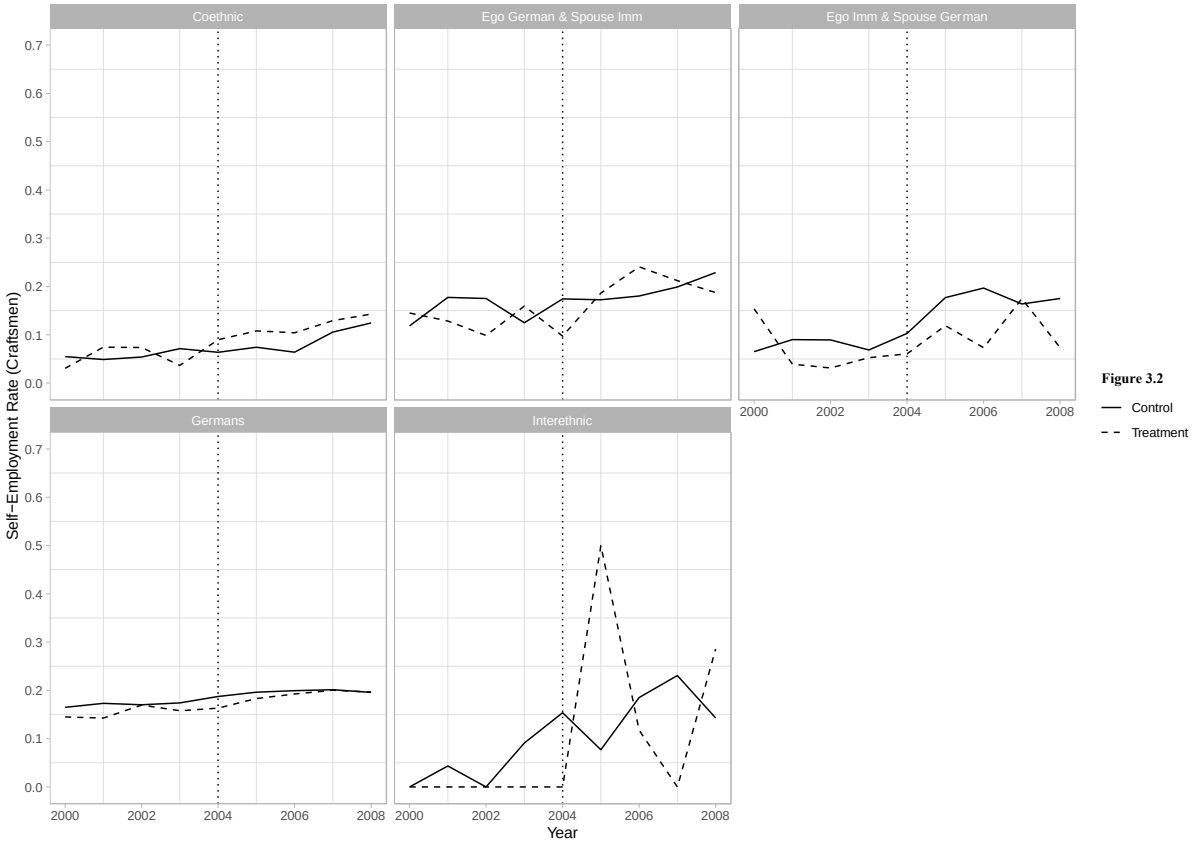


Figure 3.2

Turning to the role of social capital on self-employed immigrant women's and men's returns to occupational deregulation, figures 3.3 and 3.4 depict the average log monthly earnings for each group. Starting with craftswomen in figure 3.3, the results show that immigrant craftswomen, regardless of their spouse's ethnicity, experienced a decrease in earnings after occupational regulations were removed. The decline in monthly earnings was much starker for immigrant craftswomen with a native spouse compared to those with a coethnic spouse. Nevertheless, both groups' earnings decreased after the 2004 reform, suggesting that neither bonding nor bridging social capital benefited immigrant women once occupational licensing requirements were removed. German craftswomen with German spouses also experienced a slight decrease in monthly earnings after the reform, albeit, not nearly as stark as immigrant

craftswomen. In contrast, native craftswomen with an immigrant spouse experienced a slight increase in earnings after the reform. This suggests that native craftswomen rather than immigrant craftswomen benefited from bridging social capital after occupational licensure was removed. Overall, figure 3.3 illustrates that immigrant craftswomen with both bridging and bonding social capital experienced a loss in earnings after occupational licensing requirements were removed. Native craftswomen, however, seem to be less affected by occupational deregulation altogether. These results are consistent with the findings of chapter two that demonstrated that craftswomen with completed vocational training had the largest returns to occupational deregulation. The majority of whom were native Germans.

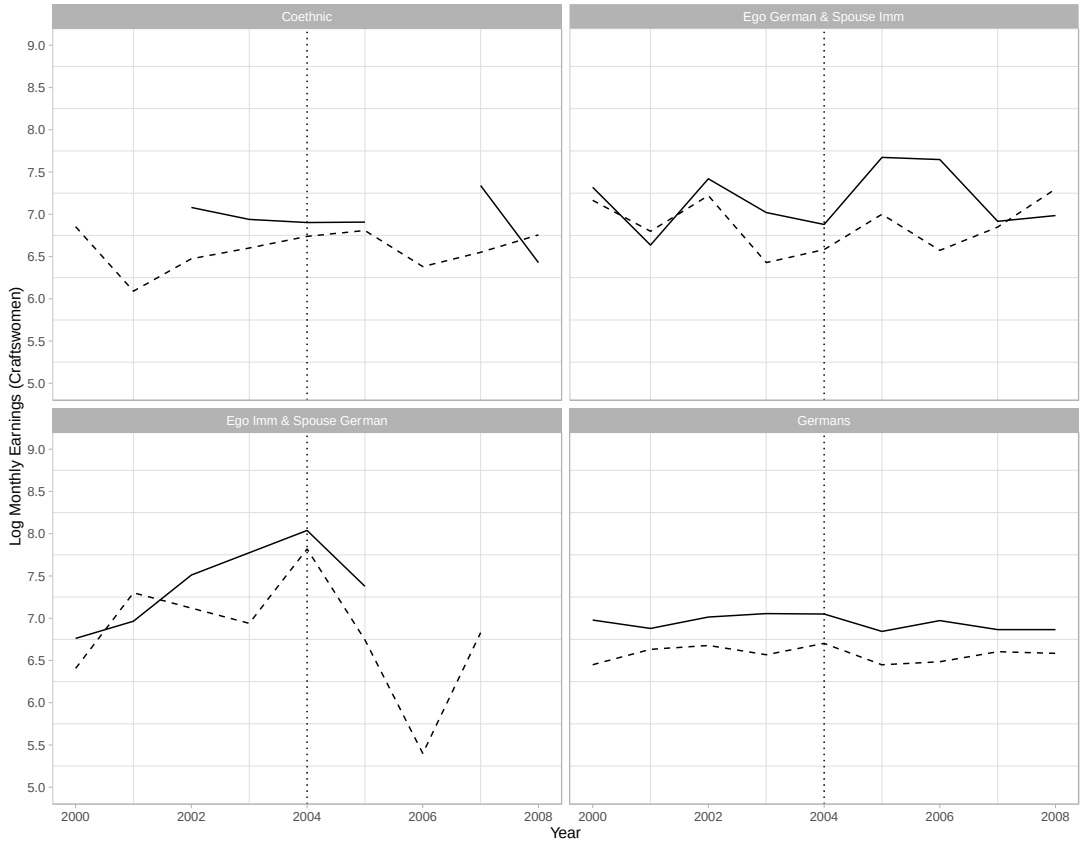


Figure 3.3

The results for craftsmen in figure 3.4 resemble those for craftswomen. Namely, married immigrant craftsmen, regardless of their spouse's ethnicity, earned less money after licensing requirements were removed. However, contrary to craftswomen, both native craftsmen with migrant spouses as well as those with native spouses earned less after the 2004 reform.

Although the loss in earnings was stronger for immigrant craftsmen, the results of figure 3.4 suggest that occupational deregulation had an overall negative effect on the earnings of self-employed craftsmen in Germany. Consistent with the findings of figures 3.1 and 3.2, figures 3.3 and 3.4 illustrate that overall, there does not seem to be a clear difference between bonding and bridging social capital on married immigrants' earnings returns to occupational deregulation. This suggests that neither ethnic nor native resources play a decisive role in immigrants' self-employment outcomes. The forthcoming difference-in-difference-in-differences (DDD) analyses will shed further light on this assumption.

