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Child care, social norms and women's labor supply

Four empirical essays in family economics

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Berlin, June 2019

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Auf dieser Grundlage habe ich die Arbeit selbstständig verfasst.

Berlin, Juni 2019

Sophia Schmitz

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Kapitel 2: Mothers-in-law are not only wicked - Partnered women's labour market outcomes

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Kapitel 5: Understanding day care enrolment gaps

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Abstract

This dissertation consists of four self-contained chapters, each making an independent contribution to the economic literature on child care, social norms, and women's labor supply.

Social norms have been put forward as prominent explanations for the changing labor supply of women. **Chapter 2** studies the intergenerational formation of these norms, examining how they affect subsequent female labor supply decisions, taking into account not only early socialization of women but also of their partner. Using large representative panel data sets from Germany, results suggest that women with partners who grew up with a working mother are more likely to participate in the labor force, work longer hours, and earn higher labor income. This intergenerational link cannot be explained by other confounding patterns. The chapter finds no evidence that this finding reflects assortative mating; rather, analysis suggests that the partner's preferences play a decisive role for the labor supply decision of partnered women. Overall the results of this chapter suggest that policy measures supporting the labor force participation of today's mothers will increase the female labor force participation of the next generation.

Chapter 3 exploits a unique natural experiment to study the local evolution of social norms and behaviour. It makes use of the fact that after the sudden collapse of the Wall separating East and West Germany, many people who were socialized under the former GDR regime moved to the western part of Germany. These immigrants hold very different beliefs about how maternal employment affects children and the family due to the politico-economic system in the GDR, which focused on policies that favoured female qualified employment and put in place an extensive child care system. We examine social learning and spillover effects on West German families that, up to this point, were mainly characterized by the traditional breadwinner-housewife model. For identification, this chapter exploits the quasi-random geographical pattern of the first-wave of East-to-West migration after the fall of the wall that was mainly determined by distance to the boarder. Using data from the German Microcensus and various other data sets from the statistical offices, the chapter finds positive and statistically significant effects on the labor supply decision of women at the intensive margin. In addition, there is suggestive evidence that West Germans adjust their beliefs about how women's

employment affects children and the family. The chapter carefully examines the dynamic evolution of these local effects in the short-, medium- and long-term, finding these best accommodated by models of local social learning and endogenous child care infrastructure. The chapter supports this interpretation by providing direct evidence on the evolution of East-West German intermarriage, local friendship-ties, and the local expansion of publicly funded child care.

As more and more countries consider expanding public child care provision, it is important to have a comprehensive understanding of its implications for families. **Chapter 4** adds to the existing literature by investigating the effect of publicly funded child care on parental subjective well-being. To establish causality, the chapter exploits cut-off rules introduced following the implementation of a legal claim to formal child care in Germany. The results suggest that child care provision strongly increases the life satisfaction of mothers who were previously constrained by the lack of formal child care supply. The effect is more pronounced for mothers with higher labor market attachment. The coefficients for fathers are smaller and not statistically significant. As potential mechanisms, a wide range of time-use and labor market outcomes are explored. This shows that mothers indeed shift time from non-market activities to formal work in response to child care eligibility, resulting in direct and indirect pecuniary and non-pecuniary returns to maternal life satisfaction. The findings of this chapter shed light on key issues of work-family reconciliation and stress the importance of considering subjective well-being measures in family policy evaluations.

Research suggests that children of less-educated or foreign-born parents are more likely to gain developmentally from day care, but are less likely to be enrolled in it. **Chapter 5** shows that substantial enrolment gaps exist for children below the age of three in Germany, a country with a universal and highly-subsidised day care system. Using a large and unique data set that records both actual and preferred day care usage, this chapter examines different demand and supply side explanation for these enrollment gaps. In the empirical analysis of supply side factors, we exploit policy induced regional and time variation in the scarcity of places and the amount of parental fees using different quasi-experimental methods. The chapter demonstrates that differences in demand cannot fully explain enrolment gaps by family background. The findings indicate that both reducing fees and local day care shortages have the potential to reduce enrollment gaps by parental education

substantially, while these factors play a minor role for enrollment gaps by parental country of birth.

Chapters 1 and 6 frame this dissertation. **Chapter 1** places this dissertation in the economic literature, outlines the structure and summarizes its general contributions. **Chapter 6** draws general conclusions and outlines scope for future research.

Zusammenfassung

Diese Dissertation umfasst vier eigenständige Kapitel, die jeweils einen eigenen Beitrag zur ökonomischen Literatur der frühkindlichen Bildung und Betreuung, sozialer Normen und Erwerbsentscheidungen von Frauen leisten.

Soziale Normen gelten als zentrale Erklärung für die sich ändernde Erwerbsbeteiligung von Frauen. **Kapitel 2** dieser Dissertation untersucht die intergenerationale Transmission dieser Normen, und wie diese nachfolgende Erwerbsentscheidungen von Frauen in Paarbeziehungen beeinflussen. Dabei werden nicht nur die frühe Sozialisation der Frau, sondern auch die ihres Partners berücksichtigt. Die Ergebnisse auf Basis großer repräsentativer Datensätze von West-Deutschen Paaren deuten darauf hin, dass Frauen, die mit einem Partner zusammenleben, dessen Mutter erwerbstätig war, mit einer höheren Wahrscheinlichkeit auch erwerbstätig sind, mehr Arbeitsstunden absolvieren und ein höheres Bruttoeinkommen erzielen. Dieser intergenerationale Zusammenhang kann nicht durch andere Faktoren erklärt werden. Desweiteren findet sich keine empirische Evidenz dafür, dass dies durch assortative Partnerwahl verursacht wird, vielmehr zeigen weitere Analysen, dass die Normen des Partners eine entscheidende Rolle für die Erwerbsentscheidung der Frau spielen. Alles in allem deuten die Ergebnisse dieses Kapitels darauf hin, dass sich politische Maßnahmen, die die Erwerbsentscheidung heutiger Mütter beeinflussen, auch auf das Erwerbsverhalten nachfolgender Generationen von Frauen auszuwirken.

In **Kapitel 3** wird die Wiedervereinigung von West- und Ostdeutschland als natürliches Experiment genutzt, um die Entwicklung lokaler sozialer Normen und Verhalten zu analysieren. Nach der Wende zogen viele Menschen, die in der DDR aufwuchsen, in den Westen Deutschlands. Durch das politisch-ökonomische System in der DDR, das die qualifizierte Erwerbsbeteiligung von Frauen förderte und über ein umfangreiches Kinderbetreuungssystem verfügte, wiesen die zugezogenen Ostdeutschen andere Einstellungen hinsichtlich arbeitender Mütter auf. Dieses Kapitel analysiert soziale Lern- und Übertragungseffekte auf westdeutsche Familien, die bis dahin durch traditionelle Rollenbilder geprägt waren. Um diese Effekte zu identifizieren, wird die quasi-zufällige geografische Variation des ersten Ost-West Migrantenzustromes nach der Wende genutzt, die hauptsächlich durch die Entfernung zur ehemaligen Grenze bestimmt wird. Die Analysen basieren auf Daten des Microzensus und zahlreicher anderer administrativer Daten der statistischen Ämter.

Die Ergebnisse zeigen positive und statistisch signifikante Effekte auf den zeitlichen Arbeitsumfang von Frauen. Weiterhin wird empirische Evidenz dafür gefunden, dass Menschen ihre Einstellung darüber ändern, wie die Berufstätigkeit von Frauen Ehe und Kinder beeinflusst. Die dynamische kurz-, mittel- und langfristige Entwicklung dieser Effekte kann am besten durch graduelle soziale Lerneffekte und Auswirkungen auf die lokale Kinderbetreuungsinfrastruktur erklärt werden. Diese Interpretation wird durch empirische Evidenz über die Entwicklung der Interaktion zwischen Ost- und Westdeutschen, den lokalen Ausbau des Kinderbetreuungsangebots für Kinder unter drei Jahren und den lokalen Ausbau von Ganztagsplätzen für Kinder über drei Jahren gestützt.

Da immer mehr Länder ihr Kinderbetreuungsangebot ausbauen, ist ein umfassendes Verständnis bezüglich der Folgen für Familien wichtig. **Kapitel 4** trägt zur bestehenden Literatur bei, indem der Frage nachgegangen wird, inwieweit der Ausbau der Kinderbetreuung das Well-Being von Eltern beeinflusst. Die Analysen basieren auf Daten des Sozio-oekonomischen Panels und nutzen eine durch Stichtagsregelungen verursachte Diskontinuität in der Wahrscheinlichkeit, einen Kita-Platz zu nutzen, um kausale Effekte zu identifizieren. Die Ergebnisse zeigen, dass der Ausbau der Kinderbetreuung die Lebenszufriedenheit von Müttern, die durch den bisherigen Mangel an Kindertagesbetreuung eingeschränkt waren, stark erhöht. Dies trifft insbesondere auf Mütter zu, die eine potenziell größere Bindung an den Arbeitsmarkt haben. Die Effekte für Väter sind kleiner und statistisch nicht signifikant. Das Kapitel untersucht weiterhin mögliche zugrunde liegende Mechanismen. Insbesondere werden Zeitverwendung von Eltern und deren Arbeitsmarktoutcomes analysiert. Dies zeigt, dass Mütter Zeit von unbezahlter zu bezahlter Arbeit verschieben und damit direkte und indirekte finanzielle und nicht finanzielle Erträge zur Lebenszufriedenheit entstehen. Die Ergebnisse des Kapitels beleuchten wichtige Vereinbarkeitsfragen und betonen die Wichtigkeit, subjektive Well-Being-Maße in familienpolitischen Evaluationen zu berücksichtigen.

Zahlreiche Studien belegen, dass Kinder von Eltern mit niedrigerem Bildungsniveau oder Migrationshintergrund in ihrer Entwicklug besonders von frühkindlicher Bildung und Betreuung profitieren, jedoch mit einer geringeren Wahrscheinlichkeit diese Angebote nutzen. **Kapitel 5** zeigt auf, dass es in Deutschland trotz universellem Zugang und stark-subventioniertem Kinderbetreuungssystem für Kinder unter drei Jahren große und anhaltende Nutzungsunterschiede nach Familienhintergrund

gibt. Basierend auf einem einzigartigen Datensatz, der sowohl die tatsächliche Nutzung als auch die Nachfrage nach Kindertagesbetreuung enthält, untersucht dieses Kapitel mögliche Erklärungen für die Nutzungsunterschiede auf der Angebots- und Nachfrageseite. In den quasi-experimentellen Analysen der Angebotsfaktoren werden politikinduzierte regionale Veränderungen in der Verfügbarkeit von Plätzen und in der Höhe der Elternbeiträge herangezogen. Die Ergebnisse zeigen, dass Unterschiede in der Nachfrage die Nutzungsunterschiede nach Familienhintergrund nur bedingt erklären können. Vielmehr deuten die Ergebnisse darauf hin, dass eine Reduktion des lokalen Mangels an Plätzen oder eine Verminderung beziehungweise stärkere Staffelung der Elternbeiträge die Nutungsunterschiede zwischen höher und niedriger gebildeten Familien verringern können. Für die Nutzungsunterschiede nach Migrationshintergrund spielen diese Faktoren allerdings kaum eine Rolle.

Chapter 1

Introduction

1.1 Motivation

How to promote and realize the current and future education and labor force potential of individuals is one of the key questions attracting the interest of policy makers and researchers alike. Finding a comprehensive answer to this question is not only important from the perspective of individual well-being, but also from a societal and macroeconomic view, e.g. to sustain economic growth and secure our social welfare systems. In recent decades, two areas have received particular attention: realizing the labor force potential of women in general, especially mothers, and the role of formal child care[1] in promoting future education and labor force potential.

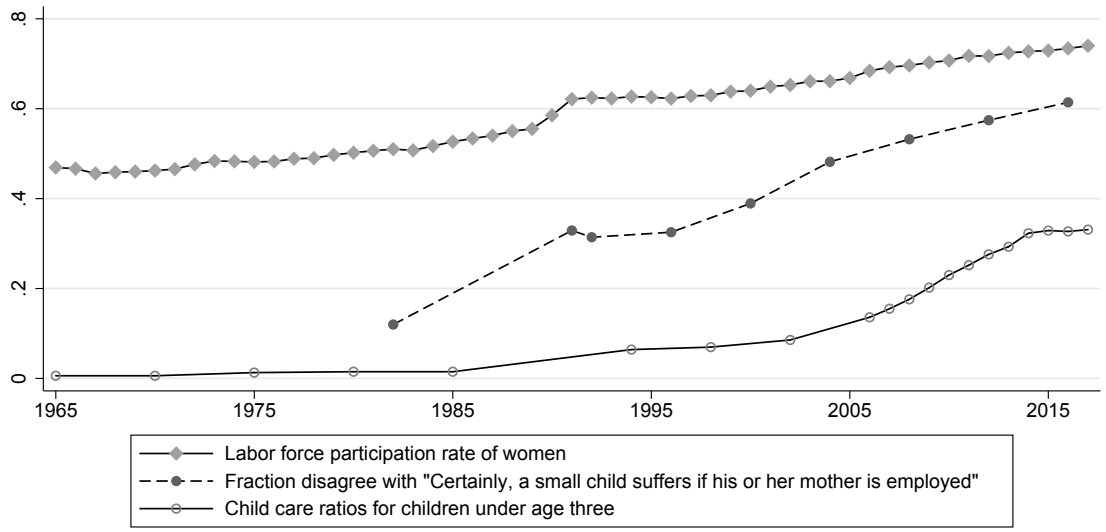
The first area - realizing the labor force potential of women - is motivated, among other reasons, by the fact, that even though women in most OECD countries are highly educated and even sometimes outperform men in terms of educational attainment (e.g. Goldin et al.; 2006), their labor supply is persistently lower than that of men. However, female labor supply increased substantially in many countries over the last couple of decades (OECD; 2019b), primarily at the extensive margin. For example, in Germany, the share of women in the labor force increased from around 47 percent in 1965 to about 74 percent in 2017 (see Figure 1.1).

The economic literature offers various explanations for this dramatic increase. Depending on the period studied, the previous literature proposes technological advances (e.g. Greenwood et al.; 2005; de V. Cavalcanti and Tavares; 2008), changes in the wage and labor market structure (e.g. Galor and Weil; 1996; Goldin; 1990;

[1] The different chapters of this dissertation use different terms when referring to formal child care, depending on the specific aspect of formal child care and age group that is relevant for the research question.

Knowles; 2012; Attanasio et al.; 2008), the development of contraceptive technologies (e.g. Goldin and Katz; 2002), or an increase in the provision of formal child care (e.g. Spieß; 2015, for an overview) as driving factors.

Figure 1.1: Formal child care, social norms and women's labor force participation in Germany



Note: The figure shows the labor force participation rate of women aged 15–64 in Germany (1965–2017), the fraction of Germans who disagree with the statement "Certainly, a small child suffers if his or her mother is employed" (1982–2016) and the fraction of children under the age of three in publicly funded child care (1983–2017). All data in percent. Until 1990 West Germany only.
Source: Statistisches Bundesamt (2017, 2019), BMFSFJ (1994), ALLBUS 1982–2016, own calculation.

However, institutional differences and economic variables can only account for a small fraction of the increase in labor supply of women across countries (e.g. Juhn and Murphy; 1997; Dearing et al.; 2007). A relatively new, but growing strand of the economic literature stresses the importance of **social norms and beliefs** for this transformation (e.g. Fernández; 2013; Fogli and Veldkamp; 2011).[2] Various

[2]Social norms are informal rules that govern behavior in groups and societies (e.g. Bicchieri et al.; 2018). With respect to women's labor supply decisions, they are often referred to as a system of beliefs and values and are closely related to the concept of women's identity (e.g. Bertrand; 2011). Although deeply ingrained (e.g. through socialization that starts in childhood), social norms can change in response to external changes in the environment, e.g. through social learning. Beliefs, social norms and identities are concepts that are often used interchangeably in the economic literature. In addition, the existing literature is not very consistent in defining and measuring these norms and beliefs. Some studies identify norms with observable, recurrent patterns of behavior (e.g. Bertrand; 2011; Alesina et al.; 2013) others use direct statements on beliefs and attitudes (e.g. Fortin; 2005). Depending on the specific context and data availability, the chapters of this dissertation use different terms and measures when referring to social norms and beliefs.

empirical studies show that social norms and beliefs play a crucial role in explaining observed behavior of women, including their labor supply and fertility decisions (e.g. Bertrand et al.; 2015; Fernández and Fogli; 2009). The role of social norms and beliefs is likely to be amplified by the institutional setting and policies. Social norms and beliefs are shown to be transmitted within families (e.g. Fernández et al.; 2004; Nicoletti et al.; 2018), peer groups (e.g. Olivetti; 2006; Mota et al.; 2016), and neighbourhoods (e.g. Maurin and Moschion; 2009).

The theoretical economic literature offers two distinct, although related concepts of how to integrate social norms and beliefs into standard microeconomic theory and how to model these empirical findings. One strand of literature argues that women's labor supply decisions rely on information and beliefs about the long run costs of maternal employment for children and the family (Fogli and Veldkamp; 2011; Fernández; 2013). These beliefs constrain the labor supply decision of women and are transmitted from peers and the family, i.e. through social learning. The other strand of theoretical work puts forth the concept of identity. In their influential work, Akerlof and Kranton (2000, 2011) argue that identity is part of the utility function and associated with a social category. For example, a woman might identify herself with the social category "mother and housewife" while men identify themselves with being a "breadwinner husband". Deviating from the behavior ascribed to these social categories causes a loss in utility of oneself and others. Thus, women are likely to mitigate the behavior of other women and stick to their chosen or given social category.[3]

Women's identities as well as social norms and beliefs about how maternal employment affects children and the family differ widely across countries (e.g. Fortin; 2005). However, in recent years, there has been a shift towards less traditional social norms and beliefs in many countries. For example, in Germany the fraction of individuals who disagree with the statement that "Certainly, a small child suffers if his or her mother is employed" increased from 12 percent in 1982 to 61 percent in 2016 (see Figure 1.1).

The second area that was mentioned at the beginning, i.e. the role of **formal child care** in promoting the current labor force potential of mothers as well as the future education and labor force potential of children, has become increasingly rec-

[3]This simple model highlights that identity is fundamental to observed behavior. Akerlof and Kranton (2000) even argue that it is the most important "economic" decision people make.

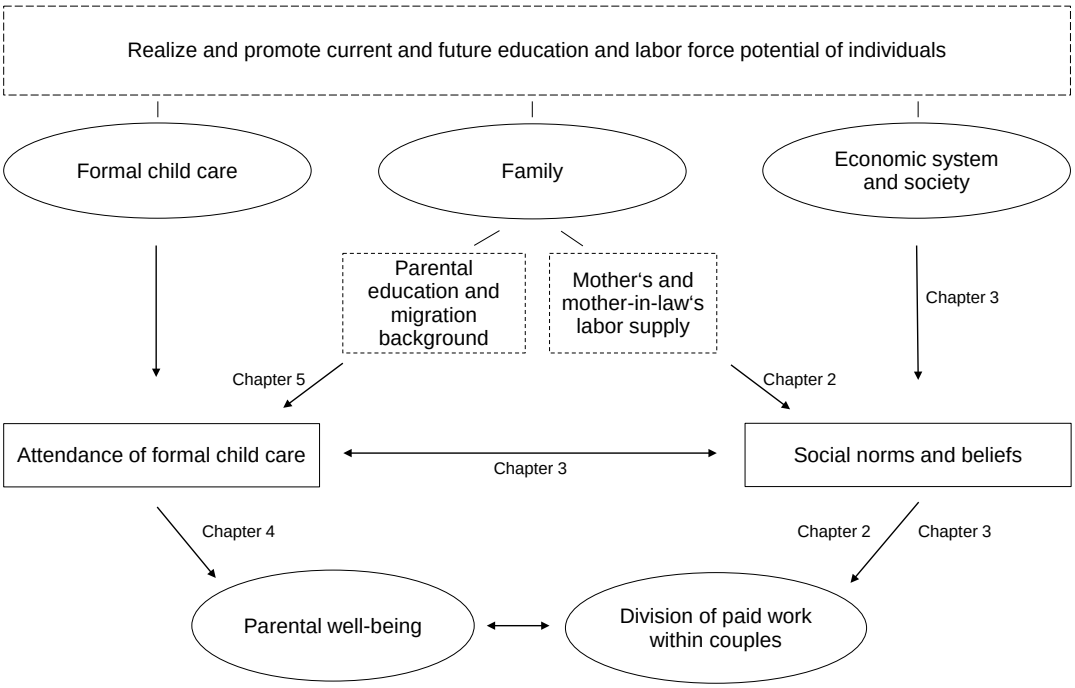
ognized as a field with large scope for policy. Both as part of education policy and family policy (e.g. Spieß; 2011, 2015, 2018, for overviews with a focus on Germany). In many OECD countries, increasing the provision (quantity) and quality of formal child care is ranked high on the political agenda. Many countries, including Germany, have achieved almost full formal child care coverage for children between age three and school starting age. However, for children younger than three, attendance rates vary greatly across countries (e.g. OECD; 2017). In Germany, attendance rates for children below the age of three remained below 10 percent until the early 2000s, but increased substantially in recent years. In 2017 they amount to around 33 percent (see Figure 1.1), which corresponds to the OECD average (e.g. OECD; 2017).

The interest of researchers and policy makers in formal child care is triggered by various theoretical and empirical evidence from the field of economics of early education and care. First and foremost, the pioneering work of James Heckmann (e.g. Heckman and Masterov; 2007; Heckman; 2006; Cunha and Heckman; 2007), which highlights the effectiveness and efficiency of investing into the early phases of life. In their dynamic life-cycle model of human capital formation, skill attainment at early stages raises skill attainment at later stages (self-productivity) and raise the productivity of later investment (complementary).[4] There is a vast empirical literature supporting this, showing that investment in early education can have substantial returns (e.g. Currie; 2001; Karoly et al.; 2006; Spieß; 2015, for overviews). It is now well-established that in children, especially those from low socio-economic backgrounds benefit substantially from early investment, e.g. from targeted early childhood programs or high quality formal child care. They not only gain in terms of educational achievement but also in the long run have higher earnings, lower welfare dependency and better health outcomes. Thus, universal formal child care has the potential to "level the playing field" (Havnes and Mogstad; 2015), i.e. it can reduce the achievement gaps between children from lower and higher socio-economic backgrounds. The benefits of early investments also expand to the society at large, ranging from a decrease in welfare spending, lower crime costs, and higher tax revenues (e.g. Heckman et al.; 2010).

This dissertation is motivated and builds upon the existing, aforementioned, literature. The four different Chapters share common themes and complement each

[4]This complementarity implies that there is no equity-efficiency trade-off for early investment in the human capital of children.

Figure 1.2: Connection between different chapters



Source: own illustration

other in several other dimensions. They all address a specific aspect of the important question of how to promote and realize the current and future labor force potential of individuals, paying particular attention to the role of social norms for the realization of women's labor force potential, the role of formal child care, and the interaction between these two areas.

Figure 1.2 illustrates the connection between the Chapters. This dissertation considers three underlying factors that influence the realization and promotion of the current and future labor force potential of individuals. They are depicted at the upper part of Figure 1.2: The infrastructure (i.e. formal child care), the family as well as the economic system and society as a whole. Attendance of formal child care as well as social norms and beliefs are considered as an outcome and as mechanisms for parental well-being and the division of paid work within couples. Notably, almost all Chapters touch upon the interplay of those different factors.

1.2 Overview and summary

The dissertation consists of four self-contained although related empirical research articles. Key points of each Chapter are summarized in Table 1.1, including the research question, main finding, the data sets used and the methodological approach. In the following, I briefly summarize each Chapter.

Chapter 2 focuses on the intergenerational transmission of social norms and behavior. Social norms have been put forward as prominent explanations for the changing labor supply decisions of women over the past decades, especially the increase in labor supply of mothers. However, we lack a comprehensive understanding about the evolution of these norms and why they are so persistent across time. We aim to contribute to this new but growing area of research by exploring the intergenerational transmission of social norms and by examining how they affect subsequent female labor supply decisions in couples. To do this, we estimate intergenerational correlations between the maternal working status during adolescence and women's labor supply in adulthood, taking into account not only early socialization of women but also of their partner. The analysis draws on representative data from the Socio-Economic Panel (SOEP) study and the German General Social Survey (ALLBUS). This allows not only for examining the labor supply decisions of women but also to study stated beliefs and attitudes directly. The results indicate that women with a partner who grew up with a working mother are more likely to participate in the labor force, work longer hours, and earn higher labor earnings. Examining potential mechanisms reveals that growing up with a working mother changes the perception of men regarding how they belief a working wife affects children and the marriage. However, we find no evidence that the labor supply estimates reflect assortative mating; rather, analysis suggests that the partner's preferences pla a decisive role for the labor supply decision of partnered women. Overall, our results suggest that policy measures supporting the labour force participation of today's mothers will increase the female labour force participation of the next generation.

Chapter 3 exploits a unique natural experiment to study the local evolution of social norms and behavior. In this Chapter, we make use of the fact that after the sudden collapse of the Wall separating East and West Germany, many people who were socialized under the former GDR regime moved to the western part of Germany. These immigrants hold very different beliefs about how maternal employment af-

Table 1.1: Overview and summary of different chapters

	Chapter 2	Chapter 3	Chapter 4	Chapter 5
Titel	Mothers-in-law are not only wicked - Partnered women's labour market outcomes	Immigration and the evolution of local social norms	The impact of publicly funded childcare on parental well-being: Evidence from cut-off rules	Understanding day care enrolment gaps
Research question	Does having a working mother affect subsequent female labor supply decisions in couples? How can this intergenerational link be explained?	Can immigration trigger the local evolution of social norms and a change in labor supply behavior of women in receiving regions?	How does publicly funded child care provision impact the subjective well-being of families?	What can explain the large and persistent day care enrolment gaps by family background?
Main finding	Strong intergenerational links between labor force participation of women and their mother-in-law that can best be explained by a change in the social norms of the partner and subsequent bargaining within couples	Social learning effects after German reunification, regions with large inflows experienced increase in female labor supply at intensive margin, a change in norms and an increase in formal child care provision	Increase in life satisfaction of mothers who were previously constrained by lack of child care supply, allows them to decrease incongruence between actual and desired employment status	Large and persistent day care enrolment gaps by family background, can only be partly explained by differences in demand, regional day care shortages and fees play a major role in explaining gaps by parental education, but not with respect migration background
Data	SOEP, ALLBUS, various datasets from statistical offices	Microcensus, ALLBUS, SOEP, various datasets from statistical offices	SOEP, various datasets from statistical offices	KiBS, various datasets from statistical offices
Methodological approach	Correlational methods	Quasi-experimental methods	Quasi-experimental methods	Descriptive and correlational methods, quasi-experimental methods

Source: Own illustration

fects children and the family due to the politico-economic system in the GDR which focused on policies that favored female qualified employment and put in place an extensive public child care system. We examine social learning and spillover effects on western families that, up to this point, were mainly characterized by the traditional breadwinner-housewife model. For identification, we exploit cross-regional variation in the inflow intensity within different empirical models. Our main empirical model is a difference-in-differences-event-study design that compares average changes in working hours of women (relative to their partner in the household) in high vs. low inflow regions in the years before and after German reunification. To alleviate remaining concerns about potentially endogenous location choices of East Germans, we also analyze local effects by distance to the former border. Using data from the German Microcensus and various other dataset from the statistical offices, we find positive and statistically significant effects on the labor supply decision of women at the intensive margin. In addition, there is suggestive evidence that people adjust their beliefs about how maternal employment affects children and marriage. We examine the dynamic evolution of these local effects in the short-, medium- and long-run, finding these best accommodated by models of local social learning and an endogenous expansion of publicly funded child care. We support this interpretation by providing direct evidence on the evolution of East-West German intermarriage, local friendship-ties, and the local provision of publicly funded child care for children below age three and provision of full-day child care for children above the age of three.