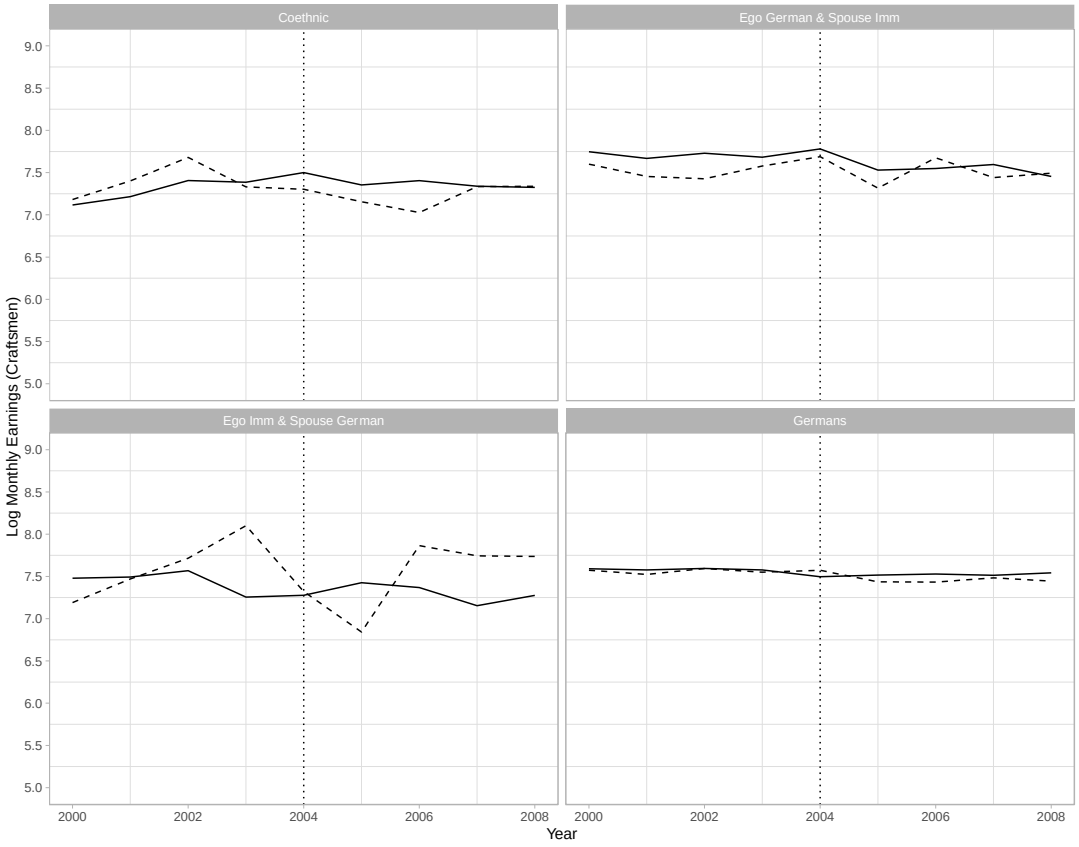


Figure 3.4

Causal Evidence

Social Capital and Self-Employment Decisions

Figures 3.5 and 3.6 present the results of the DDD analyses on the causal effect of the 2004 reform of the German Crafts Code on married immigrants' self-employment decisions. Beginning with craftswomen in figure 3.5, model one demonstrates that given the opportunity,

craftswomen married to coethnic spouses were less likely to start their own business. Craftswomen with coethnic spouses were approximately sixteen percentage points less likely to start their own business after the reform. In other words, the difference between their likelihood of self-employment before and after deregulation compared to German craftswomen with native spouses, decreased by sixteen percentage points. All other ethnic spousal combinations showed no significant difference in their self-employment probability after the 2004 reform. On the one hand, this result demonstrates that ethnic resources constrain immigrant women from starting their own business. On the other hand, this result highlights that ethnic resources are valuable for finding employment. The sixteen-percentage point decrease in self-employment is inversely a sixteen-percentage point increase in dependent employment (henceforth referred to as employment). This result illustrates that immigrant women with limited access to native resources i.e., married to a coethnic spouse, were overall less likely to start their own business given the opportunity. Accordingly, the results of model 1 confirm hypothesis 2a and hypothesis 3. To investigate the role of bonding and bridging social capital in immigrant women's solo self-employment decisions, I estimated the probability of starting a one-woman operation after the 2004 reform in model 2.

The results of model 2 show that immigrant craftswomen with coethnic spouses were significantly less likely to go into business alone after the 2004 reform. More precisely, their probability of being solo self-employed decreased by approximately twenty percentage points after the reform. This result goes against hypothesis 2b, which posited that immigrants with more bonding social capital would be more likely to start a one-person operation. Accordingly, hypothesis 2b is rejected for craftswomen. Nevertheless, the results of model 2 demonstrate that given the opportunity immigrant women with more bonding social capital used their ethnic resources to find employment, rather than open often precarious solo establishments. To determine the role of bonding and bridging social capital in the decision to start a business with

employees, I estimated the probability of being self-employed with at least one paid employee in model 3.[57]

The results of model 3 in figure 3.5 demonstrate that regardless of bonding or bridging social capital, immigrant craftswomen's decision to open a business with employees was not affected by the 2004 reform. This result contradicts my first hypothesis, in which I expected that immigrants with access to native resources would be more likely to open a business with employees given the opportunity. Rather the results of model 3 demonstrate that there is no difference in the effect of bonding and bridging social capital on immigrant women's decision to open a business with employees. Instead, the results of models 1 through 3 highlight the role of bonding social capital in immigrant women's labor market integration. Given the opportunity to decide between solo self-employment and employment, immigrant women with more bonding social capital used their ethnic resources to find a job and avoid being pushed into solo self-employment out of economic necessity.

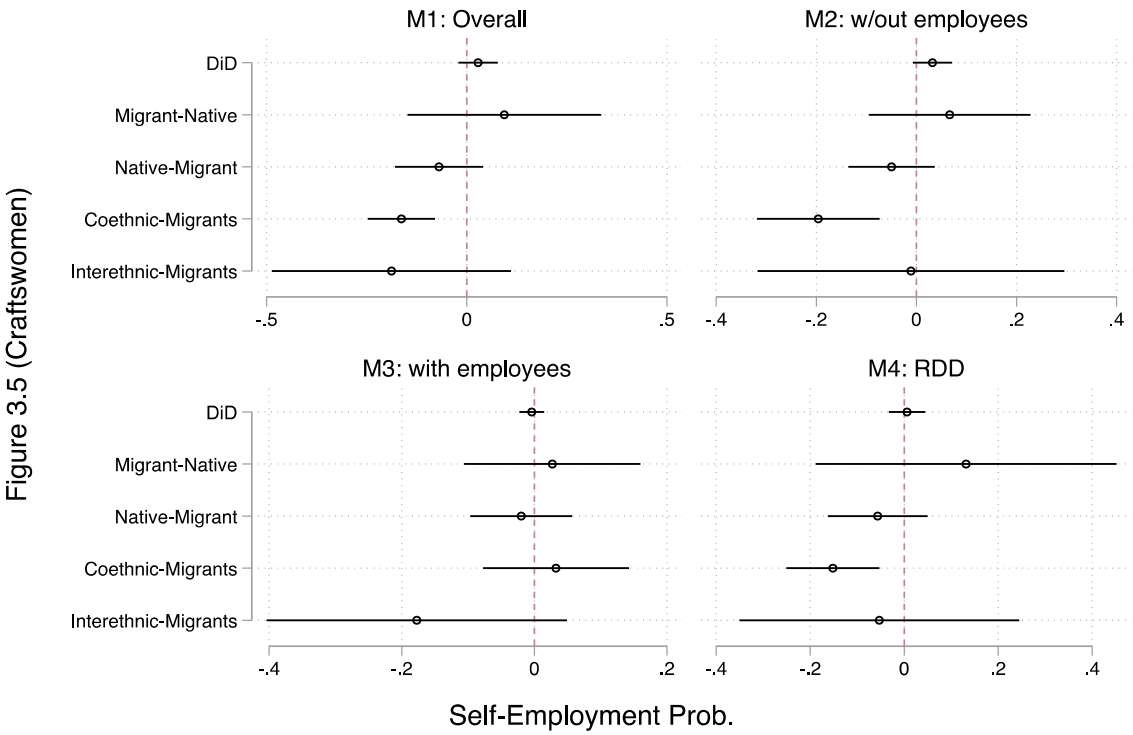


Figure 3.5 (Craftswomen)

[57] I estimated several different models that varied the number of employees in a business between one and more than nineteen. The overall results of the models remained largely unchanged.

I tested the robustness of these results by estimating additional models in which I applied a regression-discontinuity design (RDD) in model 4 and altered the year of the reform from 2004 to 2003 in model 5 (see figure A3.1 in the appendix). Models 4 and 5 confirm that immigrant craftswomen married to a coethnic spouse were overall less likely to be self-employed after the 2004 reform. However, the results of model 5 also demonstrate that this was already the case prior to the 2004 reform. Accordingly, the results of models 1 through 5 show that immigrant craftswomen with limited access to native resources were less likely to open their own business. However, this is not a causal effect of the 2004 reform of the German Crafts Code, but rather due to some other exogenous factor(s) that existed before the reform.

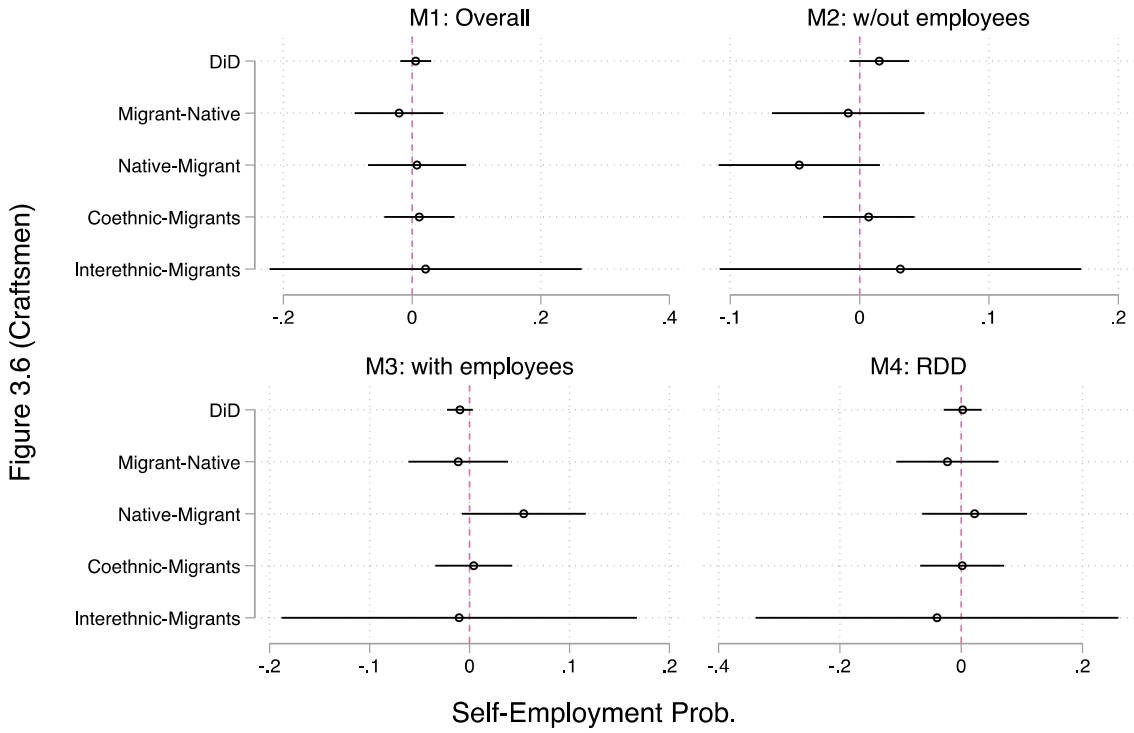


Figure 3.6 (Craftsmen)

Contrary to immigrant craftswomen, the results for immigrant craftsmen in figure 3.6, show that neither bridging nor bonding social capital influenced the self-employment decisions of immigrant craftsmen. The results of models 1 through 3 illustrate that compared to native German craftsmen with native spouses, none of the other ethnic marital groups significantly changed their self-employment probability after the 2004 reform. The results in models 2 and

3 show that this holds both for solo self-employment and self-employment with employees. These results are in line with the findings of chapter one, which showed that human capital and destination country government support were decisive in immigrant craftsmen's self-employment decisions. Nevertheless, the results contradict my theoretical expectations that immigrants with access to native resources would be more likely to start a business with employees (hypothesis 1) and that immigrants with limited access to native resources would be overall less likely to start their own business (hypothesis 2a) but more likely to start a one-person establishment (hypothesis 2b). Accordingly, hypotheses 1, 2a, and 2b are rejected for immigrant craftsmen. To test the robustness of these results, I again estimated a RDD in model 4 and a placebo test in model 5 (see figure A3.2 in the appendix). Models 4 and 5 confirm that immigrant craftsmen, regardless of their spouse's ethnicity, did not significantly change their self-employment decisions after the 2004 reform of the German Crafts Code. The findings of models 1 through 5 demonstrate that social capital does not explain immigrant men's self-employment decisions. Rather these findings are consistent with the results of chapter one, which demonstrated the importance of human capital in men's self-employment decisions.

Lastly, the results of figures 3.5 and 3.6 show that access to native networks and resources courtesy of a native spouse did not aid immigrants' self-employment outcomes. Rather the results for craftswomen demonstrate that more bonding social capital courtesy of a coethnic spouse, helped immigrant craftswomen avoid solo self-employment in favor of employment. Hence, the 2004 reform did not significantly increase self-employment among married immigrant women and men. However, it improved the labor market position of married immigrant women with limited access to native resources by giving them the opportunity to find employment rather than open a one-women business.

Social Capital and Returns to Occupational Deregulation

The results of models 1 through 5 show that neither immigrants with more bonding nor those with more bridging social capital started their own business given the opportunity. Yet, these results do not tell us anything about the effect of social capital on self-employed immigrants' earnings. Accordingly, in models 6 through 10 I estimated the causal effect of the 2004 reform on married self-employed immigrants' earnings. Figure 3.7 depicts the results of the DDD analyses for immigrant women. The results of models 6 through 8 highlight that married immigrant women's earnings were not affected by occupational deregulation, regardless of their spouse's ethnicity. Due to the small sample size, I was unable to estimate the DDD regressions for solo self-employed craftswomen in model 7. However, model 8 only included self-employed craftswomen with employees. The results of model 8 show that there were no significant differences in married craftswomen's earnings after the 2004 reform, regardless of their spouse's ethnicity. These results are consistent with the findings of chapter two, which demonstrated that occupation-specific human capital had the largest effect on craftswomen's earnings after occupational deregulation. Accordingly, hypothesis 4 (immigrant entrepreneurs with coethnic spouses will increase their earnings after occupational deregulation) and hypothesis 6a (removing occupational restrictions will increase the earnings of immigrant women, regardless of their spouse's ethnicity) are rejected.

Models 9 (RDD) and 10 (placebo test) again tested the validity of these results (see figure A3.3 in the appendix). The results of model 9, which compared more similar occupations across the treatment and control groups, shows that immigrant craftswomen with more bonding social capital experienced a significant decrease in earnings once occupational licensing requirements were removed.[58] The results of the placebo test in model 10 confirmed the findings

[58] A log value of *-0.488* roughly corresponds to the following interpretation: on average immigrant women married to coethnic spouses working in one of the deregulated crafts and trades earn approximately 120 times less a month after the reform compared to German craftswomen married to German spouses.

of model 6 and 8, namely, that none of the ethnic marital groups experienced a significant change in their earnings after the reform. The results of models 6 through 10 demonstrate that self-employed married immigrant craftswomen's earnings were not significantly affected by occupational deregulation. However, the results of model 9, which considered occupational heterogeneity and random assignment to treatment, show that immigrant craftswomen with limited access to native resources suffered an earnings penalty once occupational licensing requirements were removed. This finding is in line with previous evidence which found that more vulnerable groups, such as immigrant women with limited destination country resources, are disproportionately disadvantaged once formerly closed occupations are opened. Accordingly, hypothesis 6b is confirmed.

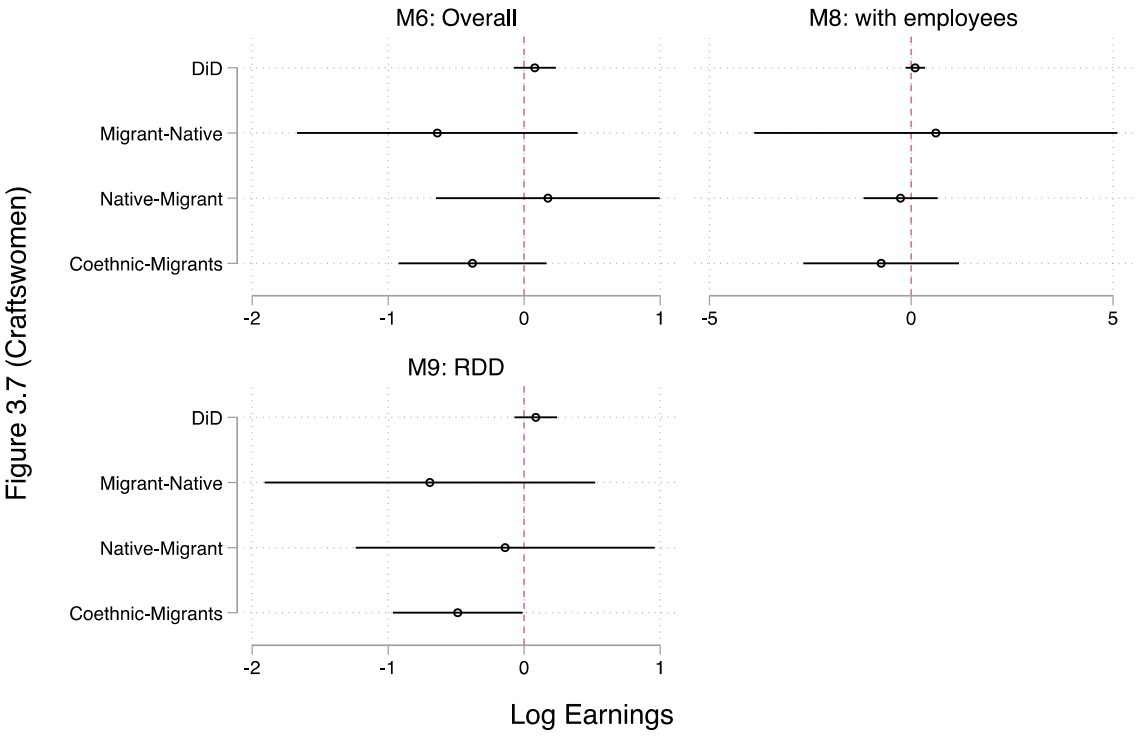


Figure 3.7 (Craftswomen)

The results for craftsmen in figure 3.8 are consistent with those for craftswomen in figure 3.7, namely, that married immigrant craftsmen's earnings were not significantly affected by occupational deregulation, regardless of their spouse's ethnicity. Models 6 through 8 reveal

that this is true for overall self-employment, solo self-employment, and self-employment with employees. Models 9 (RDD) and 10 (placebo test) confirmed the validity of these results (see figure A3.4 in the appendix). Contrary to the findings for immigrant craftsmen in chapter two, the current results demonstrate that neither bonding nor bridging social capital play a significant role in explaining self-employed immigrant men's earnings returns to occupational deregulation. Accordingly, hypothesis 4 (immigrant entrepreneurs with coethnic spouses will increase their earnings after occupational deregulation) and hypothesis 5 (their increase in earnings will be driven by solo self-employment rather than self-employment with employees) are rejected.