Expanding public child care provision has become a growing priority in many countries. However, we lack a comprehensive understanding of its implications for families. **Chapter 4** adds to the existing literature by investigating the effect of publicly funded child care on parental subjective well-being in Germany. As a source of exogenous variation, I exploit cut-off rules that were introduced following the implementation of a legal claim to publicly funded child care in Germany in 1996. The analysis is based on rich data from the Socio-Economic Panel study, using the well-established life satisfaction measure as the main outcome. The results indicate that child care provision strongly increases the life satisfaction of mothers who were previously constrained by the lack of child care supply. The effect is more pronounced for mothers with higher labor market attachment, while fathers are affected less. To shed additional light on these findings, I explore a wide range of potential mechanisms, including time-use measures and labor market outcomes

of parents. This shows that mothers indeed shift time from non-market activities to formal work in response to child care eligibility, resulting in direct and indirect pecuniary and non-pecuniary returns to maternal life satisfaction. The findings shed light on key issues of work-family reconciliation and stress the importance of considering subjective well-being measures in family policy evaluations.

It is a well-established empirical finding that children from lower socio-economic status and children from foreign-born parents benefit from high quality early childhood education and care. Despite that, in **Chapter 5** we document large and persistent day care enrolment gaps of under three year olds by family background in Germany using large and representative data from the the German Child Care Study (KiBS). We explore the demand-side role as an explanation for observed gaps by making use of the fact that our data set reports stated preferences for day care irrespective of actual enrolment and examine the supply-side factors of regional availability, i.e. shortages, and cost of places in a panel fixed effects model subject to the identifying assumption that changes in shortages are unrelated to changes in other determinants of enrolment gaps within counties, conditional on controls for labor market conditions. To analyze the impact of fees on the enrolment gap, we use the synthetic control method exploiting a substantial reduction of fees due to a policy change in one German federal state. We show that differences in demand for day care can only account for a small fraction of the large enrolment gaps by family background. Instead, results suggest that day care fees and local day care shortages play a significant role in explaining gaps by parental education. Reducing day care fees (or a more progressive fee structure) and reducing regional day care shortages can lower enrolment gaps by parental education substantially. However, enrolment gaps by parental country of birth are less affected by changes in local supply-side factors.

Finally, **Chapter 6** discusses the main policy implications of all Chapters and critically assesses the limitations and scope for future research.

1.3 Contribution

Each Chapter of this dissertation makes an independent contribution to the economic literature - some contributions are more content-related others more method-

ologically.[5] The individual contributions of each Chapter to the existing literature are discussed in detail in the respective Chapters. In the following, I highlight five main contributions that this dissertation makes in general, over and above the independent contribution of each chapter.

First, two of the Chapters explicitly address measures that were long disregarded in the economic literature: social norms. Even though their existence was often implicitly recognized, for example when explaining irrational behavior, their quantitative importance has long not been established. A series of recent papers shows that they play a significant role in explaining many economic phenomena (e.g. Bertrand et al.; 2015; Fernández; 2013; Fogli and Veldkamp; 2011). However, there is relatively little research on how these social norms and beliefs are shaped and how they evolve over time. Chapter 2 and 3 contribute to this growing area of research by providing evidence of intergenerational transmission within families and social learning effects from neighbor and peers, i.e. the horizontal (across generations) and vertical (within generations) transmission of social norms and behavior. These two Chapters show that both transmission mechanisms are important in explaining the evolution and persistence of social norms within families and within regions. In addition, Chapter 2 provides suggestive evidence that social norms of men, who in general hold more "traditional" views regarding the appropriate role of women and the potential cost of maternal employment for children, are a particularly strong predictor of intercouple division of paid work, potentially because men have higher bargaining power than women. Furthermore, Chapter 2 and 3 go beyond measuring outcomes that can be considered as the realization of social norms, e.g. the labor supply decision of mothers, but also look directly at stated beliefs and attitudes using well-established survey questions.

Second, this dissertation uses a variety of different empirical methods. Even though conducting randomized control trails (RCT) constitute the gold standard in causal inference (e.g. Angrist and Pischke; 2008), it might not always be feasible due to ethical or financial constraints. The latter might be particularly severe when it is necessary to collect data for a long period of time to study long-run outcomes, e.g. for the research questions asked in Chapter 2 and Chapter 3. In addition, inference from RCTs - even though strong with respect to internal validity, often lacks external validity. Instead of relying on experimental methods, the dif-

[5]Contributions in terms of policy implications are discussed in Chapter 6.

ferent Chapters use a variety of quasi-experimental empirical methods to model the counterfactual outcome. The empirical methods used in this dissertation range from simple correlation analysis and fixed effects estimation to synthetic control methods, event-study designs, instrumental variable, difference-in-differences, and regression-discontinuity estimations. The internal validity of these methods rests on different identifying assumptions which are carefully assessed in the respective chapters. For some variables, it is difficult to find a credible source of exogenous variation. Take maternal employment in Chapter 2 as an example. Potential instruments such as maternity leave reforms, simply taking regional averages or institutional changes (e.g. an expansion of child care provision) are very likely to affect the outcome of interest through other paths than maternal employment. Thus, they would violate the exclusion restriction. Instead of relying on potential bad instruments which might even amplify the estimation bias, Chapter 2 and parts of Chapter 5 carefully use correlation analysis and cautiously assess different threats to identification and explore alternative interpretations.

Third, each Chapter goes beyond identifying the overall treatment effect or correlation by examining the underlying mechanisms through which these effects are generated. Even though methodologically it is not possible to pin down one single mechanism that drives the result using only one source of exogenous variation (e.g. Frölich and Huber; 2017), each Chapter provides suggestive evidence by using additional datasets, outcomes, and by providing evidence of heterogenous effects. Explaining why and how a certain treatment effect occurs is not only of interest for policy makers but can also serve as an explanation for why results might be different to previous studies. Hence, examining potential channels enhances our understanding of how different effects evolve.

Fourth, this dissertation uses a variety of data sets. Thereby, all chapters combine several datasets to answer one research question. For example, Chapter 2, Chapter 3, and Chapter 4 use representative survey data from the Socio-Economic Panel Study (SOEP). Chapter 2 combines this with data from the General Social Survey (ALLBUS) and aggregated data from the statistical offices. Both survey data sets are very rich on socio-economic characteristics, a feature that is necessary for the methodological approach of Chapter 2 and Chapter 4. In addition, these Chapters exploit other strengths of the data sets such as the household panel structure of the SOEP and the focus of the ALLBUS on beliefs and values. For methodological

reasons, Chapter 3 requires large scale survey data. It uses data from the German Microcensus in combination with administrative data from the registration offices and other regionally aggregated statistics from the statistical offices. Chapter 5 uses data from the German Child Care Study (KiBS) and aggregated statistics from the statistical offices. The KiBS data is rarely used in the field of economics, even though it is very large and has some unique features, e.g. it is the only data set in Germany which allows for quantifying child care shortages. Overall, all Chapters highlight the potential of using secondary data sources and combining different data sets to study a specific research question.

Fifth, the empirical analyses in all Chapters are based on the German context. With respect to patterns of female labor supply and child care infrastructure, Germany differed a lot from other OECD countries, like the US, the UK, or the Nordic countries where many previous studies are set. Germany was long characterized by low levels of publicly funded child care provision and low female employment rates, especially of mothers, despite being highly educated. In addition, social norms and beliefs aligned with the traditional breadwinner-housewife model. In recent decades, there has been a strong increase in female labor supply, mainly on the extensive margin. In addition, several policies were implemented within the universal and highly subsidized child care system that aimed to increase child care provision for young children substantially (see also Figure 1.1). Given this institutional setting, providing evidence in the German context advances the understanding of the potential scope for policy not only in Germany but also in other countries facing a similar institutional setting. In addition, German re-unification constitute a unique natural experiment that can be exploited for identification of social learning effects.

Chapter 2

Mothers-in-law are not only wicked - Partnered women's labour market outcomes*

2.1 Introduction

The role of women in many Western industrialized countries has changed fundamentally over the last few decades. One of the most dramatic shifts is the vast increase in female labour force participation, particularly for women with children. For example, in Germany, as of 2015, 73 percent of women aged between 16 and 65 (73 percent) worked outside the home, compared with 47 percent in 1960 (Statistisches Bundesamt; 2017a). Yet, full-time participation of women remains low, especially among mothers, and large regional differences in participation persist.

The literature provides various reasons for the rise in female labour force participation, which depend on the time period of the observed increase. Such explanations include the introduction of new consumer durables, the development of contraceptive technologies, an extension of the service sector, an increase in the availability of formal child care, skill biased technological changes, changes in the wage and labour market structure, as well as other demand side related factors (e.g. Galor and Weil; 1996; Goldin; 1990; Goldin and Katz; 2002; Greenwood et al.; 2005; Fernández et al.; 2004; Knowles; 2012; Attanasio et al.; 2008; Olivetti; 2006).

A relatively new, rapidly growing, strand of the economic literature emphasizes the importance of social norms, especially of gender identity norms, in explaining this transformation and the observed patterns. The existing literature shows that not only are the own gender identity norms and attitudes an important predicator of the subsequent labour supply decision of women (e.g. Fernández; 2011), but that there are also important social learning effects from peers (e.g. Olivetti et al., *forthcoming*) and the family (e.g. Nicoletti et al.; 2018). A few studies focus on intergenerational links, suggesting that the behaviour of the older generation influ-

*This chapter is based on joint work with C. Katharina Spieß.

ences the norms and attitudes of the younger generation and, thus, their subsequent labour market behaviour. In particular, this literature examines intergenerational correlations between the working status of parents during adolescence and subsequent labour supply decisions during adulthood. Fernández et al. (2004), in their pioneering study on this topic, argue that a significant determinant of the rise in female labour force participation rates among US women was the presence of a new type of man, namely one that was brought up by a working mother. Significant and robust correlations between the labour supply of married women and and their mothers-in-law are also documented for Switzerland (Bütikofer; 2013), while Kawaguchi and Miyazaki (2009) do not find such associations for Japan.

We add to this later literature by analysing intergenerational correlations between various labour market outcomes of women in childbearing age and the labour market participation of her mother and mother-in-law. We focus on partnered women using large and representative samples of households in West Germany. Thus, we focus on a country with an overall female labour force participation around the EU average, but with a relatively low maternal employment rate, particularly once we compare maternal full-time employment or the employment of mothers with three and more dependent children (OECD; 2019a).[1]

The results suggest that women with partners who grew up with a working mother are more likely to participate in the labour force, work longer hours, and, consequently, have higher labour income. This holds when controlling for various background characteristics and local labour market conditions. The intergenerational labour force participation link is comparable with existing estimates on samples for the US (Fernández et al.; 2004) and Switzerland (Bütikofer; 2013). Moreover, just like in the US and Switzerland, we document that the working status of the mother-in-law is more predictive than the working status of the women's own mother for female labour supply.

However, unlike existing studies, we assess a variety of potential mechanisms for this intergenerational link using large and rich panel data sets, covering not only married but also cohabiting women living in West Germany.

[1]We restrict our samples to West Germany, as female labour supply decisions are systematically different in East Germany mainly due to differences in formal child care provision and differences in norms regarding maternal employment (e.g. Campa and Serafinelli, *forthcoming*; Bauernschuster and Rainer; 2012).

This shows that men who grew up with a working mother develop different social norms and attitudes towards working women than other men, measured by various statements concerning the compatibility of work and motherhood. However, they do not spend more time on unpaid work such as housework or childrearing and, thus, do not contribute to lowering the double burden of their working partners. In addition, we assess whether the intergenerational correlation reflects assortative mating in other unobserved characteristics or can be interpreted as evidence that the partner's preferences determine the labour supply decision of women. To distinguish between these channels, we use additional data on (single) women and exploit the panel structure of our main dataset, thus allowing us to observe the same women in different partnerships. In addition, we examine heterogeneities by different background characteristics that reflect relative bargaining positions within the household. Three key findings come out of this: First, the labour supply decision of women is not correlated with gender norms of future partners. Second, even when taking into account individual fixed effects, i.e. when exploiting variation that comes from women switching their partner, having a working mother-in-law is as significant predictor for various labour market outcomes. Third, heterogeneity analysis suggests that the relationship is strongest in partnerships where the women has less bargaining power and for couples where you would expect norms to play a more significant role like in rural areas. Taken together this indicates that the strong intergenerational link between the labour supply of women and their mother-in-law is not an outcome of assortative mating but results from gender-specific processes in the formation of preferences during adolescence and subsequent household behaviour where the male decision maker plays a decisive role for the outcome.

Using much larger and richer panel datasets then previous studies allows us to rule out a variety of alternative explanations. For example, we can rule out that the correlation reflects systematic recall error or variation in local culture, peer effects, or other regional labour market conditions that are more prone to women's labour force participation, rather than the direct impact of mother's and mother-in-law's labour force participation. In addition, the panel-structure of our main data allows us to study how the correlation evolves over the life-cycle of women; i.e. allowing us to get a sense when norms might kick in. Finally, we note that the intergenerational correlations in female labour supply could be confounded by mothers who think that women should work and thus support their son's family

with grand-parental childcare[2]; thus, enabling both partners to work. To exclude this channel, we document that the correlation between having a working mother and female labour force participation is unchanged when the mother-in-law has deceased or does not live in proximity.

This study also contributes to the literature studying preferences and identity formations. The psychological socialization literature (Bandura; 1977) and economic literature on preference formation and transmission (e.g. Bisin and Verdier; 2000) highlights the importance of childhood and, in particular, adolescence, as social and gender norms are established earlier in life while children are exposed mainly to their parents as role models[3]. The "gender intensification hypothesis" is used in psychology to explain an array of situations whereby gender difference emerge or intensify during adolescence (Hill and Lynch; 1983).[4]

2.2 Data and empirical approach

2.2.1 Data

We use national representative data from the German Socio-Economic Panel (SOEP) study and the German General Social Survey (ALLBUS) to examine the intergenerational links between the labour supply choices of one generation of women and that of their mothers and mothers-in-law.

SOEP data The SOEP is an annual panel study of private households in Germany that was first implemented in 1984 in West Germany and later extended to East Germany. The panel dataset covers about 30,000 respondents from 17,000 households and has a strong focus on intergenerational aspects (Goebel et al.; 2019). In our analysis, we include all cohabiting couples, independent of their marital status, living in West-Germany where the women is aged between 25 and 55; i.e. out

[2]In general, grandparents are an important resource for families (Compton and Pollak; 2014).

[3]Assessing the joint dynamics of culture and female labour force participation on a macro level, two recent papers by Fogli and Veldkamp (2011) and Fernández (2013) model work and cultural change as a learning process where women learn about the effects and long-run costs of maternal employment, from their parents and by observing employed women nearby.

[4]More broadly, this study also contributes to the literature that stress the quantitative importance of social norms. For example, using the "epidemiological" approach (see Fernández; 2011, for an overview), many studies find that a significant portion of variance in work or fertility behaviour of second generation immigrants can be accounted for by variables that reflect the cultural norms in the country-of-ancestry (e.g. Fernández and Fogli; 2009; Antecol; 2000).

of education bur far from retirement.[5] Our main sample consists of 22,814 year observations from 3,650 different women cohabiting with a partner.

The employment status of the own mother and the mother-in-law, our main variables of interest in the analysis, are captured by indicator variables that are equal to one if the mother participated in the labour force when the respondent was aged 15 and zero otherwise.[6] This information is derived from a supplementary biography questionnaire that asks all SOEP respondents detailed questions about socio-economic and demographic characteristics of their parents and the situation during childhood.[7] Unfortunately, for our main sample we do not have information on the entire working history of the women's and their partners' mother or on their hours worked.[8] Hence, it could be that we classify some mothers and mothers-in-law as working even though they were absent from the labour market for most of the time during the childhood of their sons and daughters. We assess this potential measurement error in the robustness section.[9] Overall, 50 percent of men and 57 percent of women are classified as being brought up by a working mother.

We focus the analysis on three main outcomes: (i) labour force participation of women; (ii) their working hours; and (iii) their gross labour income. Women are defined as participating in the labour force when they report being in regular full- or part-time employment. Working hours are measured as contracted weekly working hours and we take logs of women's gross monthly labour income. For (ii) and (iii), we also look at the outcome relative to the partner, i.e. a woman's share of working hours and gross wages within the partnership. Descriptive statistics on the main SOEP sample are presented in Table A2.1 in the Appendix.

[5] Same-sex couples are dropped from the analysis.

[6] More precisely, the respondent is asked about the type of job the mother hold when he or she was aged 15.

[7] The information on mothers working status was only included starting in the year 2000. As individuals only answer the biography questionnaire once when entering the SOEP, almost all observations in our dataset are drawn from a refreshment sample of the SOEP which was selected independently from all other subsamples from the population of private households in the year 2000.

[8] However, this information is available for a subsample (see robustness section).

[9] Moreover, there might be a simple recall error concerning the labour force status of mothers. However, when comparing the information on mothers' and mothers-in-law' working status in the SOEP to administrative statistics of female labour force participation (Statistisches Bundesamt 2017) over time, we find that our measure fits well, both in terms of levels and development of female labour force participation over time (see Figure A2.1 in the Appendix).

ALLBUS data To examine directly if men and women who were brought up by a working mother have different social norms and attitudes, we make use of the German General Social Survey (ALLBUS). The ALLBUS is a cross-sectional dataset that is conducted biennially since 1980 (GESIS - Leibniz-Institut für Sozialwissenschaften; 2016). It covers a representative sample of the German population. In contrast to the SOEP, it has a strong focus on the attitudes and beliefs of the respondents. Similar to the SOEP, we use information on women's and men's mother's working status when the respondent was aged 15.[10] This information is available starting in 2004. To investigate if men and women who are raised by working mothers develop different social norms and beliefs that are more favourable toward working women, we use the following six different statements concerning attitudes towards working mothers: (i) A working mother can just as well have a hearty and trustful relationship with her children as a non-working mother; (ii) it is even good for a child if his or her mother is employed instead of merely focusing on household work; (iii) certainly, a baby suffers if his or her mother is employed; (iv) it is more important for women to support her husband's career instead of making her own career; (v) it is better for all if the husband works and the wife stays at home taking care of household and children; and (vi) married women should turn a job down if only a limited number of jobs are available and her husband is able to make a living for the family.

The statements capture the respondents' opinion about compatibility of paid work and family related work, i.e. whether they think maternal employment has detrimental effects on children and the family, as well as about the appropriateness of specialization of male and female roles. The agreement to the various items is measured on a 4 point Likert scale ranging from 1 (completely agree) to 4 (completely disagree). The questions are only asked in the waves 2004, 2008, 2012 and 2016.[11] We combine the six different items to a single index by standardizing each item and then adding up each item such that higher values correspond to more "tradi-

[10]We also replicate the link between the labour force participation of women and that of their mother and mother-in-law using ALLBUS data. As in the SOEP analysis, participating in the labour force is coded as one if the women works regularly in full- or part-time. Information on women's working hours or gross labour income is not provided in the ALLBUS. It is important to note that the ALLBUS is not a household survey; rather it is targeted at individuals. Hence, when replicating the associations between the working status of women and their mothers-in-law, we use information reported by the partner. If available, we construct all control variables similar to SOEP measures. Descriptive statistics are provided in Table A2.2.

[11]In 2012 and 2016, one half of the sample was asked a slightly revised set of questions. To maintain a consistent measure across years, we drop those observations.

tional" social norms and views about how maternal paid work affects children and the family.

2.2.2 Empirical approach

We start out estimating simple intergenerational correlations with the following model:

$$Y_{ijt} = \beta_0 + \beta_1 MILworked_j + \beta_2 Mworked_i + X'_{ijt}\beta_3 + \epsilon_{ijt} \tag{2.1}$$

where dependent variables Y_{ijt} of women i with partner j in year t are (i) labour force participation, (ii) weekly working hours, and (iii) log gross monthly labour income. For (ii) and (iii), we also look at the outcome relative to the partner j. $MILworked_j$ is the working status of the mother-in-law, i.e. an indicator whether the partner j grew up with a working mother, while $Mworked_i$ is the working status of the own mother when the respondents was aged 15. The model subsequently include a rich set of control variables X'_{ijt} to control for several confounding sources of heterogeneity contained in ϵ_{ijt}.[12] On the individual level, this includes the woman's and partner's age (linear and squared), years of education, religion measured in four categories corresponding to catholic, protestant, other religion and no religion, marital status, log gross labour income of the partner (linear and squared), the number of children in the household, the number of children under the age of six and the city size in three categories. Including these covariates rules out that our estimates simply reflect assortative mating in for example education or religion, cohort or age differences.[13] In addition, we control for other parental background characteristics of the couple: in particular, mother's and father's highest educational degree in three categories corresponding to primary, secondary, and tertiary education according to the ISCED-97 classification (International Standard Classification of Education), a measure of the job prestige of the father when the respondent was aged 15 (magnitude prestige scale by Wegener (1984)) as a proxy for income and wealth of the

[12] In addition, we conduct several robustness checks in section 2.4 where we explicitly rule out potential confounding patterns.

[13] For example, younger cohorts of women are more likely to have a working mother-in-law and be working themselves because of the strong secular increase in female labour force participation in the 1990s and new millennium, causing a spurious correlation between mother-in-law's and women's labour force participation. Some of these controls (e.g. fertility) might be endogenous to social norms and beliefs, we present results for different model specifications.

parents, and the number of siblings. Including parental characteristics as additional control variables ensures that β_1 or β_2 capture the association with growing up with a working mother rather than having a mother who is well-educated or was living in a household with lower or higher household resources. Finally, we control for various regional characteristics at the county level in year t such as the unemployment rate, employment rate, average GDP per capita, share of foreigners, the size of the county in kilometres squared and day care availability for under three year olds and for children aged between three and school entry (Statistisches Bundesamt; 2019). All models control for survey year fixed effects and are estimated with robust standard errors clustered at the couple level.

When estimating equation (2.1), we cannot differentiate whether the estimated coefficient γ_1 reflects assortative mating in other unobserved characteristics or the direct impact of the partner's social norms and beliefs on the woman's labour supply decision.[14] The former would be consistent with a story where a man matches with a women who is similar to his mother in terms of unobserved social norms and beliefs regarding maternal employment and labour force attachment. The latter implies that the observed pattern is the result of a joint labour supply decision or a bargaining process where the partners' social norms are more relevant for the observed labour supply behaviour of partnered women.

To shed light on this issue, we first exploit the panel structure of the SOEP data and use additional data on all single women in the SOEP to check if the contemporaneous labour force participation of women is correlated with the mother's working status of later partners, i.e. men they cohabit with in the future. Formally, this corresponds to estimating regressions of the following form:

$$Y_{ift} = \gamma_0 + \gamma_1 MILworked_f + \gamma_2 Mworked_i + X'_{ift}\gamma_3 + u_{ift} \tag{2.2}$$

where f is the partner that single women i is cohabiting or married with in the future, i.e. in $t = t + n$, $n \in \{1, ..., N\}$. If our main estimates reflect associative mating in unobserved characteristics that are correlated with the labour supply decision of women, you would expect to find a similar correlations already before women form a partnership, i.e. a significant γ_1 coefficient.

[14] Whether a man grows up with a working mother is not a significant predictor for cohabiting with a women, i.e. is not predictive for being included in our estimation sample.

In addition, the panel setting offers the chance to include individual fixed effects on the women level which formally reads:

$$Y_{ijt} = \delta_0 + \delta_1 MILworked_j + X'_{ijt}\delta_2 + \mu_i + \xi_{ijt} \tag{2.3}$$

In equation (2.3), the identifying variation comes from women who we observe changing their partner, i.e. from variation in the labour force status of the mother $MILworked_j$ of the old and new partner.[15] Including individual fixed effects μ_i controls for all potential time-constant confounding factors, e.g. time-constant preferences for a particular type of men or time-constant preferences for a particular division of paid work. In addition, we control for the same set of time-varying characteristics as in equation (2.3), e.g. time-varying characteristics of the current partner.

2.3 Results

2.3.1 Main results

We start by estimating simple intergenerational correlations between female labour force participation of different generations using equation (2.1). The results in Table 2.1 show that having a partner who grew up with a working mother is associated with a significant increase in the probability that a women does paid work by about 7 percentage points.[16] Including the rich set of additional control variables described in the previous section leaves the coefficient unchanged, suggesting that the results are not driven by, for example, systematic differences in religion, education, and cohort or age differences.[17] In particular, we also control for the working status of the women's own mother during youth. In line with the findings by Fernández et al. (2004), this does not change the estimated coefficient. The point estimate on

[15]Note that, in this regression, we do not drop women with missing information on time constant covariates because this would reduce the number of women observed switching their partner substantially. Overall, we observe 212 women changing their partner for on average four years after the change in partners.

[16]Using ALLBUS data, the findings in Table A2.5 are very similar to Table 2.1, which is not surprising given that both surveys are representative of the (West) German population and cover similar survey years.

[17]The coefficients for all the control variables in the SOEP data are shown Table A2.4 in the Appendix.

the own mother's labour force participation is small and not statistically significant. Whether the partner grew up with a working mother is more predictive than the working status of the own mother for female labour supply decisions in couples.

Table 2.1: Female labour force participation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean of dep. variable	0.626	0.626	0.626	0.626	0.626	0.626	0.626
Mother-in-law worked	0.072***	0.063***	0.072***	0.072***	0.071***	0.076***	0.073***
	(0.022)	(0.022)	(0.022)	(0.023)	(0.022)	(0.023)	(0.022)
Own mother worked						0.027	0.025
						(0.023)	(0.023)
Controls:							
Partner's characteristics	✓		✓	✓	✓	✓	✓
Own characteristics		✓	✓	✓	✓	✓	✓
Household characteristics				✓		✓	✓
Parents-in-law's characteristics					✓	✓	✓
Own parents' characteristics						✓	✓
Regional characteristics							✓
Observations	22814	22814	22814	22814	22814	22814	22814
R-squared	0.050	0.038	0.062	0.120	0.053	0.125	0.129

Notes: Marginal effects calculated at the mean of the independent variables. See Table A2.1 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

Furthermore, the results in Table 2.2 indicate that having a partner who grew up with a working mother is associated with an increase in women's weekly working hours and gross labour income. The coefficients amount to an increase in contracted working hours of about 1-2 hours per week and an increase in gross weekly labour earnings of about 40 percent. Interestingly, for gross labour income, the working status of the own mother as an adolescent is an equally strong predictor as the mother-in-law's working status. However, this does not hold when examining labour income shares. Reassuringly, the association with the mother-in-law's working status is also large and significant when looking at the working hours and earnings relative to the partner, i.e. the share of of working hours provided by the women and the share of income. Having a working mother-in-law is associated with an increase in the share of gross labour earnings provided by the women of about 3 percent (about 10 percent relative to the mean) and an increase in the women's share of hours worked by about 3 percent (about 9 percent relative to the mean).

Table 2.2: Working hours and labour income

	Weekly working hours				Log gross monthly labour income			
	Total		Relative to partner		Total		Relative to partner	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mean of dep. variable	18.946	18.946	0.329	0.329	5.192	5.192	0.291	0.291
Mother-in-law worked	1.874**	1.491**	0.028***	0.028***	0.450***	0.390***	0.028***	0.028***
	(0.740)	(0.685)	(0.010)	(0.009)	(0.148)	(0.140)	(0.009)	(0.008)
Own mother worked		0.579		0.002		0.320**		-0.001
		(0.698)		(0.009)		(0.139)		(0.008)
Full set of controls		✓		✓		✓		✓
Observations	19913	19913	15649	15649	22814	22814	22072	22072
R-squared	0.111	0.262	0.509	0.592	0.077	0.188	0.106	0.192

Notes: OLS estimates. See Table A2.1 for list of control variables. Columns (7) and (8) is estimated without controlling for partner's labour income. The mean of log monthly gross income corresponds to about 1348 euros. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

Heterogeneity analysis in Table A2.6 shows that the correlation is significantly larger for married women and is increasing with marriage duration.[18] In addition, the correlation seems to be stronger for women who have less education than their partner and women whose father had a job with lower prestige than the father of their partner; i.e. couples where the women potentially has less bargaining power than her partner.[19] Examining heterogeneities by the size of the municipality, religion of the women and number of children in Table A2.7 reveals the following pattern: The intergenerational link is strongest in more rural municipalities but not significant and much smaller in urban areas with more than 100,000 inhabitants. Interestingly for women with no confession it does not seem to play a role whether they have a partner who grew up with a working mother or if they themselves were brought up by a working mother, while the latter seems to be especially relevant for women with other non-christian religion (mainly Muslims). The result are very similar for couples with no and up to two children in the household. However, when looking at women with three or more children the working status of the own mother becomes highly predictive of women's own labour market outcomes. These are women who on average either do not work at all or with very few hours.

Further, we show heterogeneous effects by age. Differentiating by the age of the women in Figure A2.2 shows that while women of working and non-working mothers-in-law exhibit very similar participation rates before the age of 20, the difference between these two groups grows larger and statistically significant once they reach the child-bearing age. The gap is largest and statistically significant in the 30s and 40s, i.e. when most women have young children. It decreases a bit starting at age 40, however remains statistically significant until age 60.

2.3.2 Explaining the intergenerational labour supply links

There are several potential mechanisms that could explain why women with partners who grew up with a working mother have, on average, a higher labour force participation, work longer hours, and have higher labour income. In the following, we examine three potential mechanisms in more detail: First, we analyse whether men

[18]This information is not available for all observations, which reduces the number of observations, thus increasing standard errors.

[19]Father's job prestige as a measure of family status or wealth and relative education are commonly used indicators of bargaining power when testing household bargaining models in the economic and sociological literature.

who grew up with a working mother develop different social norms and attitudes towards working women than other men. Second, we examine if partners who grew up with a working mother spent more time on unpaid work such as housework and childrearing, thus allowing the women to spend more time on paid work. Third, we carefully assess whether the intergenerational correlation reflects assortative mating or can be interpreted as an outcome of a joint labour supply decision or bargaining process where the partner's preferences determine the labour supply decision of women in couple households.

Social norms and attitudes Concerning stated social norms and beliefs about how maternal employment affects children and the family, Table 2.3 shows that the working status of the own mother during childhood is a strong predictor for contemporaneous attitudes regarding the appropriate role of women, especially for men (Panel A): Men brought up by a working mother have much less "traditional" beliefs and attitudes towards working women than other men. For men, the difference amounts to about 12 percent of a standard deviation. It is highly statistically significant and robust to the inclusion of various control variables. This is line with simple descriptive evidence in Figure A2.3 for all single items of the index.[20] For women, this link is slightly smaller (about 8 percent of a standard deviation) and in our preferred specification statistically significant at the 5 percent level.[21] Looking at single men and women reveals that mother's working status is an equally strong predictor for social norms and beliefs in adulthood for men and women. However, the coefficients are not as precisely estimated due to the smaller sample sizes.

Non-paid work We find no evidence that men raised by working mothers spent more time on housework or childrearing. The results in Table 2.4 suggest that neither the average time (in hours per day) women and men spent on housework during a typical workday, nor the time spent on childrearing differ significantly by whether or not the partner grew up with a working mother. Thus, our main estimates in 2.1 and Table 2.2 cannot be explained by the fact that men who grew up with a working mother have different household skills or preferences to cooperate in the household, which might lead to a larger engagement in different household tasks and consequently a reduction in the housework load of women.

[20] Estimation results for single items are available upon request.

[21] Similar findings were already reported by Powell and Steelman (1982), showing that the association between maternal status characteristics and gender role attitudes of adult men is stronger than for adult women.

Table 2.3: Agreement to social norms and beliefs

Panel A:	partnered men		single men	
	(1)	(2)	(3)	(4)
Own mother worked	-0.118***	-0.116***	-0.118***	-0.088**
	(0.037)	(0.037)	(0.046)	(0.046)
Full set of controls		✓		✓
Observations	1115	1115	777	777
R-squared	0.167	0.269	0.170	0.205
Panel B:	partnered women		single women	
	(1)	(2)	(3)	(4)
Own mother worked	-0.086**	-0.082**	-0.123*	-0.128*
	(0.034)	(0.035)	(0.069)	(0.070)
Full set of controls		✓		✓
Observations	1492	1492	357	357
R-squared	0.177	0.180	0.102	0.162

Notes: The dependent variable is a standardized index, derived by standardizing the agreement to social norms and beliefs shown in section 2 (measured on 4-point scale) and then adding up each item such that lower values correspond to more traditional social norms and beliefs about how maternal employment affects children and the family. See Table A2.2 for list of control variables. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: ALLBUS 2004, 2008, 2012 and 2016, own calculation.

Assortative mating So far, the analysis suggests that the intergenerational link between the labour supply decision of women and their mother-in-law is driven by the preferences of the partner, i.e. is the outcome of a joint labour supply decision or bargaining process where the partner's preferences dominate. However, it could also be that our estimates reflect assortative mating in other unobserved characteristics that we cannot control for (e.g. Morrill and Morrill; 2013). One example could be that women, who themselves have a higher labour market attachment or career aspirations, are more likely to select a partner who is supportive of that and in favour of the dual earner household model. To shed light on this, we first use additional data on single women and examine whether women who later have a partner who grew up with a working mother already exhibit different labour market outcomes before matching with their future partner. Second, we exploit the fact that we observe the same women with different partners over time, i.e. we net-out any remaining time-invariant unobserved heterogeneity by including individual fixed effects.

Table 2.4: Time spent on housework

	Time spent on housework		Time spent on child care	
	Partner (1)	Women (2)	Partner (3)	Women (4)
Mean of dep. variable	0.702	2.549	0.836	3.097
Mother-in-law worked	0.013	-0.040	-0.010	0.118
	(0.020)	(0.045)	(0.049)	(0.105)
Own mother worked	-0.005	0.080	0.119**	0.080
	(0.020)	(0.045)	(0.048)	(0.106)
Full set of controls	✓	✓	✓	✓
Observations	22876	22861	22873	22873
R-squared	0.157	0.244	0.226	0.458

Notes: Time spent on housework or child care measured as hours per typical workday. See Table A2.1 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
*Source:*SOEP v33, Statistisches Bundesamt (2019), own calculation.

The estimates using single women in Panel A of Table 2.5 show that there is no significant correlation between the contemporaneous labour market outcomes of women and the indicator for having later a mother-in-law who worked, i.e. whether or not the women will have a partner who grew up with a working mother in the future. Thus, before matching with a partner, there are no differences between the labour market outcomes of women who later have a partner who grew up with a working mother and women who later have a partner who grew up with a non-working mother. This suggest that there is no assortative mating on realized labour market outcomes and that the intergenerational labour supply links are not driven by the fact that women who themselves have a higher labour market attachment are more likely to select a partner who supports her. However, standard errors are relatively large due to the smaller sample size. Also note that, due to the sampling structure of the SOEP, which is based on a household concept, we cannot rule out that the future cohabiting or married partner of a women is her partner already, but not living in the same household. However, this would bias the coefficient of interest upwards, thus provide us with a lower bound. Including individual fixed effects in Panel B of Table 4 shows that the correlations between the working status of the partner's mother during adolescence and own labour market outcomes are a bit larger than in our main specification and remain statistically significant when including time-varying covariates. Under the assumption that patterns of partnership

Table 2.5: Female labour market outcomes - assortative mating

Panel A:	Future partner correlates - single women					
	Labour force participation		Weekly working hours		Log gross monthly labour income	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean of dep. variable	0.702	0.702	24.939	24.939	5.602	5.602
Future mother-in-law worked	-0.007	0.008	-0.222	-0.333	-0.007	0.059
	(0.041)	(0.039)	(1.670)	(1.539)	(0.295)	(0.272)
Own mother worked		-0.025		-0.716		-0.180
		(0.042)		(0.292)		(1.705)
Full set of controls		✓		✓		✓
Observations	1718	1718	1505	1505	1718	1718
R-squared	0.006	0.140	0.008	0.165	0.002	0.160
Panel B:	Fixed effects estimates					
	Labour force participation		Weekly working hours		Log gross monthly labour income	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean of dep. variable	0.620	0.620	18.855	18.855	5.165	5.165
Mother-in-law worked	0.104*	0.145**	3.602**	5.217***	0.598	0.990**
	(0.055)	(0.059)	(1.565)	(1.607)	(0.367)	(0.392)
Full set of controls		✓		✓		✓
Observations	34774	34774	30513	30513	34774	34774
R-squared	0.008	0.066	0.015	0.105	0.010	0.078

Notes: Columns (1) and (2) report marginal effects evaluated at the mean of the independent variables. See Table A2.1 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

formation and preferences for a particular type of men are constant within individuals across time, this result also suggests that our findings are not an outcome of assortative mating, but result from gender-specific processes in the formation of preferences during childhood and adolescence, along with subsequent household behaviour in later adulthood. This interpretation is supported by the heterogeneity analysis discussed above (Table A2.6), which indicates that the intergenerational links are stronger in couples where the woman has potential lower bargaining power and for women where you would expect social norms to play a more important role.

It is also in line with other research showing that in many decisions that couples take jointly, the preferences of the male decision maker determine the outcome. Examples include the choice where to live (e.g. Løken et al.; 2013), the level and

type of public good provision (e.g. Andreoni et al.; 2003) or retirement decisions (e.g. Hiedemann; 1998; Lundberg et al.; 2003). This is also confirmed in more aggregated state-level analysis on women's relative to male's labour market outcomes, e.g. Charles et al. (2009) show that after controlling for men's views regarding gender roles, women's attitudes are no longer a significant predictor for their labour market outcomes.

2.4 Robustness

In the following, we rule out several potential confounding patterns and conduct several robustness and sensitivity tests to our main estimates.

2.4.1 Rule out other confounding patterns

Early socialization vs. current involvement of mother-in-law First, we test whether our results could be driven by the current involvement of the mother-in-law rather than early socialization of her son. The former could be the case if mothers-in-law actively engage in women's decision if and how to participate in the labour market. For example, it could be that a mother-in-law with a higher attachment to the labour market more actively supports the compatibility of paid work and family duties of her daughter-in-law, e.g. by providing childcare. To assess this hypothesis, we estimate our main specifications in the sample of women where the mother-in-law has already died and in a sample of women who do not live close to their mother-in-law. Results in Table 2.6 suggest that our estimates remain very similar in magnitude however loose precision due to the smaller sample sizes. This indicates that our main findings do not reflect spurious correlation due to a current local involvement of the mother-in-law and can be interpreted in the direction of early socialization.

Local culture, peer effects or other regional labour market conditions Second, we assess whether our estimates reflect variation in local culture, local peer effects (Mota et al.; 2016; Olivetti et al., *forthcoming*) or other regional labour market conditions, which are not captured by the regional indicators that we control for

Table 2.6: Female labour market outcomes - early socialization vs. current involvement

	Labour force participation		Weekly working hours		Log gross monthly labour income	
	Mother-in-law lives far away (1)	Mother-in-law died alread (2)	Mother-in-law lives far away (3)	Mother-in-law died alread (4)	Mother-in-law lives far away (5)	Mother-in-law died alread (6)
Mean of dep. variable	0.619	0.577	18.847	17.008	5.143	4.851
Mother-in-law worked	0.068**	0.082*	1.089	1.801	0.369**	0.645**
	(0.031)	(0.046)	(0.927)	(0.138)	(0.178)	(0.285)
Own mother worked	0.013	0.034	-0.138	1.766	0.364**	0.452
	(0.032)	(0.045)	(1.013)	(1.449)	(0.179)	(0.296)
Full set of controls	✓	✓	✓	✓	✓	✓
Observations	9655	6340	8338	5436	9655	6340
R-squared	0.144	0.116	0.256	0.193	0.208	0.164

Notes: Columns (1) and (2) report marginal effects evaluated at the mean of the independent variables. Regressions in Columns (1), (3) and (5) are estimates in the sample where the mother-in-law lives far away and in Columns (2), (4) and (6) in a sample where the mother-in-law died already. See Table A2.1 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

in our main specification.[22] These factors can cause a spurious correlation between and women's labour market outcomes and mother-in-law's labour force participation that is driven by regional characteristics. To test this, we include county averages of maternal labour force participation of women's peers as an additional control.[23] Thus, we test if our main coefficients reflect peer effects rather than the association with mothers-in-law labour force status. In addition, we estimate a specification with regional fixed effects (NUTS-2 level) to capture further local effects. The estimated coefficients in Table 2.7 remain very similar to our baseline estimates. The coefficients on the average labour force participation of the women's peers in the same labour market are large, but imprecisely estimated.

[22]Note that Column (6) in Table 1 already controls for a set of regional characteristics, including city size, unemployment rate, employment rate, average GDP per capita, share of foreigners, provision of publicly funded day care, and the size of the county that the couples is living in.
[23]The averages are calculated using all individuals in the SOEP with non-missing information on mothers' labour force participation to obtain the best available measure, i.e. mothers' and mothers-in-law's participation. On average we observe 70 individuals per year (1210 averaged over all years) in one county.

Table 2.7: Female labour market outcomes - local culture effects

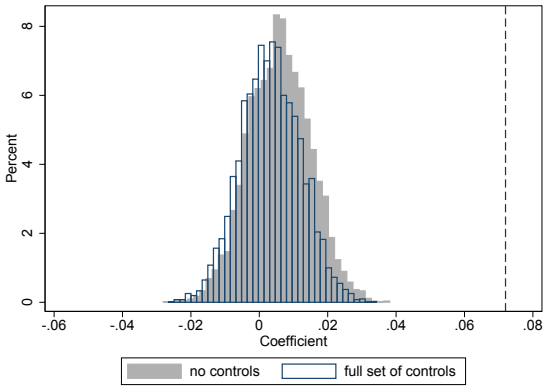
	Labour force participation		Weekly working hours		Log gross monthly labour income	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean of dep. variable	0.626	0.626	5.192	5.192	18.946	18.946
Mother-in-law worked	0.069***	0.070***	1.374*	1.449**	0.388***	0.378***
	(0.023)	(0.022)	(0.709)	(0.644)	(0.142)	(0.132)
Own mother worked	0.020	0.026	0.456	0.602	0.317**	0.336**
	(0.023)	(0.022)	(0.710)	(0.640)	(0.142)	(0.131)
Average participation of peers' mothers in county	0.091		2.442		0.051	
	(0.081)		(2.497)		(0.474)	
Full set of controls	✓	✓	✓	✓	✓	✓
NUTS 2 fixed effects		✓		✓		✓
Observations	22814	22814	19913	19913	22814	22814
R-squared	0.129	0.139	0.262	0.277	0.188	0.199

Notes: Columns (1), (2) and (3) report marginal effects evaluated at the mean of the independent variables. See Table A2.1 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

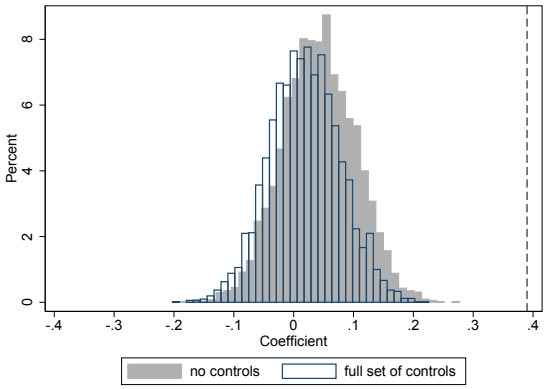
Finally, we randomly rematch women with men living in the same NUTS 2 region using 5,000 independent draws and test whether the correlation in these synthetic couples is similar to the correlation observed within real couples. The distribution of these 5,000 placebo estimates are depicted in Figure 2.1, when the outcome is (a) labour force participation; (b) weekly working hours; and (c) log gross monthly earnings. The vertical lines indicate the baseline estimates from Table 2.1 and Table 2.2. Reassuringly, for each outcome, the placebo coefficients are centred around zero and are always smaller than the true coefficient. They tend to shift even closer towards zero when including the rich set of covariates. This suggests that our main estimates are not driven by regional unobserved heterogeneity.

Figure 2.1: Placebo estimates for rematched couples within regions

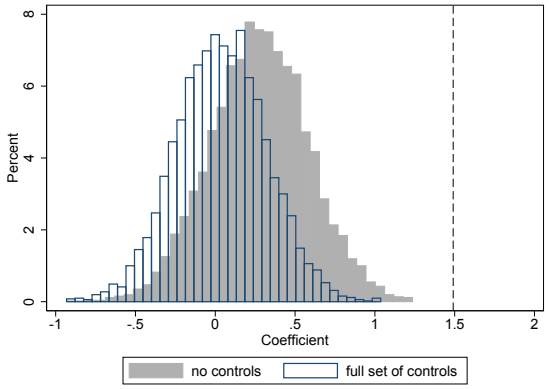
(a) labour force participation



(b) weekly working hours



(c) log gross monthly labour income



Notes: The figures show the distribution of the β_1 coefficients from equation (2.1) estimated in the samples of 5,000 independent random rematches of couples within a NUTS-2 region, i.e. the correlations between the labour market outcomes of women and their randomly matched mothers-in-law. The distributions are shown separately when estimating equation (2.1) without controls and when including the full set of controls shown in Table A2.1. The vertical line denotes our main β_1 estimate from Table 2.1 and Table 2.2. Marginal effects in (a) are calculated at the mean of the independent variables. Regressions are weighted using provided survey weights.

Source: SOEP v.33, Statistisches Bundesamt (2019), own calculation.

2.4.2 Other robustness checks

Systematic recall error First, we check if our results could be driven by a systematic recall error in mothers working status. For example, due to the retrospective reporting, it could be that the partner is more likely to state that his mother was working if he observes that his female partner is participating in the labour force,

even though the mother may have started working later on or not at all.[24] This would result in a positive coefficient even though no (causal) relationship exists.[25]

To overcome this concern, we run the same analyses using an additional constructed smaller SOEP dataset in which we exploit the household panel structure and the follow-up concept of the SOEP. This allows us to directly link individuals to their parents and observe them during their childhood, adolescence, and after they grow up and continue to live in different households. In this follow up subsample, we include all men (i.e. partners) from original SOEP households whose parents we observe at least once during their childhood (age 7 - age 18). We restrict the sample of women with a partner from an original SOEP households to the same survey years as our main estimation sample (2000 - 2017). Overall, this gives us information on 3,611 year observations from 485 women who have a partner from an original SOEP household. We define the mother-in-law as working if we observe her to be working most of the time in regular full or part-time employment when their son was aged between 7 and 18 and non-working otherwise. The set of controls is constructed accordingly (see Table A2.3 for descriptive statistics).[26] The advantage of this SOEP subsample is that there is no reporting error in our data since we observe the mother-in-law's labour force status in the original SOEP households directly. In addition, we can observe the full working history of the mother-in-law. Point estimates in Table 2.8 are larger in magnitude than our main estimates in Table 2.1 and Table 2.2 and highly statistically significant for all outcomes.[27] Having a partner who grew up with a working mother is associated with an increase in the probability to participate in the labour force by about 11 percentage points, an

[24]Note that this concern is mitigated by the fact that the respondent is asked about the type of job the mother hold when he or she was aged 15 not the working status of the mother per se.
[25]Since recall errors tend to increase as respondents are asked to think further back in time (Ebbinghaus; 1894), we additionally conduct the analysis for individuals who were still rather young when they answered the biography questionnaire. The results are very similar to our main estimates.
[26]Note that with this subsample we can use an even more precise measure for household income: We take the average value of household income over the observed period to reduce measurement error induced by transitory income fluctuations.
[27]One potential reason for the larger estimates is that we take modes of the observed labour force participation of the mother, i.e. an indicator equal to one if we observe the mother more often to be working than non-working. Thus, the group of working mothers is likely to have a higher labour force attachment than the group of working mothers in our main estimation sample. The results are robust to various ways to construct the working status of mothers, i.e. using different observation windows, or when using hours worked as a dependent variable. Notably, the coefficients become even larger when using measures of mother's labour supply during childhood. Another potential explanation could be that the couples in the constructed follow-up sample are younger and have smaller children than couples in our main sample (see Table A2.3 for details).

increase in weekly hours worked by about 3 hours (17 percent of mean) and earnings by 80 percent (18 percent relative to mean).

Table 2.8: Female labour market outcomes - follow up subsample

	Labour force participation		Weekly working hours		Log gross monthly labour income	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean of dep. variable	0.531	0.531	16.560	16.560	4.583	4.583
Mother-in-law worked	0.133***	0.114***	2.923**	2.717**	0.752**	0.800***
	(0.040)	(0.043)	(1.377)	(1.166)	(0.309)	(0.260)
Full set of controls		✓		✓		✓
Nbr. observations	3618	3618	3276	3276	3618	3618
R-squared	0.150	0.272	0.293	0.504	0.199	0.360

Notes: Columns (1) and (2) report marginal effects evaluated at the mean of the independent variable. See Table A2.3 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

Different sample restrictions and functional form assumptions Moreover, we conduct different sensitivity analyses regarding sample restrictions and functional form assumptions. For example, we specify an alternative definition for our samples to account for potential overweighting of more frequently observed couples due to the unbalanced structure of our panel; i.e. we weight each couple by the inverse frequency the couple is encountered in the data. Next, we also restrict the age of the partner to be between 25 and 50 to mitigate noise in the working status of the partner related to retirement or education decisions. As a final robustness check, we drop couples where at least one of the partner's place of residence before unification was in East Germany. Individuals who grew up under the former GDR regime developed very different social norms and beliefs regarding maternal employment (e.g. Campa and Serafinelli, *forthcoming*; Bauernschuster and Rainer; 2012). Since almost all individuals who lived in East Germany before reunification report that they grew up with a working mother, it is impossible to differentiate between the effect of growing up in East Germany and the impact of growing up with a working mother. Results reported in Table A2.8 in the Appendix show that our estimated are not sensitive to these additional robustness checks and remain statistically significant.

We also asses the sensitivity of our results to using linear probability models and ordered probit models.[28]

2.5 Conclusion

Overall, the findings of this study shed light on the persistence and importance of social norms for economic outcomes. In particular, this study contributes to the literature on intergenerational links in explaining the raise in female labour force participation. Based on much larger and richer panel data sets then previous studies, we show that female labour market outcomes of partnered women at childbearing age, at the extensive and the intensive margin, are influenced by the labour force participation of the women's own mother and her mother-in-law. However, the influence of the mother-in-law's labour market participation is economically more significant: Having a partner who grew up with a working mother increases the probability that a woman does paid work by about 7 percentage points, it increases her contracted working hours by about 1-2 hours per week, and we can observe an increase in her gross weekly labour earnings of about 40 percent. What we capture when we measure the mothers' labour force participation is the labour market participation during adolescence - a phase when gender stereotypes of children are formed in particular.

In comparison to existing studies, our data sets allow for a particularly detailed focus on various explanations for the intergenerational links in labour market outcomes. First, our study suggests that these links cannot be explained by assortative mating; rather, it can be interpreted as evidence that the partner's preferences play a decisive role for labour supply decisions of women. Second, we show that men brought up by a working mother have much less "traditional" beliefs and attitudes towards working women than other men. However, men who grew up with a working mother have no different household skills or preferences to cooperate in the household, which could have been another explanation.

Further analyses for heterogeneous groups show that the correlation is mainly driven by couples living in more rural areas, Christian women and women with less than three children. Furthermore, it is larger for married women, increases with marriage duration, and seems to be stronger for women who have less education

[28]These additional robustness checks can be obtained from the author upon request.

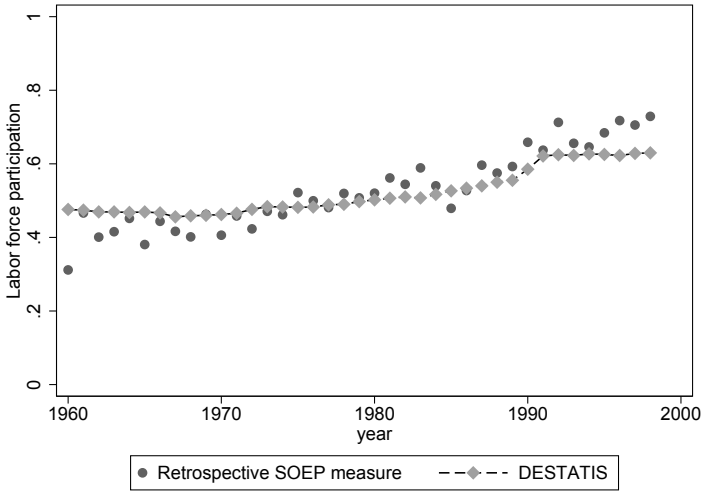
than their partner. Given a decreasing share of couples who get married (Statistisches Bundesamt; 2018b), the overall correlation might slightly decrease for future generations, all else equal. The same might be the case if you consider the rising share of women who are better educated than their partner (Statistisches Bundesamt; 2018a) or the increasing share of nonreligious individuals.