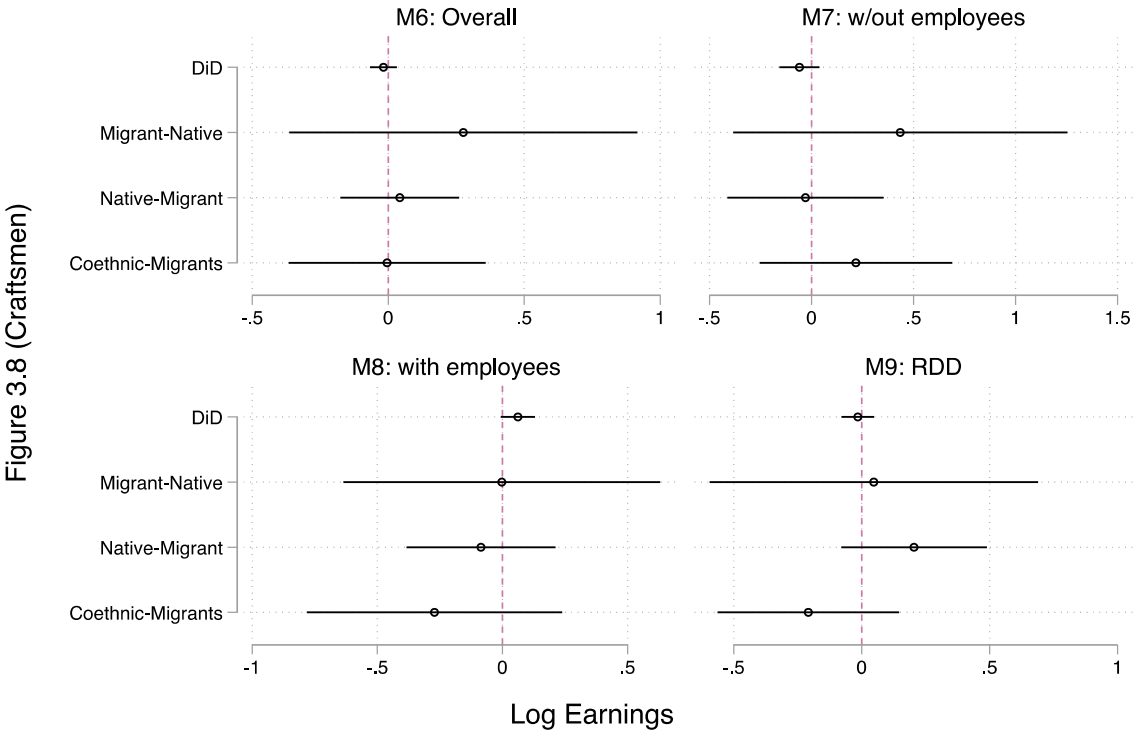


Figure 3.8 (Craftsmen)

The results of the DDD analyses in figures 3.7 and 3.8 illustrate that neither immigrants with greater access to native resources nor those with more ethnic resources improved their earnings after occupational licensing requirements were removed. Rather, the results of model 9 in figure 3.7 demonstrate that removing occupational requirements disproportionately harms more disadvantaged groups i.e., immigrant women with limited access to native resources.

However, overall, the 2004 reform of the German Crafts Code did not have much of an effect on self-employed immigrant craftspeople's earnings, regardless of the ethnicity of their spouse.

Discussion & Conclusion

The first two chapters of this manuscript hinted at the role of social capital in immigrants' self-employment outcomes. This third and final chapter tested this more directly by analyzing the effect of bonding and bridging social capital, as indicated by spouses' ethnicity, on immigrants' self-employment outcomes. The findings of chapters one and two demonstrated that immigrants with access to more resources disproportionately benefited from occupational deregulation. To test if this also holds true for social capital, I examined how access to native or ethnic resources through marriage, indicated by the ethnicity of one's spouse, shaped immigrant women's and men's self-employment decisions and affected their earnings. Specifically, using the 2004 reform of the German Crafts Code as a quasi-experiment, I analyzed the causal effect of occupational deregulation on the self-employment decisions and earnings of immigrants with native and immigrant spouses.

I incorporated the concepts of bonding and bridging social capital into the theoretical frameworks of chapters one and two to better understand the role of native and ethnic resources in immigrants' self-employment decisions and earnings. Based on Elster's decision-making model (1979, 1983) and the mixed embeddedness approach (Kloosterman et al., 1999; Kloosterman & Rath, 2001) presented in chapter one, I assumed that immigrants with native spouses have access to native networks and resources (less constraints) and would therefore be more likely to choose self-employment with employees. While immigrants with migrant spouses have limited access to native resources (more constraints) and would therefore be overall less likely to start their own business, however, more likely to choose solo self-employment.

Furthermore, I assumed that immigrant women with migrant spouses face additional constraints to self-employment and would therefore be overall less likely to start a business given the opportunity.

The results demonstrate, however, that access to native networks and resources courtesy of a native spouse does not aid immigrants' self-employment outcomes. Rather the results for craftswomen demonstrate that more bonding social capital courtesy of a coethnic spouse, allowed immigrant craftswomen to choose employment instead of often precarious solo self-employment. Hence, neither immigrants with more bonding social capital nor those with more bridging social capital decided to open their own business given the opportunity. Rather, immigrant women with more bonding social capital chose employment instead of solo self-employment. These results demonstrate that bridging social capital did not affect immigrants' self-employment decisions in the German crafts and trades. While bonding social capital deterred women with limited access to native resources away from solo self-employment. Lastly, the 2004 reform of the German Crafts Code did not significantly increase self-employment among married immigrant women and men. However, it improved the labor market position of married immigrant women with limited access to native resources by giving them the opportunity to find employment rather than open a one-women business.

Turning to the theoretical framework of chapter two, I applied bonding and bridging social capital to theories of occupational closure (Weber, 1968; Weeden, 2002) and the analytical framework of migrant entrepreneurship (Kloosterman, 2010) to better understand how occupational deregulation affects immigrants' earnings. Based on this, I assumed that immigrant entrepreneurs with more bonding social capital would increase their earnings after occupational deregulation. However, I also expected that due to their lack of native resources, this increase in earnings would be driven by solo self-employment. Furthermore, I expected that immigrant women would face a double disadvantage on the labor market and that removing occupational

restrictions would, therefore, either increase the earnings of all immigrant women or it would exacerbate existing disadvantages and lead to lower earnings for immigrant women with less access to native resources.

The results, however, illustrate that neither immigrants with access to native resources nor those with more ethnic resources improved their earnings after occupational licensing requirements were removed. Rather, after accounting for occupational heterogeneity the results demonstrate that removing occupational requirements disproportionately harmed immigrant women with limited access to native resources. Consistent with the findings for self-employment decisions, the results for earnings show that having more bridging social capital did not affect immigrants' earnings. Having more bonding social capital, however, negatively affected the earnings of immigrant women once occupational licensing requirements were removed. Overall, the 2004 reform of the German Crafts Code did not have much of an effect on self-employed immigrant craftspeople's earnings, regardless of the ethnicity of their spouse. These findings are in line with a recent study by Bol and Drange (2017) which found that returns to occupational licensure were less significant for more low-skilled occupations.

Contrary to previous findings, the current results demonstrate that having a native spouse does not positively affect the self-employment decisions and earnings of immigrants. Rather the results show that having a coethnic spouse has a negative effect on immigrant women's self-employment decisions and earnings. In line with the findings of chapters one and two, these results show that expanding occupational opportunities without providing access to necessary resources exacerbates existing inequalities between groups and leads to further disadvantages for more disadvantaged groups.