Overall our paper contributes to a small, but growing, literature that examines how attitudes and resulting social norms influence the evolution of the economy, such as female labour force participation. A few studies investigate the intergenerational link of female labour force participation for countries outside the EU. To our knowledge, we are the first showing this based on German data and thus for an economy with a particularly high share of part-time working women. Thus, our results indicate that the intergenerational links also apply to part-time working generations. Our data does not allow us to investigate how the intergenerational link would change if we divide our sample into part-time and full-time working mothers-in-law. Moreover, further research with even richer data sets might help to capture the exposure to different models of reconciling work and family life during adolescence in more detail. This might shed even more light on which combination of work and family life has the strongest influence on children's and their partner's later labour market outcomes once they are adults. However, to our knowledge no such data sets, which would allow an analysis based on a large enough sample, exist.

Apart from this, our analysis shows that all family policy related measures that support maternal labour force participation, such as affordable and available formal day care, all-day schooling, or family friendly work-place policies, might not only have effects on the current workforce of women but also on the future workforce, via the children of these mothers, particularly via their sons. Thus, evaluating such policy measures must also take the effects on the next generation into account - leading to much larger societal benefits when tax returns and social security benefits of the next generation in the labour market are added as well.

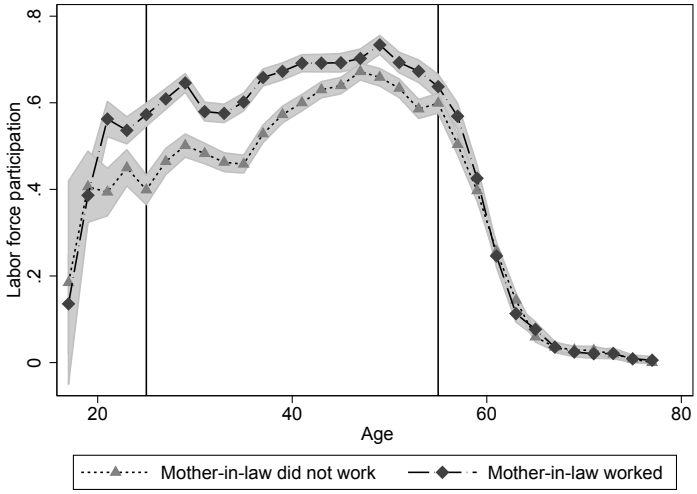
Appendix: Additional figures and tables

Figure A2.1: Comparison of mother's labour force participation in SOEP to administrative statistics



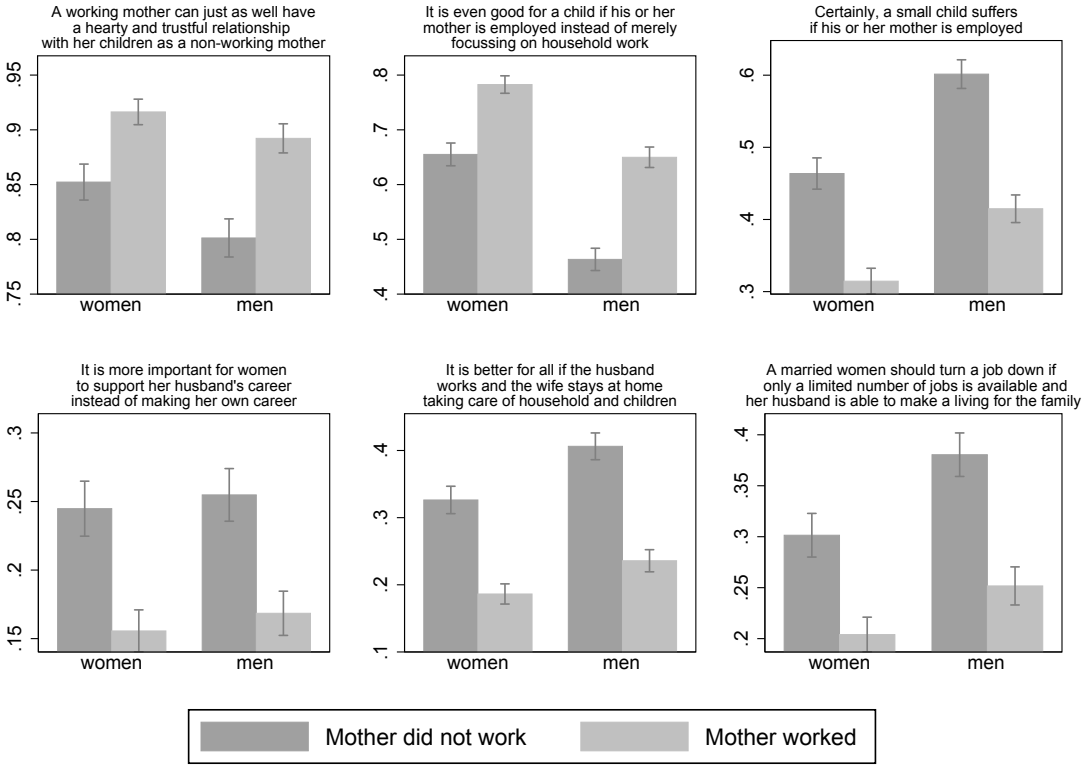
Notes: The figure shows female labour force participation in Germany (1960 - 2000) based on administrative data (Statistisches Bundesamt; 2019) and the retrospective SOEP measure of mothers' labour force participation at age 15.
Source: SOEP v.33, Statistisches Bundesamt (2019), own calculation.

Figure A2.2: Labour force participation over life cycle



Notes: The figure shows female labour force participation over the life cycle (two year age bins) by mother-in-law's working status. The age groups within the vertical lines are included in our main estimation sample. 95 % confidence intervals.
Source: SOEP v.33, Statistisches Bundesamt (2019), own calculation.

Figure A2.3: Stated norms and beliefs



Notes: The histograms show the fraction of women and men agreeing with a statement by own mother's working status.
Source: ALLBUS 2004, 2008, 2012 and 2016, own calculation.

Table A2.1: Descriptive statistics SOEP

	Mean	Std. Dev.	Min.	Max.
Independent variables:				
Own mother worked	0.57	0.49	0.00	1.00
Mother-in-law worked	0.50	0.50	0.00	1.00
Control variables:				
Own characteristics				
Age	41.42	8.31	25.00	55.00
Years of education	12.63	2.70	7.00	18.00
Protestant	0.38	0.49	0.00	1.00
Catholic	0.37	0.48	0.00	1.00
Other religion	0.08	0.27	0.00	1.00
No religion	0.17	0.37	0.00	1.00
Married	0.85	0.36	0.00	1.00
# children	0.86	1.00	0.00	8.00
# children $\leq$ 6 years	0.35	0.66	0.00	5.00
Partner characteristics				
Age	44.46	9.24	19.00	79.00
Gross monthly income	3358.08	2942.02	0.00	159905.00
Years of education	12.67	2.85	7.00	18.00
Protestant	0.33	0.47	0.00	1.00
Catholic	0.36	0.48	0.00	1.00
Other religion	0.07	0.25	0.00	1.00
No religion	0.24	0.43	0.00	1.00
Own parents characteristics				
Mother primary education	0.05	0.22	0.00	1.00
Mother secondary education	0.67	0.47	0.00	1.00
Mother tertiary education	0.28	0.45	0.00	1.00
Father primary education	0.04	0.19	0.00	1.00
Father secondary education	0.64	0.48	0.00	1.00
Father tertiary education	0.32	0.47	0.00	1.00
Father job prestige	56.09	27.38	30.10	216.00
Parents-in-law characteristics				
Mother-in-law primary education	0.05	0.22	0.00	1.00
Mother-in-law secondary education	0.71	0.45	0.00	1.00
Mother-in-law tertiary education	0.24	0.43	0.00	1.00
Father-in-law primary education	0.04	0.19	0.00	1.00
Father-in-law secondary education	0.67	0.47	0.00	1.00
Father-in-law tertiary education	0.29	0.45	0.00	1.00
Father-in-law job prestige	56.86	29.35	30.10	216.00
Regional characteristics				
<20,000 Inhabitants	0.39	0.49	0.00	1.00
20,000-100,000 Inhabitants	0.28	0.45	0.00	1.00
>100,000 Inhabitants	0.33	0.47	0.00	1.00
Unemployment rate	7.70	3.28	1.20	23.70
Employment rate	50.44	4.54	36.70	64.30
GDP per capita	1585.93	220.71	1080.50	3466.90
Share of foreigners	10.01	4.88	2.10	32.30
Size of county (km^2)	809.77	544.82	35.70	2882.06
Day care ratios <3 years	14.01	10.29	0.00	44.10
Day care ratios $\geq$ 3 years	87.42	8.10	54.26	108.80

Notes: The sample includes all cohabiting women aged between 25 and 50 living in West Germany. Descriptive statistics are weighted using provided survey weights.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

Table A2.2: Descriptive statistics ALLBUS

	Mean	Std. Dev.	Min.	Max.
Independent variables:				
Mother-in-law worked	0.48	0.50	0.00	1.00
Control variables:				
Own characteristics				
Age	41.46	8.66	25.00	55.00
Primary education	0.09	0.28	0.00	1.00
Secondary education	0.53	0.50	0.00	1.00
Tertiary education	0.38	0.49	0.00	1.00
Children	0.78	0.42	0.00	1.00
Partner characteristics				
Age	44.55	9.62	19.00	83.00
Income (in categories)	13.81	4.61	0.00	22.00
Primary education	0.05	0.22	0.00	1.00
Secondary education	0.47	0.50	0.00	1.00
Tertiary education	0.48	0.50	0.00	1.00
Protestant	0.29	0.45	0.00	1.00
Catholic	0.25	0.43	0.00	1.00
Other religion	0.07	0.25	0.00	1.00
No religion	0.40	0.49	0.00	1.00
Parents-in-law characteristics				
Mother-in-law primary education	0.32	0.47	0.00	1.00
Mother-in-law secondary education	0.52	0.50	0.00	1.00
Mother-in-law tertiary education	0.15	0.36	0.00	1.00
Father-in-law primary education	0.14	0.35	0.00	1.00
Father-in-law secondary education	0.58	0.49	0.00	1.00
Father-in-law tertiary education	0.28	0.45	0.00	1.00
Regional characteristics				
<20,000 Inhabitants	0.64	0.48	0.00	1.00
20,000-100,000 Inhabitants	0.10	0.30	0.00	1.00
>100,000 Inhabitants	0.26	0.44	0.00	1.00

Notes: The sample includes all cohabiting women aged between 25 and 50 living in West Germany.
Source: ALLBUS 2002 - 2016, own calculation.

Table A2.3: Descriptive statistics SOEP - follow up subsample

	Mean	Std. Dev.	Min.	Max.
Independent variables:				
Mother-in-law worked	0.52	0.50	0.00	1.00
Control variables:				
Own characteristics				
Age	34.04	6.15	25.00	55.00
Years of education	12.39	2.59	7.00	18.00
Married	0.78	0.41	0.00	1.00
# children	1.11	0.96	0.00	5.00
# children $\leq$ 6 years	0.65	0.75	0.00	3.00
Partner characteristics				
Age	35.05	5.35	19.00	50.00
Income	7.67	1.62	0.00	9.85
Years of education	12.74	2.73	7.00	18.00
Protestant	0.26	0.44	0.00	1.00
Catholic	0.38	0.48	0.00	1.00
Other religon	0.15	0.36	0.00	1.00
No religon	0.21	0.41	0.00	1.00
Parents-in-law characteristics				
Mother-in-law years of education	10.68	2.26	7.00	18.00
Father-in-law years of education	11.51	2.57	7.00	18.00
Log household income	7.10	0.46	5.74	8.73
House owner	0.54	0.50	0.00	1.00
Regional characteristics				
<20,000 Inhabitants	0.44	0.50	0.00	1.00
20,000-100,000 Inhabitants	0.27	0.44	0.00	1.00
>100,000 InhabitantsS	0.29	0.45	0.00	1.00
Unemployment rate	7.84	3.24	2.00	20.10
Employment rate	50.58	4.40	38.30	64.30
GDP per capita	1574.81	229.14	1113.10	3466.90
Share of foreigners	9.74	4.87	2.30	32.30
Size of county (km^2)	801.69	507.21	44.89	2882.06
Day care ratios <3 years	14.29	11.33	0.00	46.20
Day care ratios $\geq$ 3 years	87.06	8.13	56.77	105.22

Notes: The sample includes all cohabiting couples living in West Germany where the women is aged between 25 and 50. Descriptive statistics are weighted using provided survey weights.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

Table A2.4: Female labour force participation - marginal effects of controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean of dep. variable	0.626	0.626	0.626	0.626	0.626	0.626	0.626
Partner's age	0.026***		0.027**	0.030***	0.026***	0.030***	0.031***
	(0.008)		(0.010)	(0.011)	(0.008)	(0.011)	(0.011)
Partner's age squ.	-0.000**		-0.000*	-0.000**	-0.000**	-0.000**	-0.000**
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partner's income	0.070***		0.077***	0.059***	0.069***	0.055***	0.058***
	(0.017)		(0.017)	(0.018)	(0.017)	(0.018)	(0.018)
Partner's income squ.	-0.007***		-0.008***	-0.006***	-0.007***	-0.006***	-0.006***
	(0.002)		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Partner's years of education	0.011***		-0.003	0.000	0.009**	0.001	0.002
	(0.004)		(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Partner protestant	*Ref.*		*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Partner catholic	0.024		0.020	0.014	0.027	0.017	0.019
	(0.026)		(0.031)	(0.031)	(0.026)	(0.030)	(0.030)
Partner other religion	-0.089**		0.050	0.080	-0.068	0.089	0.093
	(0.042)		(0.058)	(0.058)	(0.044)	(0.057)	(0.057)
Partner no religion	0.071***		0.064**	0.050	0.073***	0.052	0.056*
	(0.026)		(0.031)	(0.032)	(0.026)	(0.032)	(0.031)
Married	-0.238***		-0.226***	-0.117***	-0.238***	-0.115***	-0.118***
	(0.024)		(0.024)	(0.025)	(0.024)	(0.025)	(0.025)
Age		0.011	0.007	0.039***		0.038***	0.039***
		(0.010)	(0.013)	(0.014)		(0.014)	(0.014)
Age squ.		-0.000	-0.000	-0.001***		-0.001***	-0.001***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Years of education		0.024***	0.027***	0.028***		0.030***	0.031***
		(0.004)	(0.004)	(0.005)		(0.005)	(0.005)
Protestant		*Ref.*	*Ref.*	*Ref.*		*Ref.*	*Ref.*
Catholic		0.009	0.006	0.014		0.011	0.013
		(0.025)	(0.028)	(0.029)		(0.028)	(0.028)
Other religion		-0.151***	-0.160**	-0.164**		-0.175***	-0.179***
		(0.043)	(0.064)	(0.065)		(0.064)	(0.063)
No religion		0.065**	0.010	0.002		-0.002	0.002
		(0.026)	(0.032)	(0.034)		(0.033)	(0.033)
# children				-0.084***		-0.086***	-0.084***
				(0.011)		(0.011)	(0.011)
# children $\leq$ 6 years				-0.155***		-0.155***	-0.157***
				(0.014)		(0.014)	(0.014)
<20,000 Inhabitants				0.000		0.000	0.000
				(0.000)		(0.000)	(0.000)
20,000-100,000 Inhabitants				0.023		0.027	0.028
				(0.024)		(0.024)	(0.026)
>100,000 Inhabitants				-0.004		0.003	0.009
				(0.028)		(0.027)	(0.041)
Father-in-law primary education					*Ref.*	*Ref.*	*Ref.*
Father-in-law secondary education					-0.080	-0.063	-0.065
					(0.057)	(0.061)	(0.061)
Father-in-law tertiary education					-0.106*	-0.091	-0.091
					(0.061)	(0.063)	(0.063)

Continued on next page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mother-in-law primary education					*Ref.*	*Ref.*	*Ref.*
Mother-in-law secondary education					0.111*	0.059	0.069
					(0.059)	(0.054)	(0.054)
Mother-in-law tertiary education					0.145**	0.098*	0.108*
					(0.063)	(0.058)	(0.059)
Father-in-law job prestige					0.000	-0.000	-0.000
					(0.000)	(0.000)	(0.000)
Father primary education						*Ref.*	*Ref.*
Father secondary education						0.032	0.022
						(0.070)	(0.070)
Father tertiary education						0.004	-0.006
						(0.072)	(0.072)
Mother primary education						*Ref.*	*Ref.*
Mother secondary education						-0.028	-0.031
						(0.056)	(0.055)
Mother tertiary education						-0.052	-0.052
						(0.059)	(0.059)
Father job prestige						0.000	0.000
						(0.000)	(0.000)
Unemployment rate							0.010*
							(0.005)
Employment rate							0.013***
							(0.004)
GDP p.c.							0.001
							(0.001)
Share of foreigners							-0.003
							(0.003)
Size of county							-0.000
							(0.000)
Childcare ratios <3 years							-0.001
							(0.002)
Childcare ratios ≥3 years							-0.001
							(0.002)
Observations	22814	22814	22814	22814	22814	22814	22814
R-squared	0.050	0.038	0.062	0.120	0.053	0.125	0.129

Notes: Marginal effects calculated at the mean of the independent variables. See Table A2.1 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

Table A2.5: Female labour force participation - ALLBUS data

	(1)	(2)	(3)	(4)	(5)
Mean of dep. variable	0.644	0.644	0.644	0.644	0.644
Mother-in-law worked	0.070***	0.095***	0.090***	0.072***	0.062***
	(0.018)	(0.017)	(0.017)	(0.018)	(0.018)
Controls					
Partner's characteristics	✓		✓	✓	✓
Own characteristics		✓	✓	✓	✓
Household characteristics				✓	✓
Parents-in-law's characteristics					✓
Observations	3525	3526	3525	3525	3525
R-squared	0.054	0.059	0.065	0.098	0.102

Notes: Marginal effects calculated at the mean of the independent variables. See Table A2.2 for list of control variables. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: ALLBUS 2000-2016, own calculation.

Table A2.6: Heterogeneity by characteristics that reflect relative bargaining positions

	By marital status		By marriage duration		By years of education relative to partner		By job prestige of own father relative to partner's father	
	married	unmarried	< median	≥ median	≤ partner	> partner	≤ partner	>partner
Panel A - Labour force participation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother-in-law worked	0.081***	0.015	0.047	0.135*	0.082***	0.054	0.085***	0.067**
	(0.026)	(0.028)	(0.029)	(0.077)	(0.027)	(0.036)	(0.031)	(0.030)
Own mother worked	0.032	-0.012	0.006	-0.018	0.018	0.036	0.046	0.005
	(0.026)	(0.027)	(0.027)	(0.064)	(0.027)	(0.036)	(0.030)	(0.032)
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	19527	3282	5107	1190	15047	7767	12062	10752
Adj. R-squared	0.120	0.169	0.230	0.363	0.124	0.171	0.156	0.126
Panel B - Weekly working hours	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother-in-law worked	1.614**	-0.124	1.011	4.922**	2.179***	0.196	2.599***	0.821
	(0.752)	(1.019)	(0.953)	(2.133)	(0.827)	(1.077)	(0.879)	(0.937)
Own mother worked	0.920	-0.573	-0.246	-1.040	0.013	1.381	1.412	-0.145
	(0.771)	(1.019)	(0.924)	(1.961)	(0.840)	(1.063)	(0.877)	(0.991)
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	17022	2891	4607	1040	13111	6802	10536	9377
Adj. R-squared	0.225	0.280	0.355	0.457	0.258	0.298	0.290	0.263
Panel C - Log gross monthly labour income	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother-in-law worked	0.429***	-0.003	0.214	0.909*	0.499***	0.183	0.580***	0.272
	(0.155)	(0.184)	(0.176)	(0.466)	(0.167)	(0.220)	(0.185)	(0.185)
Own mother worked	0.388**	-0.038	-0.004	-0.136	0.315*	0.283	0.544***	0.101
	(0.155)	(0.172)	(0.159)	(0.413)	(0.166)	(0.216)	(0.179)	(0.199)
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	19598	3216	5107	1190	15047	7767	12062	10752
Adj. R-squared	0.176	0.212	0.275	0.387	0.191	0.218	0.220	0.182

Notes: Columns (1) to (8) of Panel A report marginal effects calculated at the mean of the independent variables. See Table A2.1 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

Table A2.7: Heterogeneity by characteristics of women

	By municipality size (# Inhabitants)			By religion			By number of children in household		
	<20,000	20,000-100,000	>100,000	catholic or protestant	other religion	no religion	no children	1 or 2 children	3 and more children
Panel A - Labour force participation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Mother-in-law worked	0.078**	0.108***	0.055	0.079***	0.027	0.025	0.074***	0.072**	0.011
	(0.036)	(0.037)	(0.037)	(0.026)	(0.067)	(0.038)	(0.025)	(0.029)	(0.055)
Own mother worked	0.024	0.011	0.017	0.021	0.132*	-0.003	0.003	0.036	0.119**
	(0.036)	(0.037)	(0.037)	(0.026)	(0.069)	(0.039)	(0.025)	(0.029)	(0.051)
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	8763	6702	7349	16917	1897	4000	9423	11201	2190
Adj. R-squared	0.142	0.176	0.141	0.123	0.251	0.169	0.104	0.075	0.187
Panel B - Weekly working hours	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Mother-in-law worked	1.133	2.556**	0.983	1.423*	1.482	0.997	1.497*	1.592*	0.419
	(1.098)	(1.012)	(1.153)	(0.770)	(1.505)	(1.384)	(0.905)	(0.831)	(1.403)
Own mother worked	0.821	-0.165	0.455	0.620	3.693**	-0.401	0.551	0.699	4.077***
	(1.111)	(0.987)	(1.170)	(0.776)	(1.744)	(1.486)	(0.924)	(0.822)	(1.443)
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	7653	5921	6339	14760	1723	3430	8229	9757	1927
Adj. R-squared	0.259	0.318	0.275	0.245	0.386	0.272	0.194	0.134	0.220
Panel C - Log gross montly labour income	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Mother-in-law worked	0.324	0.543**	0.346	0.419***	0.003	0.235	0.367**	0.436**	0.161
	(0.220)	(0.214)	(0.229)	(0.158)	(0.323)	(0.255)	(0.167)	(0.191)	(0.371)
Own mother worked	0.343	0.145	0.350	0.290*	1.100***	0.097	0.174	0.433**	0.866**
	(0.220)	(0.203)	(0.235)	(0.159)	(0.344)	(0.261)	(0.169)	(0.190)	(0.357)
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	8763	6702	7349	16917	1897	4000	9423	11201	2190
Adj. R-squared	0.183	0.241	0.208	0.171	0.328	0.201	0.142	0.108	0.200

Notes: Columns (1) to (9) of Panel A report marginal effects calculated at the mean of the independent variables. See Table A2.1 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

Table A2.8: Sensitivity checks

	Inverse probability weighting		Age restriction partner		Living in West Germany in 1989	
Panel A - Labour force participation	(1)	(2)	(3)	(4)	(5)	(6)
Mother-in-law worked	0.066***	0.059***	0.087***	0.085***	0.072***	0.075***
	(0.018)	(0.019)	(0.024)	(0.025)	(0.023)	(0.023)
Own mother worked		0.025		0.030		0.026
		(0.019)		(0.025)		(0.023)
Full set of controls	✓	✓	✓	✓	✓	✓
Observations	22814	22814	16122	16122	21666	21666
R-squared	0.054	0.130	0.058	0.153	0.052	0.132
Panel B - Weekly working hours	(1)	(2)	(3)	(4)	(5)	(6)
Mother-in-law worked	1.866***	1.355**	2.179***	1.731**	1.752**	1.475**
	(0.637)	(0.592)	(0.809)	(0.709)	(0.754)	(0.694)
Own mother worked		0.260		0.203		0.509
		(0.599)		(0.731)		(0.705)
Full set of controls	✓	✓	✓	✓	✓	✓
Observations	19913	19913	14208	14208	18870	18870
R-squared	0.111	0.256	0.134	0.314	0.112	0.261
Panel C - Log gross monthly labour income	(1)	(2)	(3)	(4)	(5)	(6)
Mother-in-law worked	0.401***	0.306***	0.576***	0.483***	0.440***	0.392***
	(0.122)	(0.119)	(0.161)	(0.147)	(0.151)	(0.141)
Own mother worked		0.250**		0.299**		0.319**
		(0.117)		(0.149)		(0.141)
Full set of controls	✓	✓	✓	✓	✓	✓
Observations	22814	22814	16122	16122	21666	21666
R-squared	0.079	0.184	0.089	0.217	0.079	0.191

Notes: Columns (1) to (6) of Panel A report marginal effects evaluated at the mean of the independent variables. See Table A2.1 for list of control variables. Regressions are weighted using provided survey weights. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
Source: SOEP v33, Statistisches Bundesamt (2019), own calculation.

Chapter 3

Immigration and the evolution of local social norms*

3.1 Introduction

Social norms influence individual behavior and aggregate outcomes (e.g. Giavazzi et al.; 2013), this also applies to the labor supply decisions of women. However, important questions on the origins and the evolution of social norms remain unanswered. A series of seminal papers has established the importance of technology (Alesina et al.; 2013), social movements (Goldin; 1990), and of the family (e.g. Fernández et al.; 2004) as long-term drivers of changes in norms. Focusing on the dynamic evolution of norms, Fernández (2013) and Fogli and Veldkamp (2011) put forth a model of social learning, where norms and women's labor supply decisions depend on a on a noisy public signal generated by women's decisions in the preceding generation (Fernández; 2013) or local information transmission[1] about the long-term costs of working for children and the family (Fogli and Veldkamp; 2011).

This paper presents causal evidence on the evolution of local social norms. We examine whether large inflows of immigrants speaking the same language, but with different gender identities and social norms can trigger the local evolution of norms and behavior of natives. We measure norms related to gender and the beliefs about the long-term costs of working that are reflected in female labor supply decisions. Specifically, we study effects on weekly hours worked and on relative hours worked within households, i.e. the share of hours worked by the women. Using a combination of administrative, census and survey data sets, we carefully trace the evolution of these effects over time, examining heterogeneities and different potential channels. In particular, we provide direct evidence on the evolution of stated gender norms

*This chapter is based on joint work with Felix Weinhardt.

[1]This local information transmission generates changes in women's labor supply that are geographically heterogeneous, locally correlated, and smooth in the aggregate.

and beliefs about detrimental effects of working women on children and the family, local interaction between immigrants and natives, as well as on the endogenous local expansion of publicly funded child care infrastructure.

We exploit the setting of German reunification to investigate the effects of immigration on the evolution of local social norms. This setting is uniquely suited for two reasons. First, East and West Germans developed very different social norms and beliefs related to the role of women and potential long-term costs of working on children and the family, resulting in much higher female labor supply in the East. This is because, as argued in the existing literature, the different political-economic systems imposed on East and West Germany during the divided years led to different gender norms, identities of women, and beliefs about how maternal employment affects children and the family: individuals who grew up under the regime of the German Democratic Republic (GDR) are less "traditional" than individuals in West Germany (Campa and Serafinelli; 2019; Lippmann et al.; forthcoming; Bauernschuster and Rainer; 2012; Beblo and Görges; 2018).[2] Second, the collapse of the Wall separating East and West Germany in 1989 resulted in a sudden and unexpected large inflow of several million people who were socialized under the regime of the GDR into the territory of the former West Germany.These first-wave migrants were previously sealed off from western influences and had limited information about local differences in economic conditions and social norms within the West. We argue, and provide supporting evidence that this gives rise to meaningful and quasi-random variation in the presence of East Germans in the West.

The combination of the large inflows of East Germans and different social norms present a unique opportunity to better understand the evolution of local social norms in West Germany. East Germans were not perceived as foreigners in West Germany and are very similar in many respects - but very different in women's labor supply and their view regarding the role of women and beliefs about potential long run costs of maternal employment for children and the family. As a result, we think that this unique historical setting gets us as close as is reasonably possible to the idea of an ideal experiment for identifying local social learning effects, i.e. the evolution of local social norms: Exogenously switching social norms in large shares of the local population and then studying changes in norms and behavior in the remaining local population.

[2]We describe these differences in detail in Section 3.2.1.

To estimate effects, we use cross-regional variation in the inflow intensity within different empirical models. Our main empirical model is a difference-in-differences-event-study design that compares average changes in working hours of women (relative to their partner in the household) in high vs. low inflow regions in the years before and after German reunification. The assumption underlying this specification is that first-wave East German migrants did not select their destination in West Germany based on existing trends in local social norms. To alleviate remaining concerns about potentially endogenous location choices of East Germans, we also analyze local effects by distance to the former border. Here, we estimate effects on differences in women's outcomes and gender gaps as a function of distance in post- relative to pre-reunification years.

Our main finding is that the presence of more East Germans with less traditional gender norms changes the behavior of local women: We find significant and persistent increases in the hours worked and in the Western women's share of within household working hours. We move on to examine in detail the time-patterns of the dynamic adjustments of the local changes in female behavior. We find no reaction in the short-run, but persistent reactions at the intensive margin in the medium- and long-run. These time-patterns are consistent with local social learning effects. In terms of heterogeneity, we find effects that condition on labor force participation are strongest for women with children above the age of three. In contrast, effects at the extensive margin appear to be strongest for women with young children.

We present a battery of robustness and placebo checks to support the validity of our findings. In particular, we examine if our estimates reflect changes in local demand for employment or endogenous compositional changes. In addition, we show that the results are robust to specifications including different sets of individual-level controls, to different region-specific trend specifications, different definitions of how we measure exposure to East Germans, different sample restrictions and placebo exercises.

Using supplementary data sources, we examine different potential mechanisms that could explain the positive labor supply responses of West German women. We find that West Germans exposed to a large influx of East Germans, adjust their beliefs about how women's employment affects children and marriage. In addition, using individual-level information on friendship networks, we show that East Germans only slowly befriend with West Germans, which is especially true for

stay-home mothers. This is consistent with our finding of no effects in the short run. Moreover, we find that the rate of intermarriage of West Germans with East Germans remains very low throughout. This speaks in favor of theories of local social learning and against household bargaining explanations. Next, we document that the presence of East Germans has led to local-level increases in the provision of publicly funded child care. In Germany, the provision of publicly funded child care is governed at the local level and shortages of public provision are shown to affect female labor supply. We find that counties with a higher influx of gender-egalitarian East Germans started expanding child care provision more quickly starting several years after reunification. This immigration-induced change in the publicly funded family infrastructure potentially amplifies, or even triggers some of the labor supply responses we find in the medium- and long-term.

This project combines two strands of the existing literature. First, the existing literature that focuses on the impact of immigration on receiving regions such as political outcomes (e.g. Harmon; 2018), the level of public good provision (e.g. Alesina et al.; 1999), or preferences for redistribution (e.g. Dahlberg et al.; 2012). We add to this literature by exploiting the unique natural experiment of German reunification to study effects of immigration on a different outcome of interest: social norms regarding female labor supply and beliefs about how maternal employment affects children and the family.

Second, we provide quasi-experimental evidence on theories of identity formation and social learning (e.g. Akerlof and Kranton; 2000; Fogli and Veldkamp; 2011; Fernández; 2013). These theoretical models highlight the importance of local information transmission and behavioral mitigation in the process of identity formation and of social learning. This paper contributes to the growing body of empirical evidence showing that changes in the labor supply decisions of women can have large social multiplier effects on current and future generations of women. While there are various studies establishing strong intergenerational correlations between the labor supply decision of one generation and the next (e.g. Fernández et al.; 2004; Olivetti et al.; forthcoming), the previous literature assessing the question of identity formation and social learning in a causal manner is sparse. Alesina et al. (2013) find that descendants of societies where the plow was used as predominant agricultural tool have lower female labor market participation today, as well as less egalitarian gender norms. Fernández et al. (2004) use variation in the mobilization rates of

men in World War II to provide suggestive evidence that female labor supply shocks in one generations have long run consequences on the following generation due to changes in social norms. On the individual level, Maurin and Moschion (2009) and Mota et al. (2016) study short-term social learning effects and find positive effects of the labor supply decision of female neighbours on women's labor supply at the extensive margin. Nicoletti et al., (forthcoming) show that there are substantial long-run family peer effects (of sisters) on a mother's labor supply decision.

Methodologically, this paper is related to the literature examining labor supply effects on natives of unexpected geographically localized inflows of migrants, starting with Card (1990). Glitz (2012) studies effects of Eastern and Central European "ethnic German" immigrants on West Germans working full-time in 1996-2001 by exploiting random geographical variation due to placement policies. He finds effects for displacement of native workers. In contrast to the immigrants from East Germany that we study, "ethnic Germans" were very different to West Germans, often did not speak the language, live in segregated communities, and indeed should be considered as "foreign immigrants" as pointed out by Zimmermann (1999).[3] Dustmann et al. (2016) study short-term local labor market responses to the sudden inflow of mostly unskilled Czech workers along the German-Czech border after reunification. They find evidence for displacement and that these effects are driven by changes in "inflows" to jobs rather than "outflows" of existing workers. In contrast to this literature, we study female and household-level labor supply decisions in reaction to an influx of East Germans speaking the same language and of similar education levels. Moreover, we document effects in the medium- and long-term. Borjas (2006) points out that local effects disperse over time and space. Last, but not least, we provide direct survey-based evidence showing adjustments to local social norms and beliefs.[4]

In sum, we believe this paper makes two important contributions to the existing literature. First, we document that immigrants with different social norms and beliefs can trigger the evolution of social norms and behavior in receiving regions.

[3]Earlier papers do not find these negative effects on labor force participation for Germany (Bonin; 2005; D'Amuri et al.; 2010).

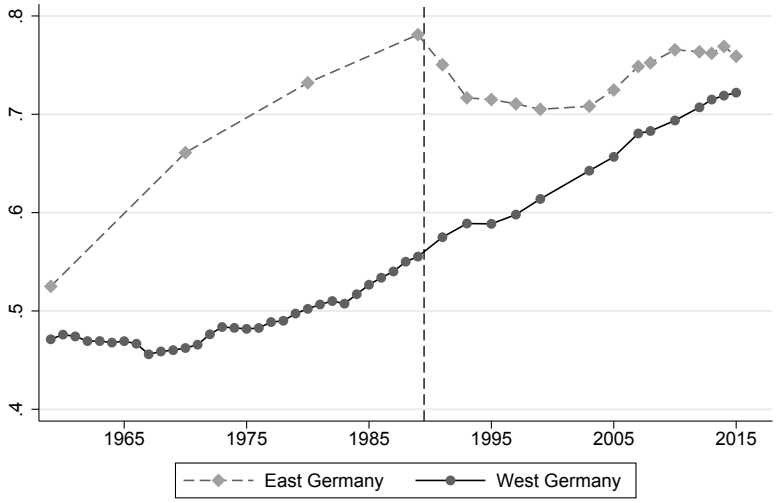
[4]This paper is also related to a wider literature that uses German reunification to test economic theory: Redding and Sturm (2008) and Ahlfeldt et al. (2015) estimate the importance of market access for economic development at the region- and density at the within-city level. Burchardi and Hassan (2013) show that West Germans with social ties to the East experienced higher wage growth post reunification. Bursztyn and Cantoni (2016) study consumption behavior in reunified East Germany and Lichter et al. (2016) trust and economic outcomes.

The dynamics that we find support theories of identity formation and social learning that will eventually result in uniform equilibrium outcomes. Second, we document that immigrants might affect natives, even with little direct interaction, by changing the local infrastructure. This finding has additional policy relevance at it implies that governments can affect the evolution of local social norms by increasing public spending in the family infrastructure.

3.2 Female labor supply, German reunification and the first wave of migration

The following section places the empirical analysis of this paper in context by providing information on patterns of women's labor supply and family policies in East and West Germany before and after reunification. A more detailed discussion can be found in section B3.2 in the Appendix. In addition, we introduce the first wave of East-to-West migration after the fall of the wall, which we use to examine behavioral changes of women in West Germany.

Figure 3.1: Female labor force participation rates 1959 - 2015



Notes: The figure shows labor force participation rates of women aged 15 - 65 in East and West Germany over time. The vertical line indicates German reunification in 1989.
Sources: Statistisches Amt der DDR (1996-1990), Statistisches Bundesamt (2017), Microcensus (1991 - 2015), own calculation.

3.2.1 Female labor supply in East and West Germany

During the divided years[5] policies for women and families as well as economic work incentives for women differed greatly between East and West Germany (e.g. Trappe; 1996), resulting in very different patterns of female labor supply and child care infrastructure.

As shown in Figure 3.1, women's labor force participation in the former GDR increased sharply in the 1970s and 1980s. By 1989 about 78 % of women in the working age population[6] participated in the labor force (91 % including women still in education), 27 % of them in part-time, usually working between 30 and 35 hours. To improve reconciliation of work and family life, the provision of publicly funded child care was massively expanded, reaching almost universal coverage in 1989 (see Figure A3.1).[7]

In West Germany, on the other hand, policies and social norms set strong incentives to live within traditional role patterns, i.e. the traditional "breadwinner and non-employed housewife" model (e.g. Wippermann; 2015). Women usually either stayed at home after they had children or entered part-time employment after an extended break. As shown in Figure 3.1, in 1989, about 55 % of women participated in the labor force working for on average 35 hours per week (average hours of all women amount to a about 18 hours per week). The share of mothers[8] participating in the labor force (47 %) and the hours worked (31 hours for employed mothers and 13 hours overall) was even lower and full-time employment was rare (23 %).[9] There was hardly any provision of publicly funded child care for children under the age of three and school-aged children before reunification, with the exception of West

[5]Following the World War II, Germany was divided into four zones. The zones occupied by Great Britain, France and the United States, generally located in the western, northwestern and southern parts became West Germany (Federal Republic of Germany) in 1949. The zone occupied by the Soviet Union eventually became East Germany (German Democratic Republic, GDR). Berlin, located within Soviet territory, was also divided into east and west zones. Starting in 1961, the border separating West and East Germany became sealed, to prevent further East-to-West migration. Prior to the construction of the Berlin Wall in 1961, there remained some possibilities for civilians to cross the border.

[6]In the former GDR, this was defined as all women between the age of 15 and 60 and 5/12 of women aged between 14 and under age 15 (Statistisches Amt der DDR; 1950–1990).

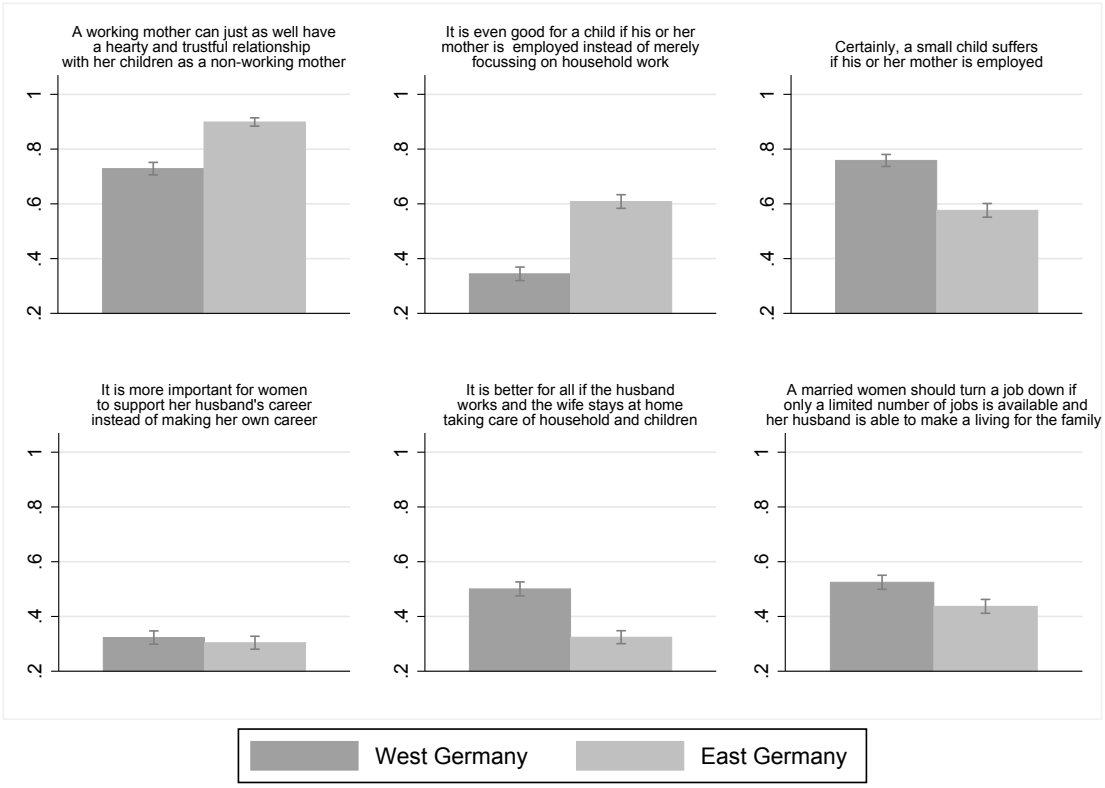
[7]By 1989 about 80 % of children under the age of three and 98 % of children above the age of three attended publicly funded child care, mainly in full-time. After-school programs were attended by 85 % of primary-school-aged children. In urban regions, the respective shares were almost 100 %.

[8]Defined as women with children under the age 18 in the household.

[9]See Appendix Figures B3.3, B3.2 and B3.4 for details.

Berlin.[10] The consequences of maternal employment and formal child care for children and marriage were subject to a heated public, political and scientific debate (e.g. Schütze; 1986; Fthenakis; 1989). As shown in Figure 3.2 in 1991[11], about two-thirds of the West German population agreed with the statement that a small child will certainly suffer if his or her mother is employed. About one-third of the West German population states that a working mother cannot have the same hearty and trustful relationship with her child than a non-working mother.

Figure 3.2: Social norms and beliefs of West and East Germans in 1991



Source: The figure shows the fraction of individuals agreeing with a certain statement by East and West Germans in 1991.
Notes: ALLBUS 1991, own calculation

[10] In 1990 almost 30 % of available child care places in West Germany were provided in West Berlin. In our analysis, we exclude West Berlin.
[11] We are not aware of any data set containing representative information on beliefs and attitudes before reunification.

Previous studies show that the different politico-economic systems imposed on East and West Germany causally[12] triggered the evolution of different social norms regarding working women. For example, the results by Lippmann et al. (forthcoming) suggest that women in East Germany can earn more than their husband without putting their marriage at risk, having to do more housework ("doing gender" hypothesis) or withdrawing from the labor market. Using a spatial discontinuity at the border, Campa and Serafinelli (2019) show that women in East Germany rate their career success to be more important than women in West Germany. Lippmann and Senik (2018) provide evidence on smaller gender gaps in math in East relative to West Germany and several studies show that East and West Germans exhibit strikingly different attitudes regarding the appropriate role of women, have different beliefs about the potential costs of maternal employment for children and exhibit different gender gaps in preferences for work (e.g. Bauernschuster and Rainer; 2012; Beblo and Görges; 2018). Most of these studies do not find convergence of social norms over time. East Germans still have different social norms after moving to West Germany.

3.2.2 East to West Migration

A series of unforeseen political events and large-scale public demonstrations cumulated in the fall of the Berlin wall on November 9, 1989 and the formal reunification of West and East Germany on October 3, 1990. Decades of East-to-West migration followed.

Extent of Immigration We rely on administrative records from all West-German registration offices to measure immigration from the East (BBSR; 2017). In Germany, by law (Bundesmeldegesetz §17) every person has to register any change in their place of residence with the registration authorities within two weeks after moving. From these records, we can construct exact measures of migration by age group and year.[13] Panel (a) of Figure 3.3 shows the total migration flows over the years 1950 - 2015. It is evident that immigration from East Germany was almost completely prevented during the period of the Wall, i.e. from August 1961 to November

[12]Note that to examine social learning effects after German reunification in West Germany, we do not have to rely on this causality assumption. For our purpose it does not really matter why social norms and the labor supply decision of women are different.

[13]Unfortunately, we have no information about the sex composition of immigrants, i.e. we can not differentiate between inflows of East German men and East German women.

1989. Within three years after the sudden collapse of the Wall almost 1.05 Million people immigrated from East to West Germany. This number corresponds to about 6.5 % of the population in the former GDR in 1989 and about 1.7 % of the population in West Germany. In our analysis we focus on this sudden initial wave of immigration from East Germany into West Germany in the three years after the fall of the wall.[14]

First-Wave Immigration We focus on the first-wave immigrants for three reasons.[15] First, this ensures that immigrants were socialized under the former GDR regime. As discussed in detail in Section B3.2 in the Appendix, individuals who grew up in reunified East Germany were exposed to different family policies and female labor market patterns, e.g. publicly funded child care provision was massively reduced after reunification. Second, a large fraction of the early migrants stayed in the region where they first immigrated to in West Germany. We estimate the share of early migrants who stayed for 10 years or longer in the region they were first observed to be around 75-85 %.[16] This is important because social learning likely takes time. Third, and most importantly, we show in the following that the first wave of immigrants from East Germany were primarily driven by distance and fairly unrelated to the economic conditions in the receiving counties.

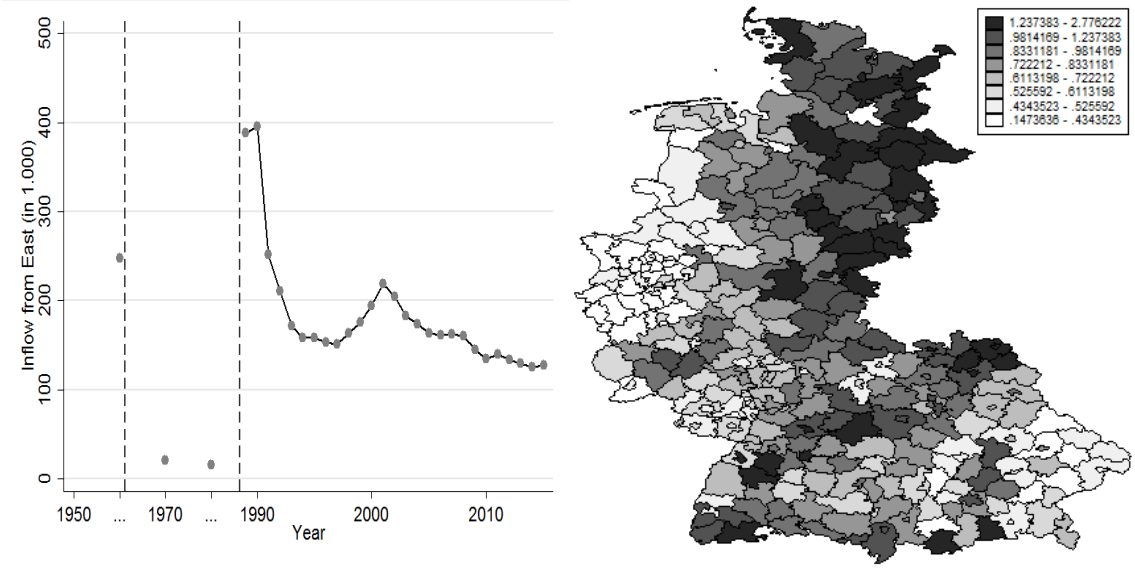
Location Decisions of Migrants Panel (b) of Figure 3.3 maps the inflows in 1991 relative to the population in each county. It is directly evident that the distance to the border is a key predictor of location choice. We provide two additional pieces of evidence that first-wave migrants, who had previously been sealed off from Western influence, were mostly uninformed: First, Figure A3.2 plots the county-level inflow share against the distance to the former border: early migration flows are strongly determined by distance. Adjusting for observable characteristics of the receiving counties using the 1987 Population Census and other administrative data (Bertram et al.; 1993) on the county-level barely changes the estimated slope

[14]Due to differences in local data availability, we base much of our results on inflows in 1991. We do not find significant differences in location decisions within these early years, where data is available.

[15]The historical literature has identified two waves of emigration out of East Germany. We study effects of the "first-wave" of migrants, which was largely uninformed. Hunt (2006) and Fuchs-Schündeln and Schündeln (2009) examine migration patterns post reunification. Fuchs-Schündeln and Schündeln (2009) show that migrants in the second wave (after 1997/98) were more selected by age and education.

[16]This estimate is based on representative data from the German Socio-Economic Panel Study (Goebel et al.; 2019). See section 3.5 for details.

Figure 3.3: Immigration from East to West Germany



(a) Number of immigrants over time (b) Inflows in 1990-1991

Notes: The figures plots (a) the number of immigrants from East to West Germany over time. The vertical lines indicate the construction of the wall in 1961 and the fall of the wall in 1989; and (b) the inflow from East Germany as share of the local county-level population in 1990.
Source: BBSR (2017), German Statistical Offices, own calculation.

coefficient. In contrast, there is no distance-relation for immigration from other West German counties (West-West mobility). Both of this holds within states. Second, we examine balancing of migration in Table A3.2.[17] In contrast to early East-to-West migration, West-West mobility during the same years can be explained very well by observable county characteristics. This holds in particular when including state fixed effects. West-West mobility is later used for placebo checks.

[17]Note that in our main empirical analysis, we do not need regions that received high inflows to be similar to regions that received lower inflows.

3.3 Empirical framework

We use a combination of administrative and survey data to study local social learning effects in West Germany following German reunification. The various data sets come at different levels of aggregation and we always use the lowest-level possible.[18]

3.3.1 German Microcensus, sample and outcomes

Our main analysis is based on data from the German Microcensus, an annual household survey that samples one percent of the German population. The German Microcensus is the largest annual household survey in Europe and contains various information on labor market outcomes and socioeconomic characteristics. If selected, households are required to respond by law.

In our analysis, we use information covering the 1982 - 2015 period. More precisely, we rely on information from 1982, 1985, 1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2008, 2010, 2012, 2013, and 2015. Before 1995, this coincides with all waves that are available at a smaller regional level than state-level.[19] Hence, we have information on four pre-reunification years and 14 post waves to study long-term social learning effects.

Our main sample consists of women aged 25 to 55, i.e. women who are out of education but far from retirement, who have grown up, and who are now living in the Western part of Germany. Unfortunately, the Microcensus does not ask directly if a respondent grewn up in West Germany. To implement this restriction, we identify and drop from the sample East Germans living in the West based on their educational degree using recorded GDR-specific educational qualifications that were universal until reunification.[20] In our main estimation sample, we restrict the analysis to cohorts born between 1945 and 1975. This ensures that we can best

[18]As a result, our analysis is conducted at the county level (*Kreis*) or the regional level *Raumordnungsregion* (ROR), where a ROR usually consist of two counties and is a commonly used definition of local labor markets based on commuter flows (e.g. Pischke and Velling (1997)).
[19]The Microcensus with regional information can only be accessed on-site in one of the safe centers of the Statistische Ämter (RDC of the Federal Statistical Offices and Statistical Offices of the Länder; 1991 - 2015).
[20]For a detailed description on how we identify individuals who grew up under the former GDR regime and plausibility checks see section B3.1 in Appendix B. Our results are not driven by remaining very small number of misclassification of East Germans living in the West.

identify women growing up in the West. Descriptive statistics for the main sample are reported in Table 3.1.

Table 3.1: Microcensus descriptive statistics

	Mean	Std. Dev.	N
Female labor market outcomes			
Working hours / week	22.74	17.39	1373594
Working hours / week of employed women	30.44	13.05	1026126
Relative working hours within household	0.38	0.13	648386
Individual controls			
Age	39.99	8.20	1438913
Degree from basic school track (*Hauptschule*)	0.43	0.49	1438913
Degree from middle school track (*Realschule*)	0.32	0.47	1438913
Degree from high school track (*Abitur*)	0.25	0.43	1438913
Foreign nationality	0.07	0.25	1438913
Individual potentially endogenous controls			
Married	0.71	0.45	1438913
Divorced	0.09	0.29	1438913
Widowed	0.02	0.13	1438913
Single	0.18	0.39	1438913
No children in household	0.48	0.50	1438913
1 child in household	0.24	0.43	1438913
2 children in household	0.21	0.41	1438913
3 children in household	0.05	0.22	1438913
4 children in household	0.01	0.10	1438913
5 or more children in household	0.00	0.05	1438913
Partner controls			
Age	43.69	9.00	1035538
Degree from basic school track (*Hauptschule*)	0.50	0.50	1025608
Degree from middle school track (*Realschule*)	0.21	0.41	1025551
Degree from high school track (*Abitur*)	0.28	0.45	1025577
Foreign nationality	0.07	0.26	1035516
Working hours / week	39.78	13.47	1002440

Notes: The sample includes all women aged 25 - 55 of birth cohort 1945-1975 with non-missing information on individual controls, who are currently living in West Germany and do not have an East German educational degree.
Source: Microcensus 1982-2015, own calculation.