Finally, the current study suffers from some drawbacks that should be addressed in future research. Firstly, the German micro-census is a repeated cross-sectional survey. This hindered me from following immigrants over time and estimating the individual level effects

of the 2004 reform on their self-employment outcomes. Instead, the results presented here are average group level effects and should be interpreted as such. Furthermore, information regarding migration background in the micro-census is rather limited. Therefore, the results presented here are largely based on citizenship rather than ethnicity. Moreover, the micro-census does not contain information which has been shown to affect self-employment decisions and earnings, such as socioeconomic background, language skills, and social network ties. Although this is less of a concern under the current identification strategy, I cannot fully rule out that the results suffer from omitted or missing variable bias. Lastly, it is not possible to clearly distinguish individuals with a master craftsman's certificate from those with similar training in the 2000-2008 German micro-census. Therefore, I was unable to examine the effect of having a license in a market that no longer requires one. Accordingly, to develop a better understanding of how occupational opportunities affect immigrants' labor market integration, future research should begin to address some of these issues.

Conclusion

Why do some immigrants start their own business, while others do not? Finding an answer to this question guided this manuscript. The previous three chapters investigated how expanding self-employment opportunities affects the self-employment decisions of immigrants. By incorporating Elster's model of decision-making (1979) into the mixed embeddedness approach (Kloosterman et al., 1999), I developed a theoretical framework to better understand the self-employment decisions that immigrants make in chapter one. Based on theories of social closure (Weber, 1968) and the analytical framework of migrant entrepreneurship (Kloosterman, 2010), in chapter two I examined how removing occupational restrictions affects immigrant entrepreneurs' earnings. Lastly, in chapter three I incorporated theories of bonding and bridging social capital (Lancee, 2012; Portes, 1998, 2010) into the theoretical frameworks of chapters one and two to better understand how access to native and ethnic resources affects immigrants' self-employment decisions and the earnings of immigrant entrepreneurs. Furthermore, I extended the mixed embeddedness approach by differentiating between solo self-employment and self-employment with employees and by explicitly considering how immigrants' self-employment outcomes vary by gender.

Based on this, I roughly expected that immigrants with less constraints would be more likely to open their own business with employees given the opportunity. While immigrants with more constraints would be more likely to open a one-person business out of economic necessity. Nevertheless, I also anticipated that variations in immigrants' resources and constraints, for example having plenty of social and ethnic capital but limited human and financial capital, would lead to different self-employment outcomes. Lastly, I expected that immigrant women with limited resources would be disproportionately disadvantaged by expanding self-employment opportunities.

Conclusion

The empirical findings tell two stories. On the one hand, immigrant men with more human capital and less institutional constraints used the self-employment opportunity presented by the 2004 reform of the German Crafts Code to start their own business with employees. Furthermore, self-employed women with occupation-specific human capital increased their earnings after the reform, whereas those with limited or general human capital suffered an earnings penalty. Hence, these results demonstrate the importance of human capital in immigrants' self-employment outcomes. On the other hand, the findings also show that immigrant women with more bonding social capital were less likely to be solo self-employed but more likely to be employed after the reform. Therefore, the findings also underpin the importance of social and ethnic capital in immigrants' self-employment decisions.

Accordingly, the findings presented in this manuscript demonstrate that destination country-specific and occupation-specific resources help immigrants' start their own business, while sociocultural resources help them find employment. In the case of the German skilled crafts and trades the resources required for self-employment are extremely specific and not easily exchangeable. Therefore, immigrants equipped with these resources used the opportunity of the 2004 reform to start businesses with employees and increase their earnings, while those who lacked these resources did not. These findings are in line with the theoretical expectations of the mixed embeddedness approach and underpin the importance of considering both immigrants' resources and the opportunity structure when determining immigrants' self-employment.

Nevertheless, the current study also demonstrates the importance of considering different forms of self-employment and the different contexts that immigrant women are embedded in. If the current study would have only examined self-employment without considering the differences between self-employment with and without employees, then the findings would have suggested that immigrant women with more ethnic resources are overall less likely to be

self-employed given the opportunity. However, since the current study differentiated between solo self-employment and self-employment with employees, the results show that immigrant women with more ethnic resources are less likely to be solo self-employed and not less likely to be self-employed with employees. The implication of these two results is quite different. Namely, instead of concluding that immigrant women with more ethnic resources lack the appropriate resources needed to start a business, the current findings demonstrate that they use their resources to avoid economically precarious solo self-employment in favor of employment. Therefore, although the 2004 reform of the German Crafts Code decreased solo self-employment among immigrant women with more ethnic resources, it improved their economic situation by helping them find employment instead of going into business alone. Hence, the current study demonstrates that expanding self-employment opportunities affects immigrant women's and men's self-employment outcomes differently. Immigrant men with more destination country-specific resources are more likely to choose self-employment with employees over employment. While immigrant women with more ethnic resources are more likely to choose employment over solo self-employment. Ultimately, both choose to improve their labor market position given the opportunity to.

The current study provides causal evidence of the effect of opportunity expansion on immigrants' self-employment outcomes, nevertheless, several questions remain unanswered. For example, although I considered opportunities, constraints, and preferences in my theoretical model of immigrants' self-employment decisions, I was unable to incorporate preferences into the empirical analyses. However, as previous research has shown preferences play an important role in individuals' decisions and social action (for an overview see Freese 2011; for adaptive preference formation see Elster 1983; for a critique and new proposal see Colburn 2011). Therefore, to develop a better understanding of immigrants' self-employment decisions, future research should consider immigrants' self-employment preferences. This would allow

researchers to investigate why immigrants with similar resources and opportunities make different self-employment choices.

Furthermore, the results presented here are based on cross-sectional data and thus a snapshot of immigrants' current self-employment status. Although the findings represent the group-level differences in self-employment and earnings after the 2004 reform, they do not tell us anything about longevity of immigrant self-employment. Hence, future research should consider using individual-level longitudinal data to better understand the role of self-employment in immigrants' labor market integration. Lastly, the current study investigated the effect of expanding self-employment opportunities on immigrants' self-employment outcomes. Hence, moving forward future research should consider how restricting self-employment opportunities affects immigrants' self-employment. Fittingly enough, twelve of the deregulated crafts and trades presented in the current study, were recently re-regulated (see *Viertes Gesetz zur Änderung der Handwerksordnung und anderer handwerksrechtlicher Vorschriften*). Consequently, this new revision of the German Crafts Code offers researchers a promising opportunity to uncover the causal effects of restricting self-employment opportunities on immigrants' self-employment outcomes. The current study provides a good starting point for future research to begin investigating these questions.

Appendix

Chapter one

Table A1.1: German Skilled Crafts and Trades

Regulated	*Deregulated*
1. Bricklayer and Concreter	1. Tile, Slab and Mosaic Layer
2. Stove and Air Heating Mechanic	2. Cast Stone and Terrazzo Maker
3. Carpenter	3. Screed Layer
4. Roofer	4. Vessel and Equipment Constructor
5. Road Construction Worker	5. Watchmaker
6. Thermal and Acoustic Insulation Fitter	6. Engraver
7. Well Builder	7. Metal Former
8. Stonemason	8. Galvanizer
9. Plasterer	9. Metal and Bell Founder
10. Painter and Varnisher	10. Cutting Tool Mechanic
11. Scaffolder	11. Goldsmith and Silversmith
12. Chimney Sweep	12. Parquet Layer
13. Metal Worker	13. Shutter and Sunshade Mechatronics Technician
14. Surgical Instrument Maker	14. Model Builder
15. Coachbuilder	15. Turner (Ivory Carver) and Wooden Toy Maker
16. Precision Engineer	16. Wood Carver
17. Motorbike and Bicycle Mechanic	17. Cooper
18. Refrigeration Mechanic	18. Basket Maker
19. Communication Technician	19. Costume Tailor
20. Automotive Mechatronics Technician	20. Embroiderer
21. Mechanic for Agricultural and Construction Machinery	21. Milliner
22. Gunsmith	22. Weaver
23. Plumber	23. Sailmaker
24. Installer and Heating Fitter	24. Furrier
25. Electrics Technician	25. Shoemaker
26. Electrical Machine Engineer	26. Saddler
27. Joiner	27. Interior Decorator
28. Boat Builder	28. Miller
29. Rope Maker	29. Brewer and Maltster
30. Baker	30. Wine Cellar person
31. Pastry chef	31. Textile Cleaner
32. Butcher	32. Wax Chandler
33. Dispensing Optician	33. Building Cleaner
34. Hearing Aid Acoustician	34. Glass Finisher
35. Orthopedic Technician	35. Precision Optician
36. Orthopedic Shoemaker	36. Glass and China Painter
37. Dental Technician	37. Precious Stone Engraver and Cutter
38. Hairdresser	38. Photographer
39. Glazier	39. Bookbinder
40. Glass Blower and Glass Apparatus Maker	40. Typesetter and Printer
41. Mechanic for Tires and Vulcanization	41. Screen Printer
	42. Flexographer
	43. Ceramist
	44. Organ and Harmonium Maker
	45. Piano and Harpsichord Maker
	46. Reed an Organ Musical Instrument Maker
	47. Violin Maker
	48. Bow Maker
	49. Metal Wind Instrument Maker
	50. Wooden Wind Instrument Maker
	51. Plucked Instrument Maker
	52. Gilder
	53. Sign and Illuminated Advertisement Maker