We focus on three main outcomes: (i) women's working hours; (ii) working hours of women in employment; and (iii) relative working hours within households. Working hours are measured as contracted working hours per week. Relative working hours are defined as the share of working hours provided by the women in the household (either married or cohabiting).[21] In addition, we include a vector of ex-

[21] Identifying non-married cohabiting couples directly becomes possible with the introduction of a new concept of living arrangements in 1996. In earlier waves, identifying non-married couples is

ogenous controls, including age, age squared, highest educational degree in three categories and nationality. For further robustness checks, we also control for potential endogenous variables, such as separate indicators for the number of children in the household and the marital status, i.e. single, married, widowed, and divorced, as well as partner characteristics such as age, highest educational degree in four categories, nationality, working status, and working hours.

3.3.2 Further data sets and outcomes

To examine different potential mechanisms, we use a number of supplementary data sets. Table A3.1 in the Appendix provides an overview of the data used. More details about the supplementary data are provided as they are introduced in the respective sections.

3.3.3 Empirical strategy

We use different empirical models to estimate social learning effects in the aftermath of German reunification. Our baseline model is a simple difference-in-difference model, which formally reads:

$$\mathrm{Y}_{irt} = \beta_0 + \beta_1 \ \mathrm{HighInflow}_r * \mathrm{Post} + X'_{irt}\beta_2 + \kappa_t + \mu_r + \epsilon_{irt} \tag{3.1}$$

Post is an indicator variable taking the value of one in post reunification periods and $\mathrm{HighInflow}_r$ is our treatment indicator that is equal to one if woman i lives in a region r that received above median inflow from the former GDR after the fall of the wall.[22] κ_t denote year fixed effects and μ_r a set of region fixed effects. We subsequently include state-year fixed effects to non-parametrically allow for economic shocks at the state level, e.g. changes in government or educational policies. In addition, we include a vector of exogenous individual controls X'_{irt}. β_2 is allowed to

possible based on information about the relationship to the household head, information on the household heads' partner, their marital status, and an age-range plausibility check on the potential couples (Lengerer; 2005).

[22]We conduct several robustness checks using different treatment definitions, all yielding similar results (see section 3.4.2).

vary in pre- and post-reunification periods. We cluster standard errors ϵ_{irt} at the regional level to allow for within-region correlations.[23]

In this specification, under common trend assumptions, β_1 identifies the average change in outcomes Y_{irt} between pre- and post reunification periods for high inflow regions compared to low inflow regions. Under the additional assumption of no compositional changes, this effect over time can be interpreted as the impact of immigration of East Germans on outcomes of West Germans.

To study the local dynamic adjustments directly and establish flat pre-trends, we estimate event study versions of equation (3.1), by interacting the variable that measures the inflow right after the fall of the wall, HighInflow_r, with year-specific dummies. Effectively, this results in the following specification:

$$\text{Y}_{irt} = \gamma_0 + \sum_{t \neq 1989} \gamma_1^t \ \text{HighInflow}_r + X'_{irt}\gamma_2 + \kappa_t + \mu_r + u_{irt} \tag{3.2}$$

The last pre-treatment indicator (γ_1^{1989}) is standardized to zero. Thus, γ_1^t identifies the effect on outcome Y_{irt} relative to the year 1989, i.e. the last period before reunification. This is the vector of coefficients of interest. We also report estimates with respect to all pre-periods to mitigate issues related to using only one year as a reference point.

As an alternative specification, we use distance to the former East border separating East and West Germany as a source of exogenous variation for the exposure to East Germans and estimate the following reduced form model:

$$\text{Y}_{irt} = \delta_0 + \delta_1 \ \text{Distance}_r * \text{Post} + X'_{irt}\delta_2 + \kappa_t + \mu_r + u_{irt} \tag{3.3}$$

where $Distance_r$ is the distance of the (population weighted) regional centroid to the next point on the former border separating East and West Germany. As before, κ_t and μ_r denote year and region-specific fixed effects and X'_{irt} is the same set of exogenous controls as in equation (3.1) and (3.2). Controls are allowed to vary in pre- and post-reunification periods. We also present results where we non-parametrically control for economic shocks at the state level by including state times year fixed effects. Here, δ_1 identifies differences in women' outcomes and gender gaps

[23] In section 3.4.2, we conduct several sensitivity checks with respect to how we estimate standard errors.

(within states) as a function of distance in post relative to pre-reunification years. To yield internally valid estimates, there should be no other systematic shocks to female (relative to male) outcomes that are correlated with distance (within states) to the border of the former GDR and no unobserved compositional differences across time that vary with distance (within states). Note that any time-invariant geographic differences are absorbed by the region specific fixed effects, while year fixed effects control for national trends in women's labor supply. In addition, looking at relative hours within households nets out any time-varying geographical differences that affects men and women similarly.[24]

3.4 Results

3.4.1 Female labor supply

Table 3.2 reports estimates for equation (3.1) for all three outcomes that we study using the Microcensus data for increasingly demanding specifications. The baseline estimates are reported in columns (1), (4), and (6). Including state year fixed effects in columns (2), (5), and (8) non-parametrically controls for state-specific unobserved shocks, e.g. changes in government or educational reforms. In addition, we flexibly control for a set of individual controls such as age, age squared, highest educational degree in three categories and nationality, which are allowed to differ in pre- and post-periods in columns (3), (6), and (9). If unobserved (economic) shocks at the state level or compositional changes were driving the results, they would differ across specifications.

The first three columns show little evidence of consistent effects on working hours for all women. Estimates turn positive but remain insignificant moving from columns (1) to (3). In contrast, the baseline difference-in-differences coefficients indicate that regions with above median inflow shares after German reunification experience an increase in working hours of employed women of about 0.9 hours per week and an increase in working hours of women relative to their cohabiting partner of about 0.05 percentage points (ppt).

[24] As a robustness check, we also differentiate against regional male outcomes by estimating a triple difference-in-differences model, which formally corresponds to: $Y_{irt} = \lambda_0 + \lambda_1 \text{ Distance}_r * \text{Post} * \text{Female}_i + \lambda_2 \text{ Distance}_r * \text{Post} + \lambda_3 \text{ Distance}_r * \text{Female}_i + X'_{irt}\lambda_4 + \kappa_t + \mu_r + u_{irt}$ and show non-parametric distance gradients by estimating $Y_{birt} = \sigma_0 + \sigma_1 \text{ Post} + \mu_r + u_{irt}$ within each 30 km bin.

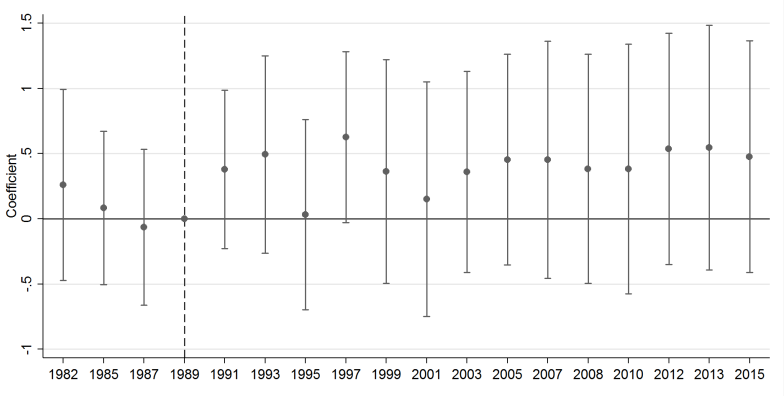
Table 3.2: Baseline difference-in-differences estimates

	Dependent variable								
	Working hours of women			Working hours of employed women			Relative working hours within households		
Mean of dep. var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
before reunification	21.62	21.62	21.62	34.78	34.78	34.78	0.42	0.42	0.42
DiD coefficient	-0.167	0.443	0.343	0.919***	0.984***	0.865***	0.008***	0.006***	0.005***
	(0.299)	(0.334)	(0.308)	(0.282)	(0.357)	(0.300)	(0.002)	(0.002)	(0.002)
State x year FE		✓	✓		✓	✓		✓	✓
Ind. controls			✓			✓			✓
Observations	1,373,594	1,373,594	1,373,594	1,026,126	1,026,126	1,026,126	648,386	648,386	648,386
Adj. R-squared	0.010	0.010	0.037	0.032	0.032	0.054	0.026	0.026	0.046

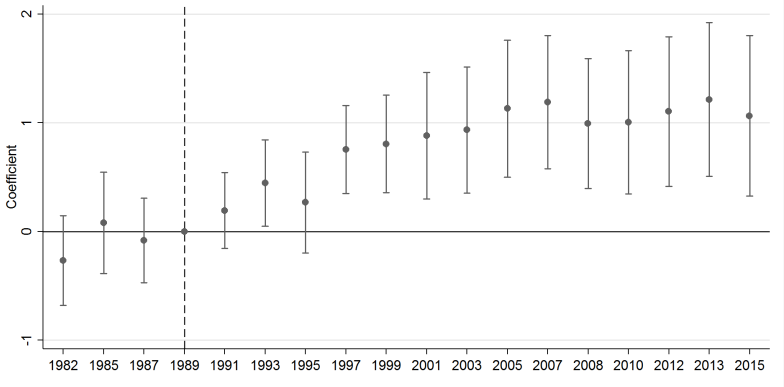
Notes: Difference-in-difference coefficients from equation (3.1). For set of individual controls see Table 3.1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Figure 3.4: Event analysis

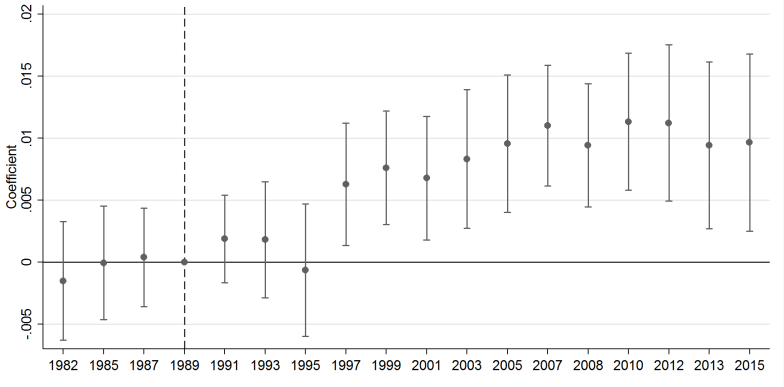
(a) Working hours of women



(b) Working hours of employed women



(c) Working hours within households



Notes: The figures plots the estimated γ_1 coefficients from equation (3.2) and corresponding 95% confidence intervals.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

To examine the effect evolution, Figure 3.4 plots coefficients from equation (3.2) for our main outcomes. The estimated coefficients are close to zero and not sta-

tistically significant in pre-reunification years, indicating that, before reunification treated and control regions exhibit similar trends in outcomes. After reunification, in panel (b), we find the positive and significant effect on working hours of employed women, which seems to level of at about 1 hour per week (2.6 % relative to the pre-reunification mean). It takes about 6 years for the coefficients to become statistically significant at the 5 % level. Subsequently, they stay roughly constant. Similarly, panel (c) shows a positive effect on the relative working hours of women within households which levels of at about 0.1 ppt (2 % relative to the pre-reunification mean). As before, effects at the extensive margin of labor supply are only mildly positive, see panel (a).

Table 3.3 shows δ_1 coefficients from equation (3.3) for our main outcomes. The results indicate that regions closer to the former East border experienced an increase in working hours of employed women after German reunification and an increase relative working hours of women within households. The coefficient in column (3) of Table 3.3 indicate that a 50 km increase in proximity to the East border is associated with an increase in working hours of employed women of about 0.28 hours per week and a 0.25 ppt increase in the share of hours relative to the partner in the household.[25] The findings are consistent with our difference-in-differences and event-study estimates, though the interpretation differs a bit. While the findings in Table 3.2 and Figure 3.4 reflect labor supply responses of West German women due to the presence of East Germans, distance correlates shown in Table 3.3 can be interpreted as geographical exposure to East Germans. Thus, we refrain from interpreting LATE estimates, i.e. re-scaling our reduced form findings by the first stage depicted in Figure A3.2, though they are highly statistical significant.[26]

We also assess potential effect heterogeneities by different household types. The estimated coefficients in Table A3.8 are obtained by stratifying our baseline difference-in-differences estimates by highest educational schooling degree, marital status, and

[25]This finding holds when differentiation against male outcomes by estimating a triple-difference regression: We find a strong and significant gradient in distance to the east border for working hours of employed women and relative working hours within households, while coefficients for men are relatively flat.

[26]Appendix Figure A3.8 shows *Post* estimates in different distance bins. The left hand figures are obtained from regression $\mathrm{Y}_{birt} = \sigma_0 + \sigma_1\ \mathrm{Post} + \mu_r + u_{irt}$ within each 30 km bin and then plotting σ_1 coefficients. The right hand figures in addition differentiate against regional male outcomes, i.e. plot π_1 coefficients in each 30 km bin from the following equation: $\mathrm{Y}_{birt} = \pi_0 + \pi_1\ \mathrm{Post} * \mathrm{Female} + \pi_2\ \mathrm{Post} + + \pi_2\ \mathrm{Female} + \mu_r + u_{irt}$.

Table 3.3: Baseline distance estimates

	Dependent variable								
	Working hours of women			Working hours of employed women			Relative working hours within households		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Distance $*$ *Post*	0.00313	-0.00343	-0.00263	-0.00590**	-0.00581**	-0.00561**	-0.00007***	-0.00005***	-0.00005***
	(0.00255)	(0.00230)	(0.00223)	(0.00247)	(0.00253)	(0.00230)	(0.00002)	(0.00002)	(0.00002)
State x year FE		✓	✓		✓	✓		✓	✓
Ind. controls			✓			✓			✓
Observations	1,143,815	1,143,815	1,143,815	850,400	850,400	850,400	537,787	537,787	537,787

Notes: educed form coefficients from equation (3.3). For the set of individual controls see Table 3.1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

age of the youngest child within the household.[27] When stratifying the results by education, it is evident that the intensive margin results are primarily driven by women with low and medium levels of education, especially within households (i.e. relative working hours within households). All coefficients are a bit larger for married women. Finally, investigating labor supply responses by age of the youngest child, we find that effects that condition on labor force participation are strongest for women with children above the age of three. In contrast, effects at the extensive margin appear to be strongest for women with young children.

Overall, the findings of the different empirical specifications are consistent with our prior assumption on slow moving social learning effects, which are reflected in the labor supply decisions of women at the intensive margin. One interpretation of the lack of significant effects at the extensive margin is that these also depend on the provision of local child care infrastructure (a mechanism we turn to in section 3.5).

3.4.2 Robustness

In the following, we provide a series of robustness and sensitivity checks to our main analysis. In particular, we carefully assess the validity of our identifying assumptions and issues of measurement error.

3.4.2.1 Treatment definition, sample restrictions and placebos

Panel A of Table A3.3 shows difference-in-differences results for different functional forms to capture the inflow of East Germans, either using different cut-offs to define high inflow or continuous measures. Reassuringly, using a 25 % vs. 75 % instead of a median split generates larger estimates, suggesting that the effect size depend on the intensity of exposure. Estimates based on continuous inflow measures are also statistically significant.

Panel B of Table A3.3 presents results imposing different sample restrictions (event versions are depicted in figure A3.3). One challenge of our main data set is that respondents are not directly asked if they grew up in East Germany. Thus, one

[27] As mentioned above, restricting our sample to cohorts born between 1945 to 1970 has the potential caveat that our sample grows older with time. That is why the stratification by age of the youngest child is done using all cohorts. For all other results, we report results based on the restricted sample. Note, however that the results are very similar without this cohort restriction.

potential threat to the social learning interpretation would be to misclassify East German women as West Germans. This would mechanically bias our estimates upwards since East German women exhibit strikingly different labor market outcomes, even after moving to the western part of Germany. To mitigated this issue, in our main specification we restrict the analysis to cohorts born between 1945 and 1970. This ensures that we can best identify and exclude all East Germans who moved to West Germany by observing their GDR educational degree (see section B3.1 in the Appendix for details). The downside of using this cohort restriction is that our sample grows older with time. As expected from section B3.1, our estimates are very similar without this cohort restriction (estimates with column-title "all cohorts"). The other sample restriction that we use, in panel B of Table A3.3, is the exclusion of border regions. This is motivated by the fact that Redding and Sturm (2008) find regions close to the Iron Curtain experience a decrease in population growth due to the loss of market access following German division.[28] In addition, in 1971 the West German government introduced a subsidy program (*Zohnenrandfördergesetz*) for regions within 40 kilometers of the border (e.g. Seidel and von Ehrlich; 2014). Estimates from this "no border" sample are very similar to the baseline.

Finally, in Panel C of Table A3.3, we estimate placebo regressions with male labor supply as the outcome variable. Here, we fail to detect significant effects. Furthermore, we construct an equivalent treatment measure using West-West migration, i.e. mobility within West Germany and do not find significant treatment effect. Overall, these placebo exercises suggest that local demand spillovers that might, for example, result from an increase in population density are unlikely to drive our results.

Another concern would be that immigrants start working in services that are close substitutes of household production (e.g. as caregivers or household help), and thus lowering the prices of these goods (e.g. Cortes; 2008).[29] For example, Cortes and Tessada (2011) show that low skilled immigration increases working hours of highly-skilled women in the US. This alternative interpretation is very unlikely to apply to our setting for several reasons. First, East German immigrants are if anything positively selected and work in similar occupation than West Germans (about 4 %

[28]However, they find no statistically significant effects after German reunification.

[29]We show in section 3.5 that the presence of East Germans lead to an expansion of the child care infrastructure. Similarly, to the previous argument one could argue that the labor supply responses are driven by West German women now working in child care institutions. However, excluding West German women who work as child minders (about 3 % of our sample) does not change our results.

work in the child care sector). Second, we observe larger effects for lower skilled West German women. Third, informal child care by child minders is not very common in Germany (e.g. Büchel and Spieß; 2002). In addition, very few German households purchase other household services in the market (e.g. Schupp et al.; 2006).

3.4.2.2 Compositional changes

We also assess whether our estimates might simply reflect compositional changes, e.g. due to selective out-migration as a response to the inflow of East Germans. This concern is particular severe given our long post treatment period which we choose to capture slow moving social learning effects. In Table A3.9 in the Appendix, we examine if the amount of outflow and the age patterns of outflow in reunified Germany differs by treatment status. While coefficients are negative, indicating lower outflows for treated ($HighInflow$) regions, these are small and far from reaching significance. Furthermore, compositional changes might evolve due to selective in-migration. However, coefficients in Panel B of Table A3.9 suggest no difference in the amount and age pattern of immigration from other West German regions. Again coefficients are negative, indicating lower inflows in our treated ($HighInflow$) regions. Thus, there is no evidence of (selective) in- or out-migration due to larger inflow shares of East Germans.

In addition, we estimate models with a more extensive set of individual controls (see Table 3.1 for details) such as dummies for the number of children, marital status in four categories (single, married, widowed, divorced) and partner characteristics (age linear and squared, education, nationality, working status, working hours).[30]. Note, that some of these additional controls might be endogenous to local social learning effects, in particular over the long-term However, they can better control for any potential compositional changes. Estimated coefficients for our baseline difference-in-differences model are depicted in Table A3.7 and event versions in Figure A3.4. They are very similar across different control specifications, suggesting that systematic compositional changes do not drive our results. We also assess compositional changes more directly by replacing the outcome with each of the extensive

[30]Unfortunately, the Microcensus only contains information on net monthly income. Since in Germany, couples are subject to an income splitting taxation model, controlling for the net-income of the partner partly reflect the endogenous earning of the women.

set of control variables and re-estimate our models. None of these coefficients are statistically significant.

3.4.2.3 Further robustness checks

In addition, we assess the sensitivity to modeling time trends. Figure A3.5 graphically depicts our event-study estimates using different trend specifications, i.e. region specific linear time trends and region specific linear time trends fitted only on pre-unification (1982 - 1989) data. As expected from observing parallel trends in Figure 3.4, results are stable using different trend-specifications, with the exception of overall working hours. Note that using unit specific linear time trends changes the identifying assumption from parallel trends to one of parallel growth.[31]

We also report estimates based on using all pre-periods as baseline. This mitigates problems related to using only one year (i.e. 1989) as a reference point. Results in A3.6 are very similar to our main estimates.

As mentioned in section 3.3.3, we also assess the sensitivity of inference, i.e. to how we calculate our standard errors. Table A3.11 reports standard errors of our main DiD estimates when clustering standard errors on the higher level of aggregation, which corresponds to the state-level in our setting. In addition, it reports unclustered standard errors and standard errors that are obtained when aggregating the data on the regional level and re-estimating our main specification. Note that we only conduct the latter exercise without including additional controls because this would also slightly change our estimated treatment coefficients. Inference remains similar using alternative ways to cluster standard errors. However, when clustering on the state level, standard errors are larger and only the coefficient without any additional controls remains significant.

3.5 Mechanisms

There may be different mechanisms at play that could explain the positive labor supply responses of West German women. It could be that West German women simply mimic the labor supply behavior of East German women (Akerlof and Kran-

[31]There is an ongoing debate whether including unit-specific linear time trends in fixed effects models is a reasonable thing to do since they might pick up parts of the treatment effect or cause some spurious correlation in the residual (e.g. Wolfers; 2006).

ton; 2000), or that there is some sort of information and social norm transmission (Fogli and Veldkamp; 2011) through social interactions, i.e. through social learning. It could also be that East Germans slowly triggered a change in the supply of local infrastructure for families (e.g. child care provision) either through their direct demand or indirectly through voting outcomes.[32] All of these potential mechanisms are likely to reinforce each other over time.

Empirically, it is not possible to net out one single explanation for the observed effects. However, we can use additional data sets and outcomes to better understand the observed patterns in the data and to provide additional evidence on social learning effects. The additional survey and administrative data used to examine effects on local social norms, East-West friendship and intermarriage as well as the local child care infrastructure are summarized in Appendix Table A3.1. Descriptive statistics are presented in Table A3.4 and Table A3.5.

3.5.1 Local social norms and beliefs

Previous studies show that individuals who grew up under the former GDR regime developed different social norms regarding the appropriate role of women, beliefs about the potential costs of maternal employment for children, and rate the importance of women's careers differently (Campa and Serafinelli; 2019; Lippmann et al.; forthcoming; Bauernschuster and Rainer; 2012; Beblo and Görges; 2018).

To empirically examine if social norms and beliefs were transmitted to West Germans, we examine the agreement of West Germans to statements regarding the appropriate role of women in the family and beliefs about the potential negative effects of maternal employment for children and the family using data from the General Social Survey (ALLBUS) (GESIS - Leibniz-Institut für Sozialwissenschaften; 2018).[33] We combine the agreement the first three items shown in Figure 3.2 to a single index by standardizing each variable (measured on 4-point scale ranging

[32] This in turn might have spillovers on social norms and beliefs. As shown by Zoch and Schober (2018) the expansion in publicly funded child care is associated with changes toward less-traditional gender ideologies in Germany.

[33] The datasets used for our analysis contain detailed regional information and are accessible at the Secure Data Center (www.gesis.org/en/sdc) of the GESIS Data Archive for Social Sciences in Cologne Germany. Researchers are required to sign a special usage agreement and to work within an individually tailored secure virtual workspace.

Table 3.4: Social norms and beliefs

	(1)	(2)	(3)	(4)	(5)
HighInflow	-0.0579**	-0.0611**	-0.0626**		
	(-2.02)	(-2.13)	(-2.45)		
Distance to east boarder				0.000459**	0.000492**
				(2.07)	(2.40)
State x year FE		✓	✓		✓
Individual controls			✓		✓
Observations	6,009	6,009	6,009	6,009	6,009
Adj. R-squared	0.0521	0.0527	0.1580	0.0456	0.1580

Notes: The index is standardized to have mean zero. All estimates include year fixed effects. The individual controls include age, age squared, highest schooling degree in three categories, religion, and city size in three categories. Standard errors clustered at regional level. T-statistics in parenthesis. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: ALLBUS 2000-2016, BBSR (2017), own calculation.

from 1 "completely agree" to 4 "completely disagree") and then add up each item such that lower values correspond to less "traditional" beliefs about how maternal employment affects children and the family. In the ALLBUS survey, these question were first asked in 1982. However, regional identifiers only become available in 1994. Although we do not have data on norms and beliefs before and after reunification, we can test weather individuals living in high inflow counties exhibit less traditional social norms after reunification, controlling for a rich set of covariates including state times year fixed effects.[34]

Estimated coefficients in Table 3.4 are negative and significant, suggesting that individuals living in treated (HighInflow) counties in West Germany in post reunification periods exhibit less "traditional" beliefs about detrimental effect of maternal employment for children and the family. This holds when controlling for state year fixed effects, capturing state specific shocks and a very rich set of individual controls. The magnitude amounts to about 7 % of a standard deviation. The estimated relationship increases with time. Examining heterogeneities by gender and individual statements shows that this result is driven by women who adjust their beliefs about the costs of working for children and families (first three statements in figure 3.2), while attitudes toward the appropriate role of women (last three statements in figure

[34]The ALLBUS data has several advantages. First, it directly asks individuals where they were born and spent their youth, mitigating the problem of misspecification of East Germans. Second, it is very rich in socio-economic controls, e.g. we can also control for religion.

3.2) are less affected. Similarly, in Table 3.4 we find a significant distance gradient after German reunification, indicating that West Germans adjust their beliefs more strongly if they live closer to the former East border.

3.5.2 Social interactions: friendships and intermarriages

The transmission of social norms, information or behavioral mitigation is likely to happen more rapidly if there is a lot of interaction between local West Germans and individuals who grew up under the former GDR regime. Since East Germans are observationally similar to West Germans, i.e. they speak the same language and have similar levels of education, one would not expect to find a "clustering" or enclaves of immigrants as it is common for other immigration groups.

To examine to what extent West Germans interact with people who grew up under the former GDR regime, we rely on data from the German Socio-Economic Panel (SOEP) study.[35] The SOEP is an annual household-panel survey that is representative of the entire population in Germany (Goebel et al.; 2019). We construct measures of the prevalence of East Germans in the friendship network of men and women living in West Germany and the share of marriages where one partner is from East Germany. In particular, we construct two indicators: the share of friends who originally come from East Germany and an indicator whether a person states to have at least one friend from East Germany.[36]

Table 3.5 shows that in treated (HighInflow) regions the share of friends who are originally from East Germany is significantly higher (about 0.5 ppt) than in control regions. In addition, West Germans in treated regions state to have at least one friend who is originally from east Germany with a 1 ppt higher probability. These coefficients are large given the overall mean of about 3 % and 5 %, respectively. Intermarriages rates is also higher in treated regions (by about 0.2 ppt), though the coefficients are not statistically significant.[37] Examining the coefficients over time

[35] As an additional robustness check, we also conduct the main analysis based on SOEP data. The estimated coefficients are similar, however due to much smaller sample sizes, they are less precisely estimated (Table A3.10).

[36] This information is derived from a question on friendship networks that is available in the years 1996, 2001, 2006, 2011, and 2016. Respondents are asked to think of three friends or relatives (excluding people living in the same household) with whom they go out with or meet regularly.

[37] Note that when examining the group of East Germans who live in West Germany directly, we observe an equivalent pattern.

Table 3.5: Friendships and intermarriages

	Share friends from East Germany		At least one friend from East Germany		Partner from East Germany	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean of dep. variable	0.026	0.026	0.052	0.052	0.003	0.003
HighInflow	0.005*	0.005**	0.010**	0.010**	0.002	0.001
	(0.002)	(0.002)	(0.004)	(0.004)	(0.001)	(0.001)
Ind. controls		✓		✓		✓
Observations	51,720	51,720	51,720	51,720	238,797	238,797
adj. R-squared	0.003	0.008	0.003	0.008	0.003	0.004

Notes: All estimated include year fixed effects. Covariates are depicted in Table A3.4. Friendship information is available every fifth year starting in 1996. Standard errors clustered at regional level. 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: SOEP 1984-2016, BBSR (2017), own calculation.

shows that while treated and control regions exhibit the same friendship outcomes in 1996 (first year available), the coefficient subsequently increases to 1.2 ppt and 3 ppt in 2016, respectively. Further analysis shows that the coefficient is significantly larger for working individuals and is increasing with years of education which might indicate that some of the interaction between East and West Germans happens at the workplace.

To sum up, friendships and intermarriages between East and West Germans remained at a low level in the first decade following German reunification. However, they increased substantially in high inflow regions in the years that followed, which might have gradually lead to stronger local behavioral mitigation and information transmission processes.

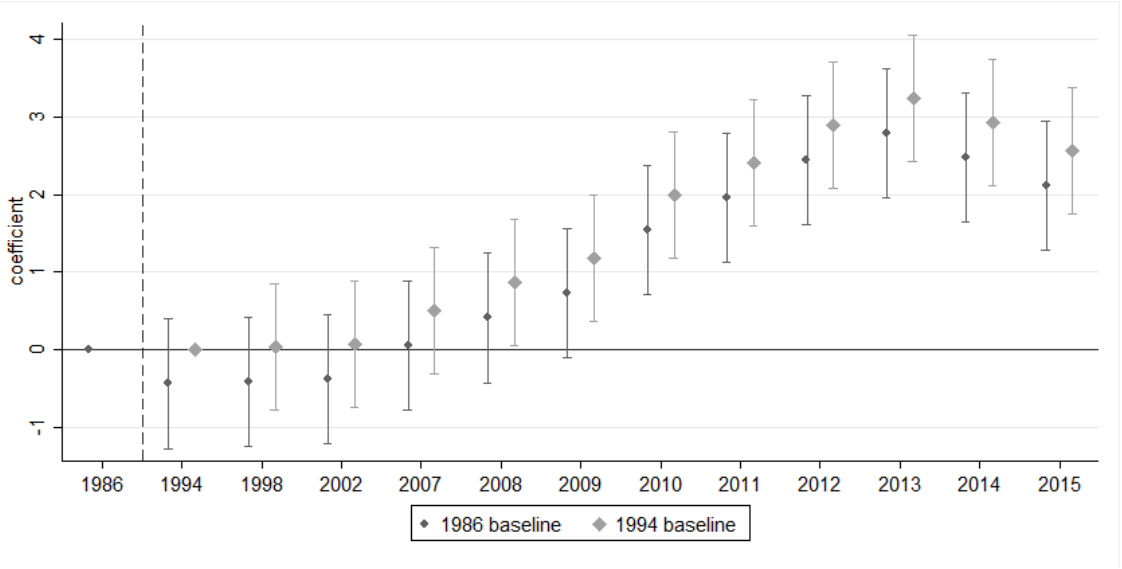
3.5.3 The local child care infrastructure

As described in section 3.2, in East Germany almost all children were in publicly funded child care from a rather early age. In West Germany, on the other hand, child care places[38] for children below the age of three, full-time care for children above the age of three, and after-school care for school-age children were very rare (see

[38]In Germany - in contrast to other industrialized countries - about 98 % of all formal child care places are publicly funded and provided by the municipalities themselves or by non-profit organizations, i.e. churches or welfare organizations (e.g. Spieß; 2008). The administration in Germany is up to the states, counties and municipalities.

section 3.2 and Appendix section B3.2 for more details on the institutional setting). Most child care for children under the age of three was provided informally by the mothers, grandparents or other family members and friends (e.g. Büchel and Spieß; 2002). Administrative data on the number of children in publicly funded child care on the county level is available starting in 1986.[39] We construct child care ratios separately for children under the age of three and for children aged three and above who are in full-day child care. Child care ratios are defined as the fraction of children using publicly funded (full-day) child care in the respective age group.

Figure 3.5: Expansion of publicly funded child care for children below age three



Notes: The figures plots the estimated γ_1 coefficients from equation (3.2) and corresponding 95% confidence intervals using 1986 and 1994 as baselevels.
Source: Statistisches Bundesamt (2017), BBSR (2017)

Figure 3.5 plots the estimated treatment effect on child care ratios for children below the age of three.[40] Average effects are reported in Appendix Table A3.12. It is evident that in regions with above median inflow, the provision of publicly funded child care for under three year olds expanded at a much faster pace than in other

[39]Until 2002 this data set was collected in four-year intervals and contained information on the number of approved child care slots. Starting in 2007 the actual number of children in publicly funded child care is provided annually. Due to severe child care shortages, the change in definition does not cause a discontinuity in the data. The data from 1986 is obtained from the Regionaldatenbank DJI (1993).
[40]Since in 1986, there are some missings in the data, we also show estimates when using 1994 as a baseline.

regions. By 2015 the coefficient amounts to about 2.5 ppt (7 % relative to the mean in 2015 and 17 % to the overall mean). The coefficients averaged over all years corresponds to 1.2 ppt (see Table A3.12). Interestingly, child care ratios do not increase right away, though in the administrative data set we cannot differentiate between the children of East and West Germans. The explanation why it takes so long for the supply to respond to the demand is that the provision of publicly funded child care in Germany is organized within a multi-level structure that is strictly regulated, i.e. opening a new child care center is a lengthy process (e.g. Spieß; 2008). In addition, the expansion of publicly funded child care for children under the age of three was only promoted on the national level in 2005 and 2008, when the government passed two laws to expand child care provision for this age group. Similarly, the estimated coefficient for the fraction of children above the age of three (until school entry) in all-day care amounts to about 3 ppt (11 % relative to the overall mean).[41] In Appendix Table A3.12, we also report reduced form estimates using distance to the former East border as a measure of exposure to East Germans.[42] Coefficients are highly statistically significant and robust across different specifications.

Overall, our empirical exercise suggests that there were substantial spillover effects on the local child care infrastructure that potentially amplified or even triggered some of the labor supply responses of women that we see in the data.

3.6 Concluding remarks

We exploit the unique natural experiment of German reunification to study the local evolution of social norms and behavior. We show that large migration inflows of individuals with different social norms and beliefs about how women's employment affects children and the family had substantial spillovers effects on west German families, reflected in intensive margin of labor supply and within household division of paid work. We find these effects best accommodated by models of social learning

[41] It would also be interesting to examine the impact on the provision of after school care. However, due to data availability and the expansion of all-day schooling (*Ganztagsschulausbau*), it is not possible to construct a consistent measure of after school care ratios on the county level over time.
[42] Unfortunately, we have no information on full-day child care ratios before reunification. Thus we report distance coefficient based on equation (3.3) but without the post interaction. For children under the age of three, we have one pre-treatment year (1986). In this year, distance is not correlated with child care ratios ($p = 0.311$).

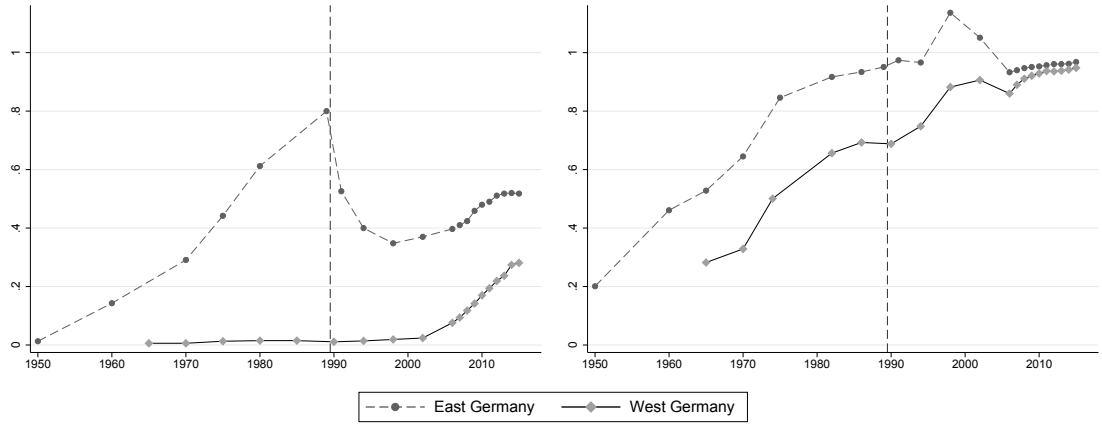
and endogenous child care infrastructure. We support this interpretation by providing direct evidence on the evolution of stated beliefs about detrimental effects of working women for children and the family, local social interaction between East and West Germans and the local expansion of publicly funded child care.

We argued that the historical setting that we study is uniquely suited to better understand the impact of immigrants on local social norms, i.e. to causally test theories of local social learning. Nevertheless, what does this imply for external validity? The immigrants that we study have different social norms, but speak the same language; they also have accredited educational degrees and are failry similar in many other respects. The effects of immigration working through local social interaction are likely to take longer to materialize whenever immigrants integrate less well with the native population. As a result, different and less integrated immigrants are less likely to immediately affect the social norms of natives through the learning channel, rather in the second generation or not at all. Instead, the effect through changes in the local infrastructure do not depend on direct immigrant-native interaction.

Appendix A: Additional figures and tables

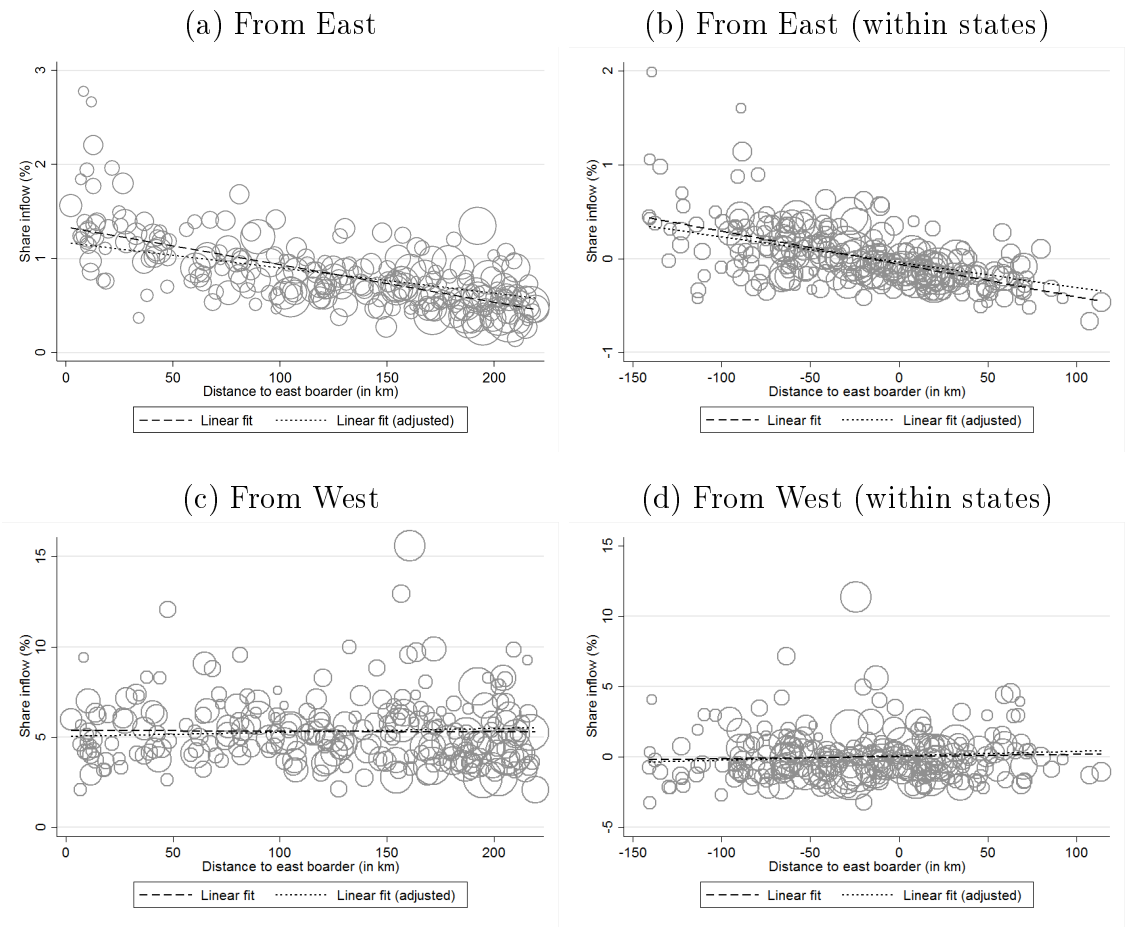
Figure A3.1: Child care ratios 1950 - 2015

(a) Children < 3 years (b) Children ≥ 3 years



Notes: The figure shows the fraction of children in different age groups being cared for in publicly funded child care in East and West Germany over time. For West Germany there is no data available before 1965. The vertical line indicates German reunification in 1989.
Sources: Statistisches Bundesamt (2018), BMFSFJ (1994), Winkler (1990)

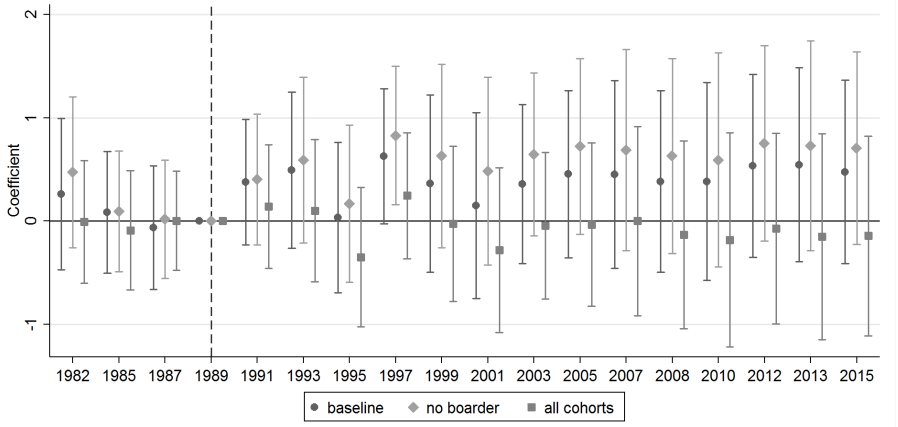
Figure A3.2: Immigration from East and West Germany by distance to East boarder



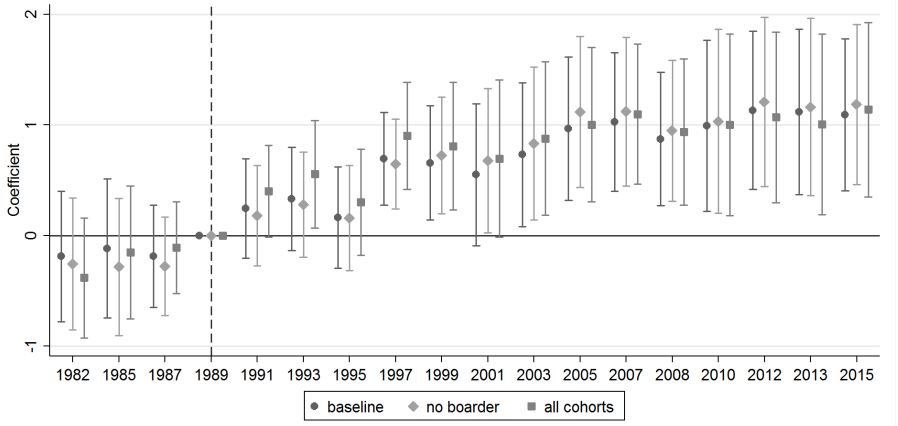
Notes: The size of the bubbles reflect the population size of each county. Distance is measured as the distance of the county's centroid to the nearest boarder point. Inflows shares are defined as inflow relative to the population in each county. (b) and (d) show inflow shares using only within state variation, i.e. relative to the state mean. Linear regression lines are shown without and with the adjustment by observable county characteristics (see Table A3.2 for details). Slope coefficients in (a) -.0039 ($t = -10.57$), in Panel (b) -.0039 ($t = -12.00$), in Panel (c) .0022 ($t = 1.22$), and in Panel (d) .0010 ($t = 0.68$).
Source: BBSR (2017), own calculations.

Figure A3.3: Event analysis - sample definitions

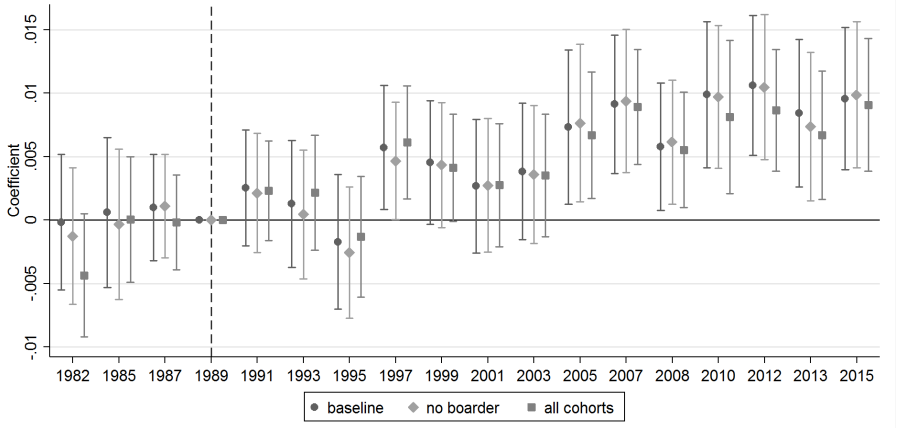
(a) Working hours



(b) Working hours of employed women



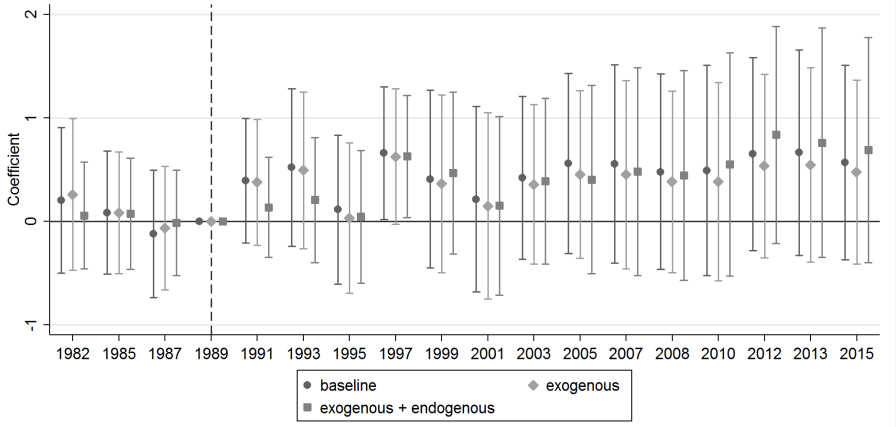
(c) Working hours within households



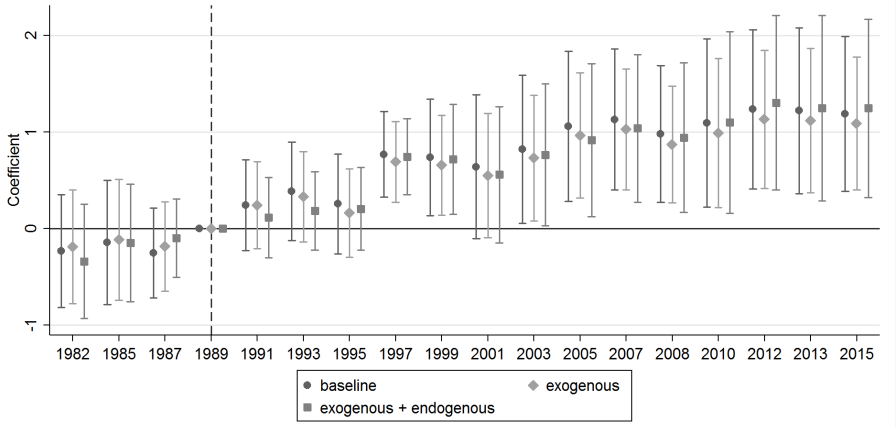
Notes: The figures plots the estimated γ_1 coefficients from equation (3.2) and corresponding 95% confidence intervals using different sample restrictions. Baseline results are estimates using only the cohorts born between 1945-1975. The figures also show results when using no cohort restriction and when excluding regions close to the boarder (within 50 km radius).
Source: Microcensus 1982 - 2015, BBSR (2017), own calculation.

Figure A3.4: Event analysis - controls

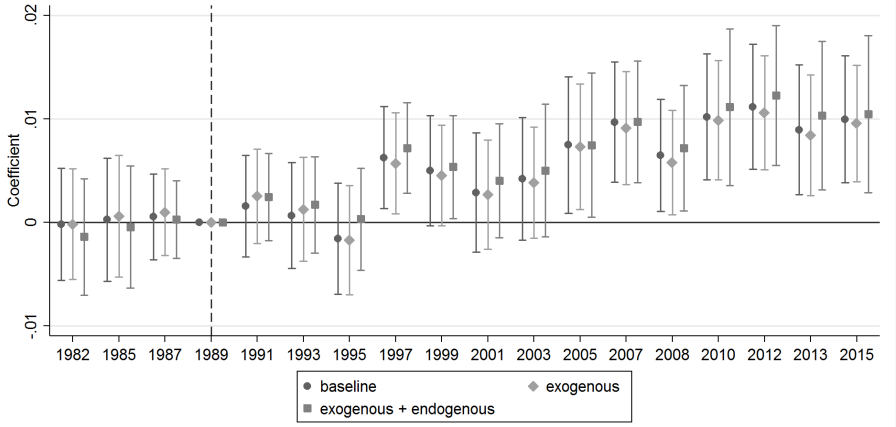
(a) Working hours



(b) Working hours of employed women



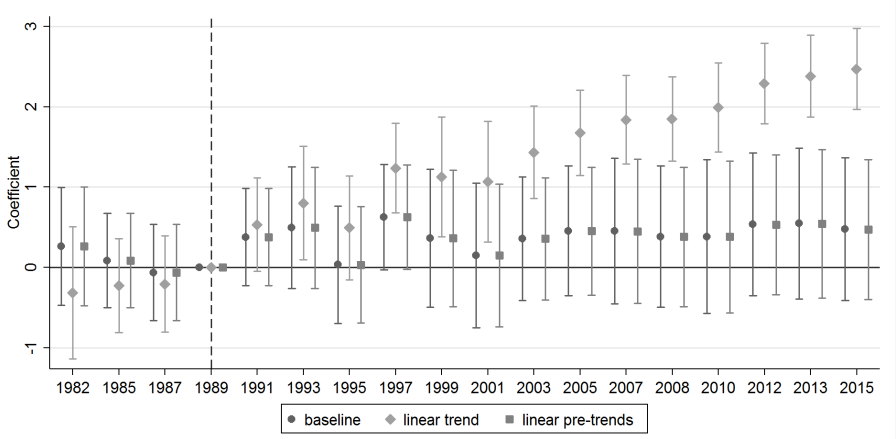
(c) Working hours gap within households



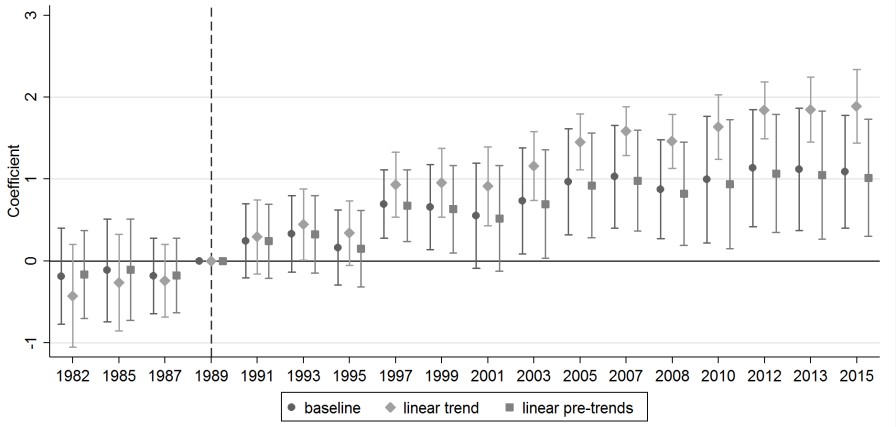
Notes: The figures plots the estimated γ_1 coefficients from equation (3.2) and corresponding 95% confidence intervals using different sets of control variables. See Table 3.1 for details.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Figure A3.5: Event analysis - trend specification