Table A1.2: List of control variables

Variable	Operationalization
EU Groups	German; Non-German EU country; Non-EU country.
Relative group size	The yearly proportional size of the nationality groups in each German federal state.
Years since migration and its square	Duration of residence in Germany and its square.
Part-time (weekly hours worked)	Dummy Variable (0 = no, 1 = yes)
Married	Dummy Variable (0 = no, 1 = yes)
Children	Dummy Variable (0 = no, 1 = yes)
Highest level of education	None: did not complete high school Low: high school with no vocational or higher education degree Medium: vocational education High: higher education degree
Real Household Income	Adjusted net household income; CPI 2005.
Age, Age²	Between 20 and 65; continuous along with the respective squared values.
Federal states fixed-effects	Dummy Variable (0,1) for each German Federal State.
Industrial sector fixed-effects	Dummy Variable (0,1) for each industrial sector.
Year fixed-effects	Dummy Variable (0,1) for each year (2000 – 2008).
Occupation fixed-effects	Dummy Variable (0,1) for each of the 79 occupational classification codes.
German micro census 2000 – 2008	

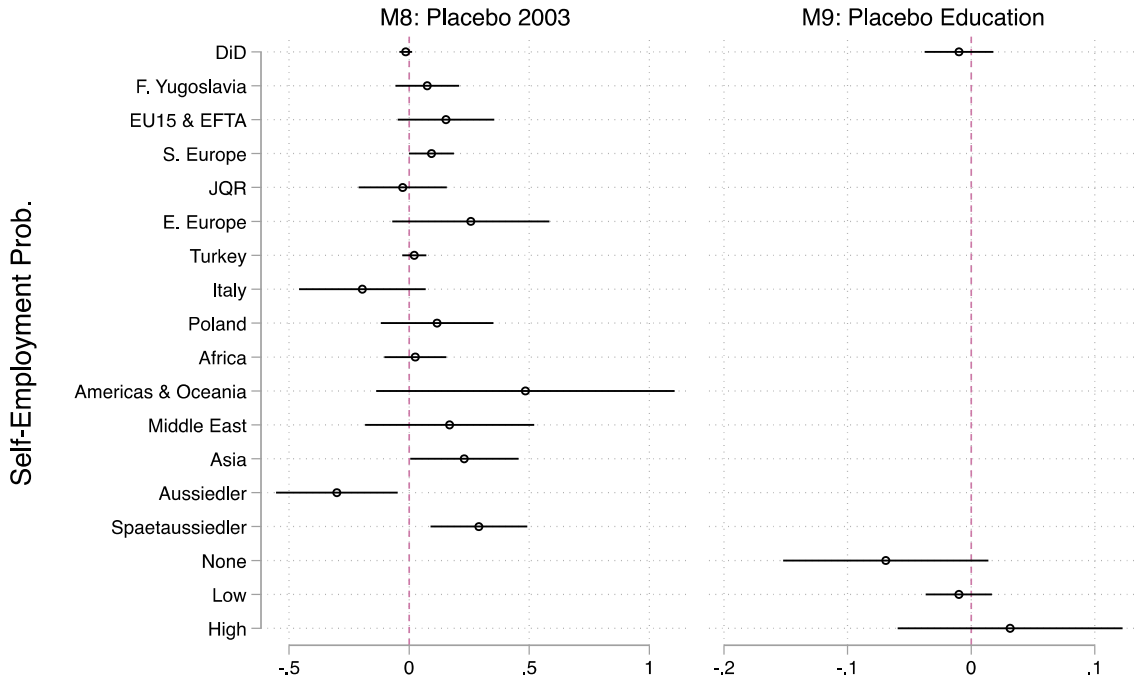


Figure A1.1 (Craftswomen)

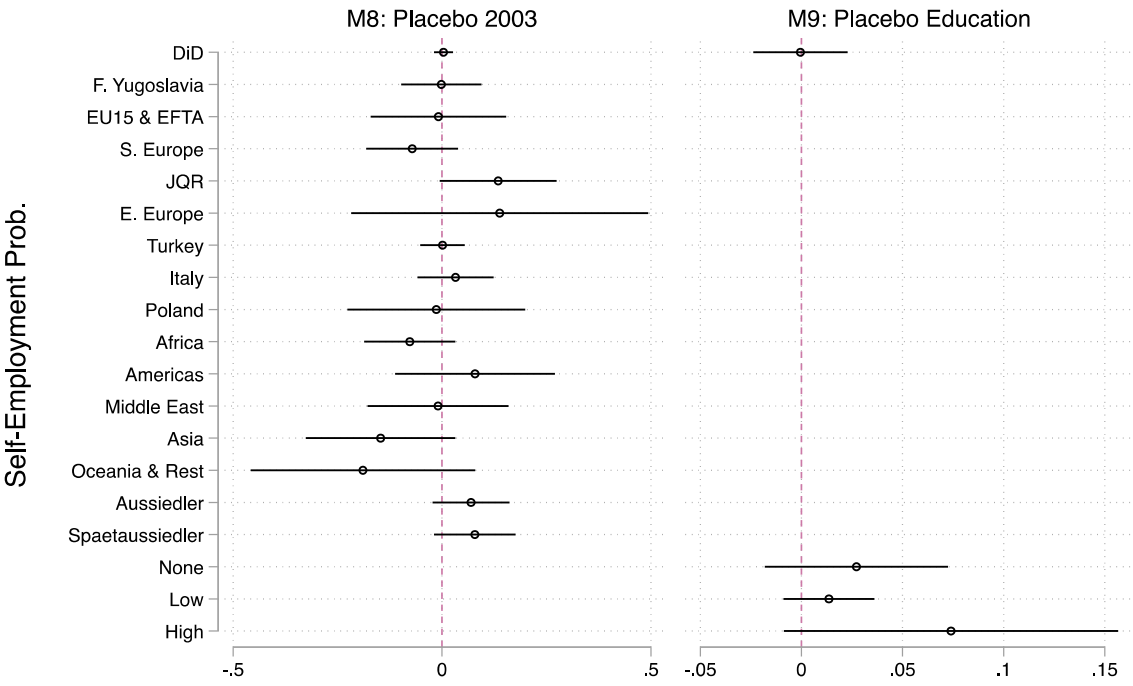


Figure A1.2 (Craftsmen)

Chapter two

Table A2.1: German Skilled Crafts and Trades

Regulated	*Deregulated*
1. Bricklayer and Concreter	1. Tile, Slab and Mosaic Layer
2. Stove and Air Heating Mechanic	2. Cast Stone and Terrazzo Maker
3. Carpenter	3. Screed Layer
4. Roofer	4. Vessel and Equipment Constructor
5. Road Construction Worker	5. Watchmaker
6. Thermal and Acoustic Insulation Fitter	6. Engraver
7. Well Builder	7. Metal Former
8. Stonemason	8. Galvanizer
9. Plasterer	9. Metal and Bell Founder
10. Painter and Varnisher	10. Cutting Tool Mechanic
11. Scaffolder	11. Goldsmith and Silversmith
12. Chimney Sweep	12. Parquet Layer
13. Metal Worker	13. Shutter and Sunshade Mechatronics Technician
14. Surgical Instrument Maker	14. Model Builder
15. Coachbuilder	15. Turner (Ivory Carver) and Wooden Toy Maker
16. Precision Engineer	16. Wood Carver
17. Motorbike and Bicycle Mechanic	17. Cooper
18. Refrigeration Mechanic	18. Basket Maker
19. Communication Technician	19. Costume Tailor
20. Automotive Mechatronics Technician	20. Embroiderer
21. Mechanic for Agricultural and Construction Machinery	21. Milliner
22. Gunsmith	22. Weaver
23. Plumber	23. Sailmaker
24. Installer and Heating Fitter	24. Furrier
25. Electrics Technician	25. Shoemaker
26. Electrical Machine Engineer	26. Saddler
27. Joiner	27. Interior Decorator
28. Boat Builder	28. Miller
29. Rope Maker	29. Brewer and Maltster
30. Baker	30. Wine Cellar person
31. Pastry chef	31. Textile Cleaner
32. Butcher	32. Wax Chandler
33. Dispensing Optician	33. Building Cleaner
34. Hearing Aid Acoustician	34. Glass Finisher
35. Orthopedic Technician	35. Precision Optician
36. Orthopedic Shoemaker	36. Glass and China Painter
37. Dental Technician	37. Precious Stone Engraver and Cutter
38. Hairdresser	38. Photographer
39. Glazier	39. Bookbinder
40. Glass Blower and Glass Apparatus Maker	40. Typesetter and Printer
41. Mechanic for Tires and Vulcanization	41. Screen Printer
	42. Flexographer
	43. Ceramist
	44. Organ and Harmonium Maker
	45. Piano and Harpsichord Maker
	46. Reed an Organ Musical Instrument Maker
	47. Violin Maker
	48. Bow Maker
	49. Metal Wind Instrument Maker
	50. Wooden Wind Instrument Maker
	51. Plucked Instrument Maker
	52. Gilder
	53. Sign and Illuminated Advertisement Maker

Table A2.2: List of control variables

Variable Name	*Operationalization*
EU status (for craftsmen) Nationality (for craftswomen see Table 2.1)	Nationality: German Non-German EU country Non-EU country
Relative group size	The proportional size of each nationality group, for each year, in each German federal state.
Years since migration and years since migration²	Duration of residence in Germany and its square.
Hours worked	How many hours do you normally work per week? Continuous Variable: 1 to 98 or more.
Married	Dummy Variable (0 = no, 1 = yes)
Children	Dummy Variable (0 = no, 1 = yes)
Highest level of education	None: did not complete high school Low: high school with no vocational or higher education degree Medium: vocational education High: higher education degree
Age, Age²	Between 20 and 60; continuous along with the respective squared values.
Federal states fixed-effects	Dummy Variable (0,1) for each German Federal State.
Industrial sector fixed-effects	Dummy Variable (0,1) for each industrial sector.
Year fixed-effects	Dummy Variable (0,1) for each year (2000 – 2008).
Occupation fixed-effects	Dummy Variable (0,1) for each of the 79 occupational classification codes.

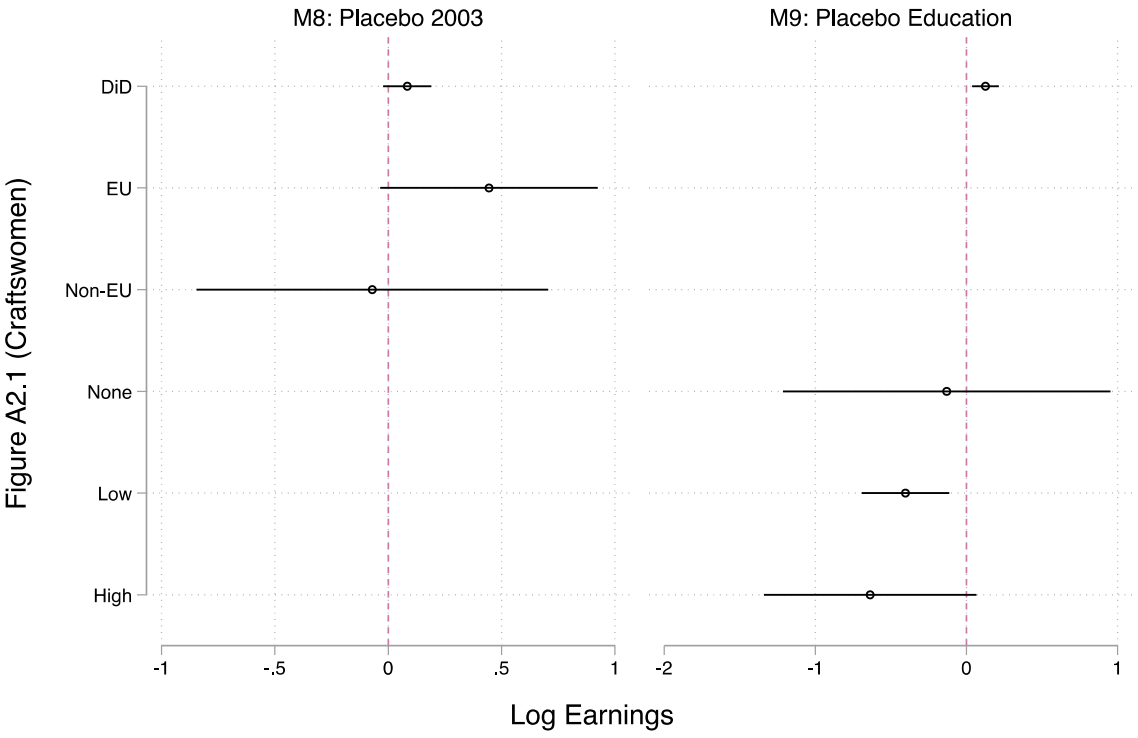


Figure A2.1 (Craftswomen)

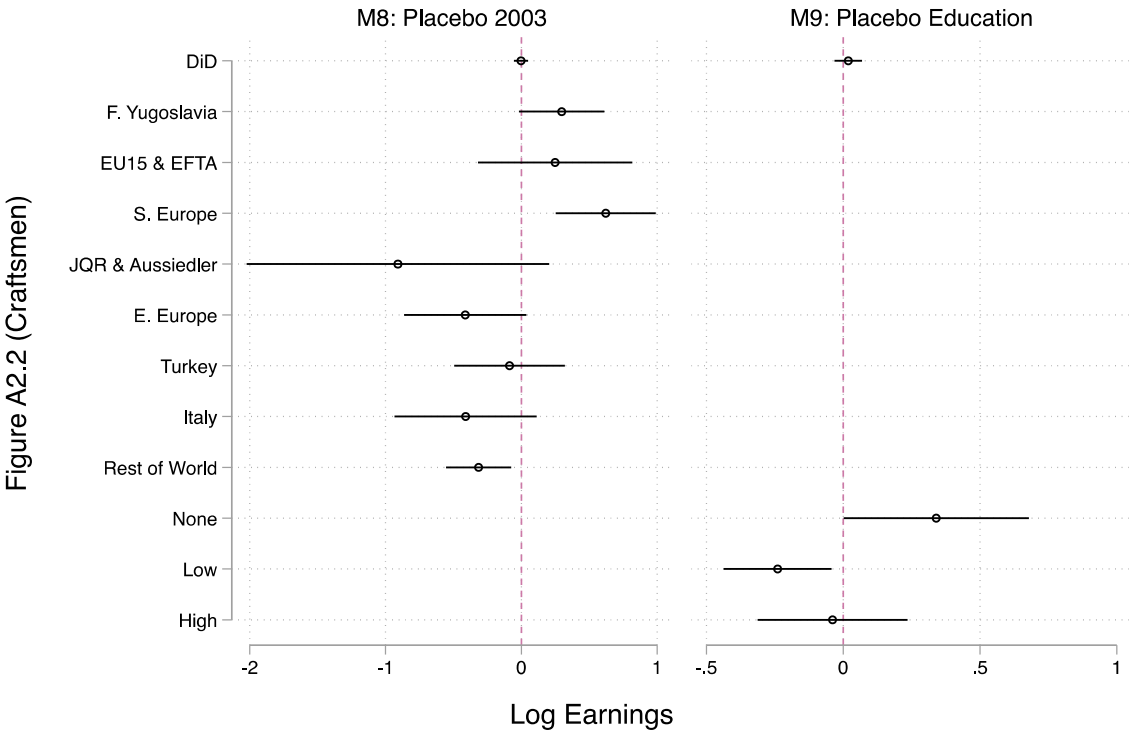


Figure A2.2 (Craftsmen)

Chapter three

Table A3.1: List of control variables

Variable	Operationalization
Nationality Groups	German; EU15 & EFTA; Southern European; Jewish Quota Refugee; Eastern European; Turkish; Italian; Polish; African; N. & S. American; Middle Eastern; Asian; Oceanic & remaining; Aussiedler; Spaetaussiedler.
EU Groups	German; Non-German EU country; Non-EU country.
Spouse's Nationality	See nationality groups above.
Spouse's Occupation	Three-digit German Occupational Classification 1992.
Relative group size	The yearly proportional size of the nationality groups in each German federal state.
Years since migration and its square	Duration of residence in Germany and its square.
Weekly hours worked	Continuous Variable: 1 to 98 or more.
Married	Dummy Variable (0 = no, 1 = yes)
Children	Dummy Variable (0 = no, 1 = yes)
Highest level of education	None: did not complete high school Low: high school with no vocational or higher education degree Medium: vocational education High: higher education degree
Age, Age²	Between 20 and 65; continuous along with the respective squared values.
Federal states fixed-effects	Dummy Variable (0,1) for each German Federal State.
Industrial sector fixed-effects	Dummy Variable (0,1) for each industrial sector.
Year fixed-effects	Dummy Variable (0,1) for each year (2000 – 2008).
Occupation fixed-effects	Dummy Variable (0,1) for each of the 79 occupational classification codes.
Real Household Income	Adjusted net household income; CPI 2005.

German micro-census: 2000 - 2008.

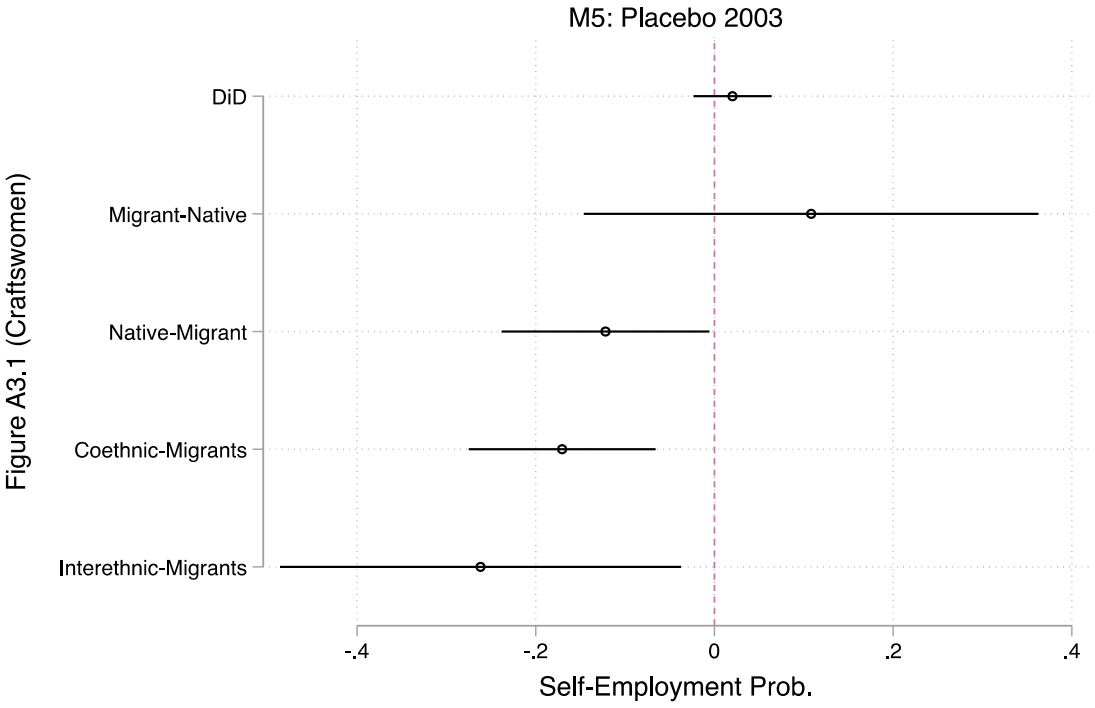


Figure A3.1 (Craftswomen)

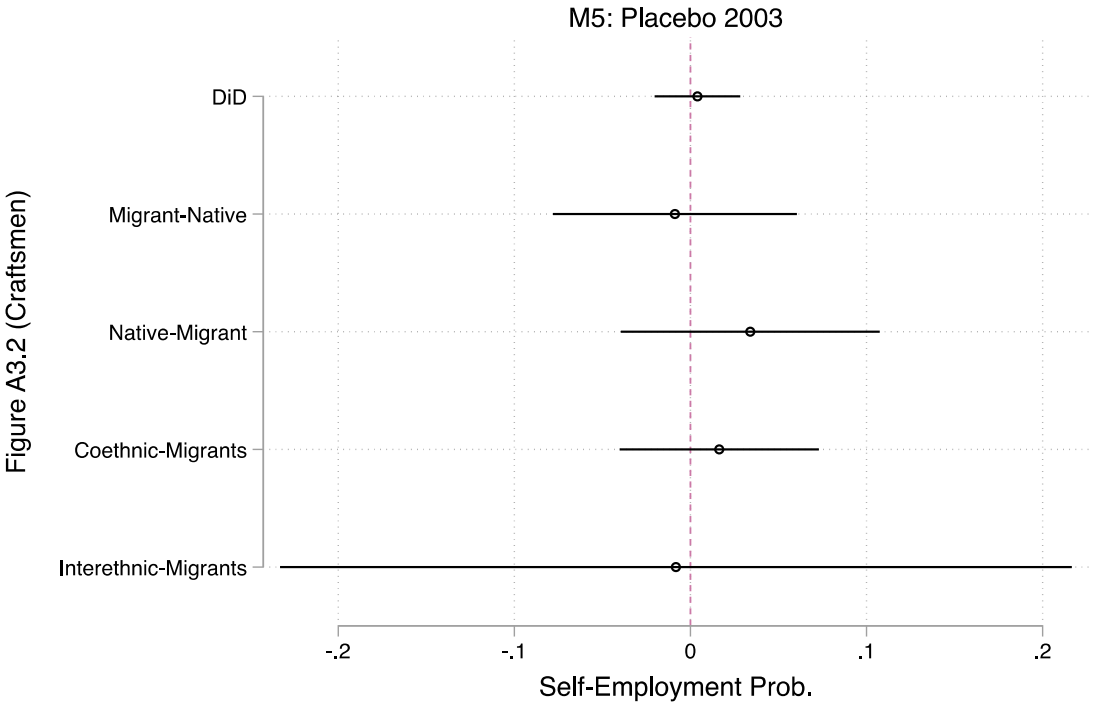


Figure A3.2 (Craftsmen)

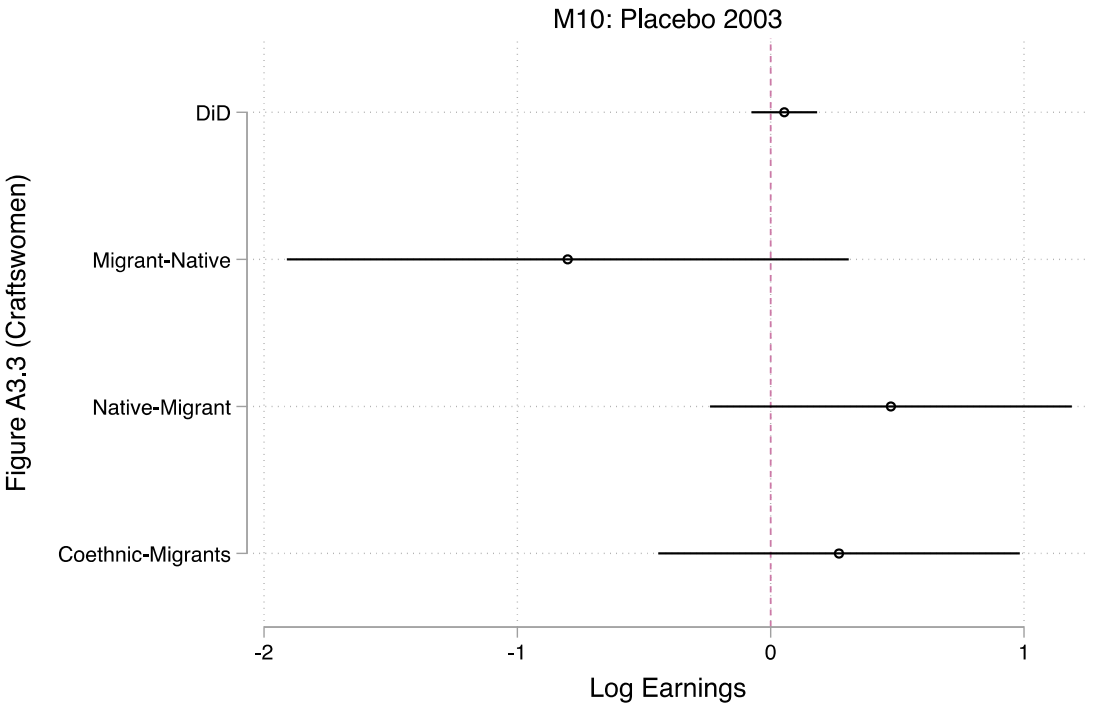


Figure A3.3 (Craftswomen)

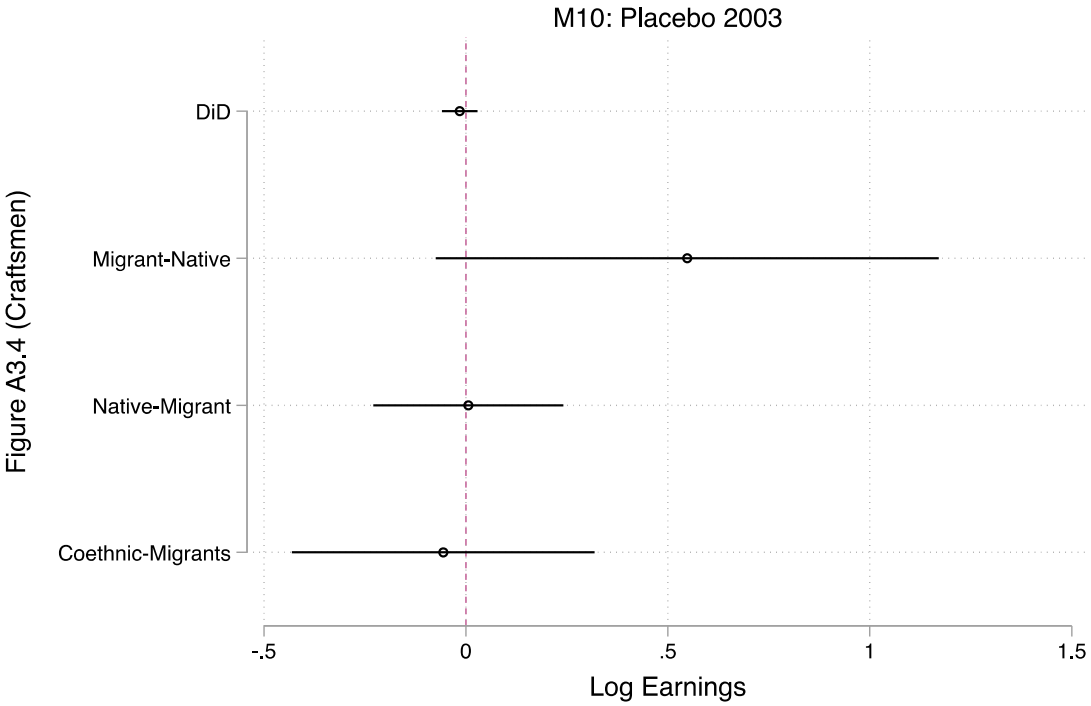


Figure A3.4 (Craftsmen)

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