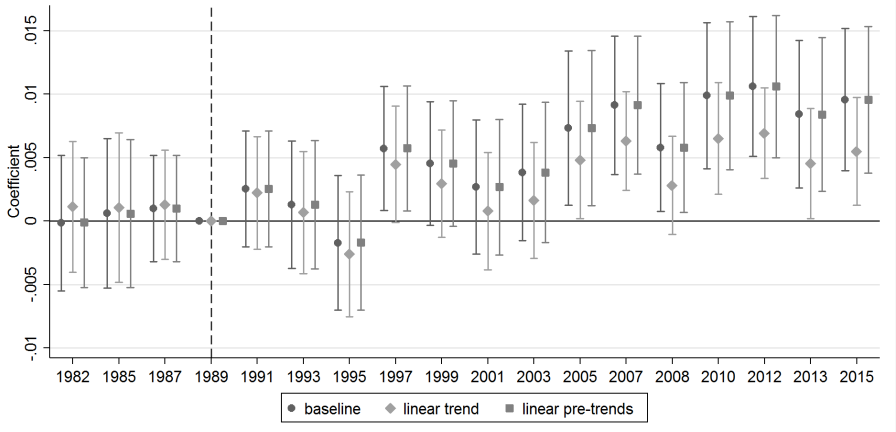
(a) Working hours



(b) Working hours of employed women



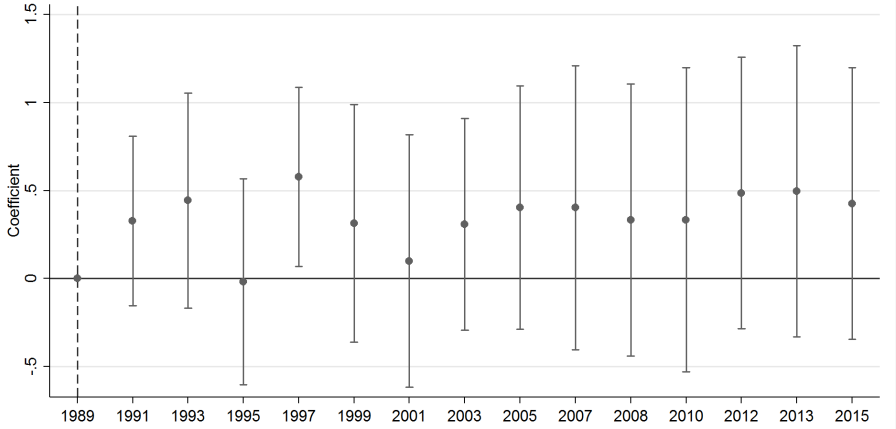
(c) Working hours within households



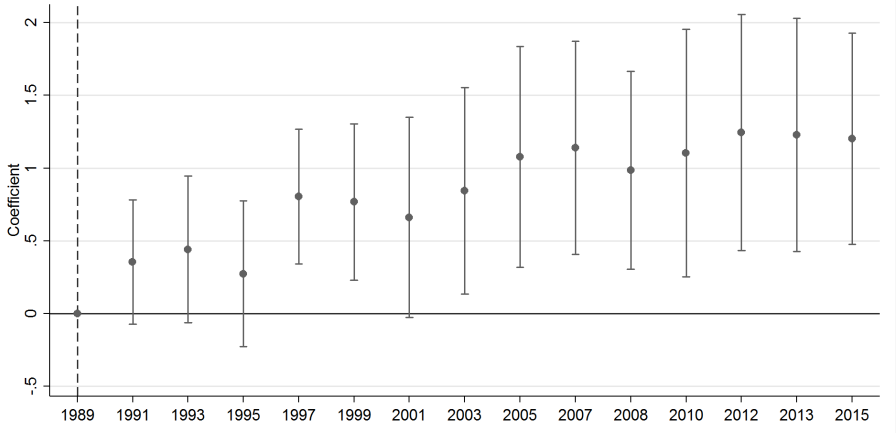
Notes: The figures plots the estimated γ_1 coefficients from equation (3.2) and corresponding 95% confidence intervals using different regional trend specifications. Baseline results include no regional trends, linear trends are fitted using all available time periods, and linear pre-trends are estimated using pre-reunification data only.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Figure A3.6: Event analysis - all pre-periods as baseline

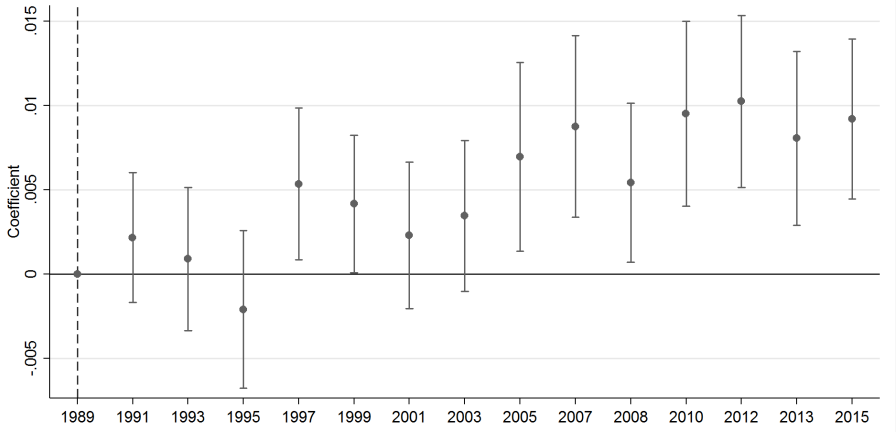
(a) Working hours



(b) Working hours of employed women



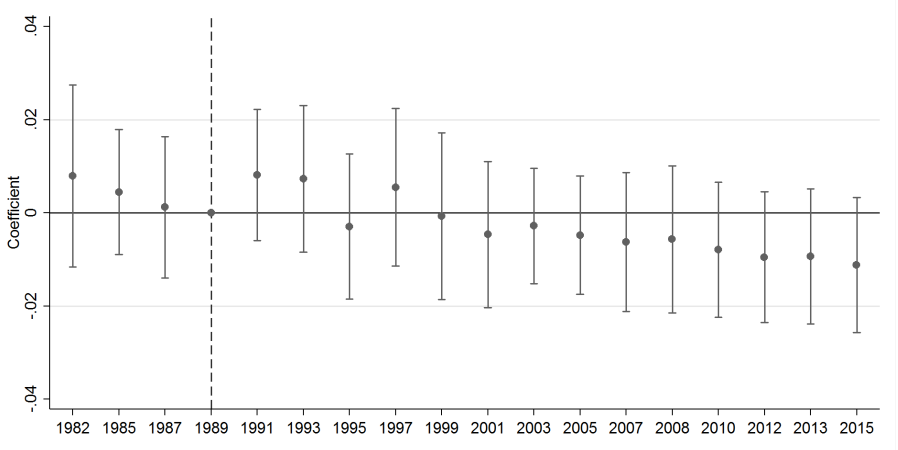
(c) Working hours within households



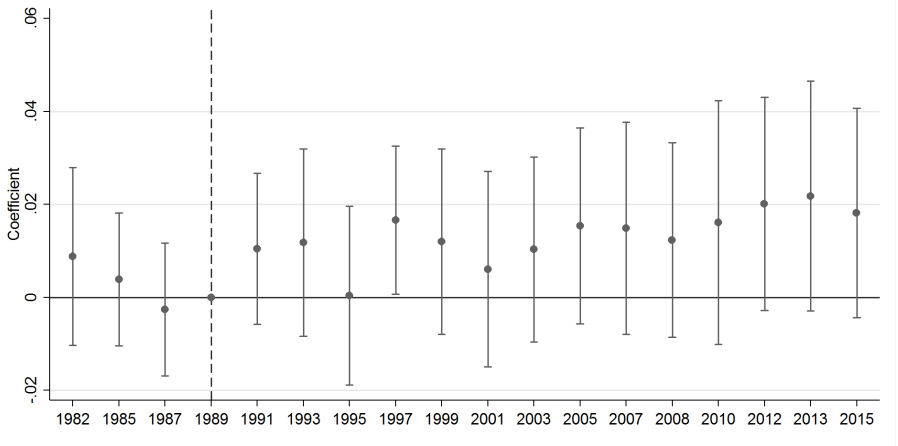
Notes: The figures plots the estimated effects when using the average of all pre-periods in equation (3.2) as a reference point and corresponding 95% confidence intervals.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Figure A3.7: Event analysis - other outcomes

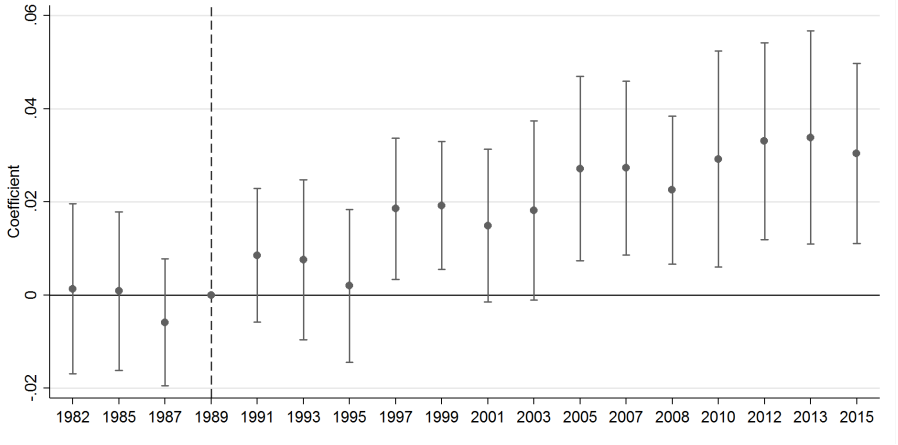
(a) Labor force participation



(b) Full-time employment



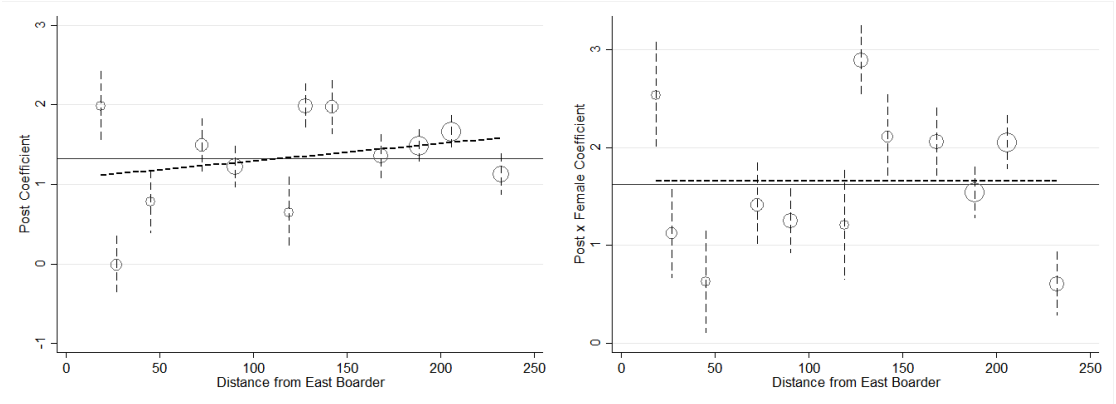
(c) Full-time employment of employed women



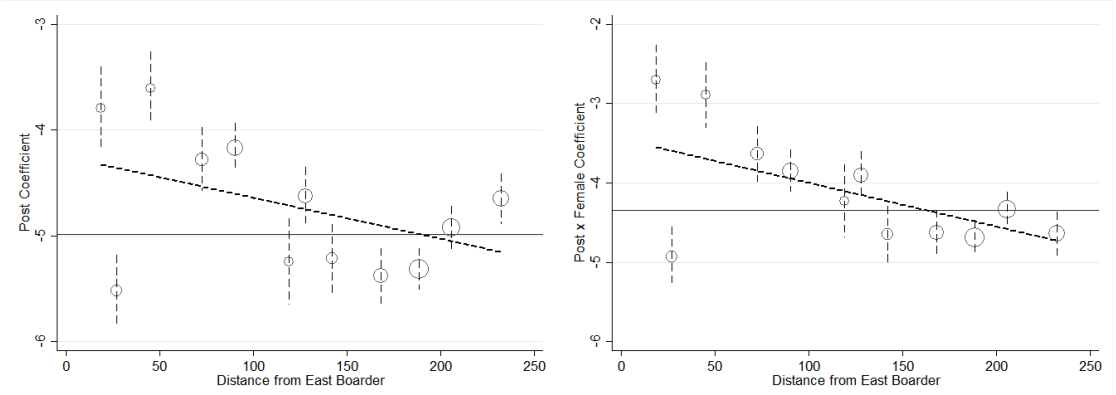
Notes: The figures plots the estimated γ_1 coefficients from equation (3.2) and corresponding 95% confidence intervals for alternative outcomes.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Figure A3.8: Distance gradients

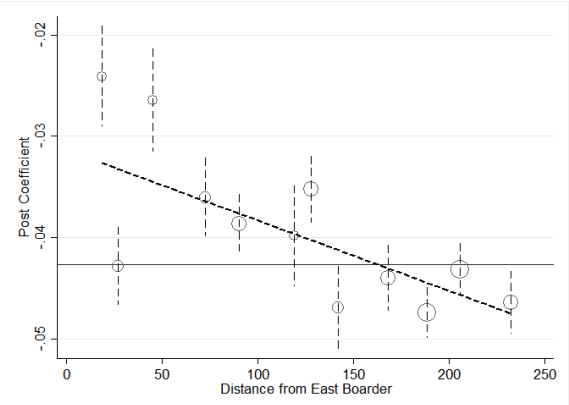
(a) Working hours



(b) Working hours of employed women



(c) Working hours within households



Notes: The left hand panel plots σ_1 coefficients (bubbles) for each 30 km bin from $Y_{birt} = \sigma_0^b + \sigma_1^b$ Post $+ \mu_r + u_{irt}$. The size of the bubbles reflect the number of observations in each bin. The dashed lines are 95% confidence intervals. The solid lines indicate the average *Post* estimate when using the entire sample, i.e. the average increase (decline) in outcomes in pre- relative to post-reunification periods. The dashed lines are linear fits to the estimated σ_1 coefficients. The right hand panel differentiates in addition against regional male outcomes, i.e. plots σ_1 for each 30 km bin from $Y_{birt} = \sigma_0^b + \sigma_1^b$ Post $*$ Female $+ \sigma_2^b$ Female $+ \mu_r + u_{irt}$.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Table A3.1: Overview over different datasets

Data set	Access	Type	Main variables	Years
Migration statistics	Sonderaus-wertung	admin	Inflow from East Germany by age groups	1991 - 2015
Microcensus	on-site use	admin	Women's labor supply Socio-economic characteristics	1982, 1985, 1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2008, 2010, 2012, 2013, 2015
Socio-economic Panel Study (SOEP)	(on-site use)	survey	East Germans in friendship network and intermarriage rates	1985 - 2015
German General Social Survey (ALLBUS)	on-site use	survey	Social norm and beliefs	2000, 2004, 2008, 2012, 2016
Population statistics	open access	admin	Population size by age	1990 - 2015
Child care statistics	open access	admin	Child care ratios for different age groups	1986, 1994, 1998, 2002, 2007 - 2015
Regionaldatenbank DJI	open access	admin	Various county charact. mainly based on Population Census and Occupation Census	1986, 1987, 1989

Table A3.2: County correlates

	High inflow from East Germany		High inflow from West Germany	
	(1)	(2)	(3)	(4)
Industry sector in 1987: Share of employees working in ...				
Agriculture and forestry	0.717*	0.142	-2.343***	-2.281***
	(0.401)	(0.387)	(0.381)	(0.358)
Trade	0.530	-0.100	-2.053***	0.457
	(0.768)	(0.521)	(0.760)	(0.552)
Manufacturing	2.961	2.702*	-11.315***	-7.698***
	(1.960)	(1.610)	(1.861)	(1.527)
Energy, water supply and mining	-0.291	-0.069	-0.755***	-0.273
	(0.212)	(0.201)	(0.208)	(0.197)
Firm structure in 1987: Share of employees working in ...				
Small firms (2 - 19 employees)	1.471	0.601	-1.497*	-3.398***
	(0.908)	(0.991)	(0.907)	(0.905)
Large firms ($\geq$ 100 employees)	-0.069	-0.033	0.225***	0.334***
	(0.060)	(0.068)	(0.058)	(0.059)
Religion in 1987:				
Christian religion	-0.175	0.790	-3.371***	-4.806***
	(0.757)	(0.676)	(0.733)	(0.606)
Other / no religion	0.423	-0.910	3.558***	4.808***
	(0.747)	(0.663)	(0.719)	(0.584)
Voting outcomes in 1989:				
Vote share Christian Democratic Union	0.398	0.573	-5.168***	-6.311***
	(0.886)	(0.988)	(0.837)	(0.788)
Vote share Social Democratic Party	0.327	0.841	0.051	0.566
	(0.885)	(0.656)	(0.885)	(0.610)
Vote share Greens	-0.165	-0.477	1.860***	2.480***
	(0.315)	(0.343)	(0.297)	(0.284)
Vote share Free Democratic Party	-0.077	0.049	0.519***	0.632***
	(0.130)	(0.093)	(0.126)	(0.089)
Formal child care and expenditures in 1986:				
Child care ratio (0–2 year olds)	0.070	-0.002	0.629***	0.722***
	(0.147)	(0.164)	(0.142)	(0.157)
Child care ratio (3–6 year olds)	-2.068	4.216**	5.345**	3.360**
	(2.410)	(1.683)	(2.394)	(1.619)
After-school care ratio (6–9 year olds)	-0.725	-0.844	2.960***	3.595***

Continued on next page

	High inflow from East Germany		High inflow from West Germany	
	(1)	(2)	(3)	(4)
	(0.500)	(0.556)	(0.473)	(0.508)
Child and youth welfare expenditures	-0.155	-0.190	0.594***	0.703***
	(0.113)	(0.131)	(0.109)	(0.118)
Population composition in 1987:				
Share singles	1.591	-0.171	-7.764***	-2.275*
	(1.915)	(1.279)	(1.866)	(1.343)
Share married	2.575	1.218	-10.795***	-3.744**
	(2.414)	(1.554)	(2.340)	(1.650)
Share divorces	0.014	-0.046	0.118	0.803***
	(0.205)	(0.161)	(0.205)	(0.161)
Share foreigners	-0.477	-0.433	0.091	1.197***
	(0.419)	(0.400)	(0.420)	(0.403)
Share single households	-0.572	-1.085	5.964***	7.365***
	(0.872)	(0.979)	(0.803)	(0.838)
Share households ≥ 4 person	1.597	0.700	-8.875***	-6.622***
	(1.279)	(1.101)	(1.181)	(1.006)
Housing in 1987:				
Average rent (per m^2 in DM)	-0.509	-0.471**	0.476	0.864***
	(0.348)	(0.206)	(0.349)	(0.176)
Average number of rooms per person	0.034***	0.027***	0.044***	0.024***
	(0.008)	(0.008)	(0.008)	(0.008)
Female labor supply in 1987:				
Share female employees	1.067***	0.388	1.668***	1.218***
	(0.349)	(0.403)	(0.341)	(0.365)
Share of women working part-time	0.705*	0.471	0.174	0.478
	(0.425)	(0.359)	(0.426)	(0.348)
Share of women working as family worker	0.484	0.297	-1.437***	-2.263***
	(0.324)	(0.359)	(0.315)	(0.314)
Distance to former East boarder:				
Distance (in km)	-64.034***	-55.719***	-0.067	8.384
	(8.284)	(7.822)	(9.035)	(8.211)
Observations	316	316	316	316

Notes: Each coefficient is obtained from a separate regression. Column (2) and column (4) include state fixed effects. Similar patterns emerge when using continuous inflow shares (standardized to have mean zero and standard deviation one to make the magnitudes of the coefficients comparable across inflows from East and West Germany). The data is mainly based on population and occupation Censuses.
Source: DJI Regionaldatenbank (1993), BBSR (2017), own calculation.

Table A3.3: Difference-in-differences estimates - robustness and sensitivity checks

Panel A: treatment definition	Working hours of women		Working hours of employed women		Relative working hours within households	
	25 vs. 75 (1)	continuous (2)	25 vs. 75 (3)	continuous (4)	25 vs. 75 (5)	continuous (6)
DiD coefficient	0.721	0.287	2.589***	1.721***	0.016***	0.015***
	(0.672)	(0.505)	(0.300)	(0.445)	(0.002)	(0.003)
State x year FE	✓	✓	✓	✓	✓	✓
Ind. controls	✓	✓	✓	✓	✓	✓
Observations	690,896	1,373,594	507,466	1,026,126	316,424	648,386
Panel B: sample restrictions	Working hours of women		Working hours of employed women		Relative working hours within households	
	all cohorts (1)	no boarder (2)	all cohorts (3)	no boarder (4)	all cohorts (5)	no boarder (6)
DiD coefficient	-0.044	0.494	1.013***	0.996***	0.006***	0.005***
	(0.380)	(0.329)	(0.355)	(0.285)	(0.002)	(0.002)
State x year FE	✓	✓	✓	✓	✓	✓
Ind. controls	✓	✓	✓	✓	✓	✓
Observations	1,855,582	1,204,709	1,343,695	896,884	824,547	569,367
Panel C: placebos	Working hours of women		Working hours of employed women		Relative working hours within households	
	male (1)	west-west (2)	male (3)	west-west (4)	west-west (5)	
DiD coefficient	0.289	-0.216	0.160	0.114	0.001	
	(0.239)	(0.198)	(0.122)	(0.115)	(0.001)	
State x year FE	✓	✓	✓	✓	✓	
Ind. controls	✓	✓	✓	✓	✓	
Observations	1,375,725	1,375,725	1,296,065	1,296,065	648,386	

Notes: Difference-in-difference coefficients from equation (3.1) using different treatment definitions in Panel A, different sample restrictions in Panel B and placebo outcome and treatment indicator in Panel C. For set of individual controls see Table 3.1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Table A3.4: SOEP descriptives statistics

	Mean	Std. Dev.	Min	Max	N
Friendship network:					
Share friends from East Germany	0.03	0.13	0.00	1.00	52293
At least one friend East Germany	0.05	0.22	0.00	1.00	52293
Partner from East Germany	0.00	0.05	0.00	1.00	242369
Covariates:					
Female	0.48	0.50	0.00	1.00	242369
Age	42.73	15.09	14.00	92.00	242369
Years of education	11.57	2.52	7.00	18.00	242369
$<$ 20,000 Inhabitants	0.42	0.49	0.00	1.00	242369
20,000–100,000 Inhabitants	0.30	0.46	0.00	1.00	242369
$\geq$ 100,000 Inhabitants	0.28	0.45	0.00	1.00	242369
Protestant	0.40	0.49	0.00	1.00	242369
Catholic	0.40	0.49	0.00	1.00	242369
Other religion	0.02	0.15	0.00	1.00	242369
No religion	0.13	0.33	0.00	1.00	242369
Female labor market outcomes (replication):					
Working hours	15.71	16.45	0.00	80.00	99166
Working hours of employed women	30.62	13.56	0.10	99.90	65542
Relative working hours within household	0.40	0.15	0.00	0.99	48686

Notes: The sample includes all individuals with non-missing information on friendship network, who are currently living in West Germany and did not live in East Germany in 1989. The replication sample is restricted to women aged between 25 and 55. Descriptive statistics are weighted using provided survey weights.
Source: SOEP 1984-2017, own calculation.

Table A3.5: ALLBUS descriptives statistics

	Mean	Std. Dev.	N
Social norms and beliefs:			
Index	0.00	(0.776)	6,009
Norm 1	1.630	(0.848)	6,009
Norm 2	2.471	(0.898)	6,009
Norm 3	2.292	(1.029)	6,009
Covariates:			
Female	0.513	(0.500)	6,009
Age	48.422	(17.175)	6,009
Primary Education	0.145	(0.353)	6,009
Secondary Education	0.513	(0.500)	6,009
Tertiary Education	0.342	(0.474)	6,009
Protestant	0.418	(0.493)	6,009
Catholic	0.402	(0.490)	6,009
Other Religion	0.030	(0.170)	6,009
No Religion	0.000	(0.000)	6,009
$<$ 20,000 Inhabitants	0.610	(0.488)	6,009
20,000-100,000 Inhabitants	0.101	(0.301)	6,009
$>$ 100,000 Inhabitants	0.289	(0.454)	6,009

Notes: The sample includes all individuals with non-missing information, who are currently living in West Germany and did not spent their youth in East Germany.
Source: ALLBUS 2000-2016, own calculation.

Table A3.6: Microcensus descriptive statistics - East German women in West Germany

	Mean	Std. Dev.	N
Female labor market outcomes			
Working hours	26.585	15.837	17,859
Working hours of employed women	31.624	11.789	15,013
Relative working hours within household	0.405	0.121	9,948
Individual controls			
Age	41.100	7.874	18,902
Foreign nationality	0.019	0.135	18,902
Individual potentially endogenous controls			
Married	0.701	0.458	18,902
Divorced	0.137	0.344	18,902
Widowed	0.016	0.125	18,902
Single	0.145	0.353	18,902
No children in household	0.524	0.499	18,902
1 child in household	0.263	0.440	18,902
2 children in household	0.172	0.377	18,902
3 children in household	0.034	0.182	18,902
4 children in household	0.006	0.075	18,902
5 or more children in household	0.002	0.040	18,902

*Notes:*The sample includes all women aged 25 - 55 with non-missing information on individual controls, who are currently living in West Germany and have an East German educational degree.
Source: Microcensus 1982-2015, own calculation.

Table A3.7: Difference-in-differences estimates - controls

	Dependent variable								
	Working hours of women			Working hours of employed women			Relative working hours within households		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
DiD coefficient	0.343	0.403	0.603	0.865***	0.912**	1.062***	0.005***	0.007***	0.007***
	(0.308)	(0.355)	(0.391)	(0.299)	(0.357)	(0.368)	(0.002)	(0.002)	(0.002)
State x year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ind. exog. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ind. endog. controls		✓	✓		✓	✓		✓	✓
Partner endog. controls			✓			✓			✓
Observations	1,373,594	1,373,594	985,410	1,026,126	1,026,126	693,520	648,386	648,386	643,503

Notes: Difference-in-difference coefficients from equation 3.1 using different vectors of controls. For the different set of individual controls see Table 3.1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Table A3.8: Difference-in-differences estimates - heterogeneity

	Working hours of women			Working hours of employed women			Relative working hours within households		
Stratified by	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	low	middle	high	low	middle	high	low	middle	high
Education	0.271	0.749**	0.535	1.274***	0.704***	0.088	0.009***	0.004*	0.000
	(0.274)	(0.319)	(0.491)	(0.368)	(0.242)	(0.344)	(0.003)	(0.002)	(0.003)
		no	yes		no	yes		no	yes
Married		0.234	0.431		0.614**	0.974***		0.006*	0.006***
		(0.44144)	(0.33021)		(0.30168)	(0.34234)		(0.00295)	(0.00217)
	<3	[3,6]	>6	<3	[3,6]	>6	<3	[3,6]	>6
Age of youngest child	0.813	0.667	0.273	0.991*	1.629***	1.465***	0.002	0.011***	0.010***
	(0.595)	(0.505)	(0.491)	(0.540)	(0.579)	(0.515)	(0.004)	(0.004)	(0.003)

Notes: Difference-in-difference coefficients from equation (3.1) assessing heterogenous effects by highest schooling degree, marital status and age of the youngest child. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Table A3.9: Compositional changes - outflows and inflows

Panel A: outflow in other west regions		stratified by age groups					
	overall	[0,17]	[18,24]	[25,29]	[30,49]	[50,64]	≥65
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean of dep. variable	27941	4279	5639	5184	9257	2075	1507
HighInflow	-4865	-654	-713	-1040	-1906	-353	-198
	(4933)	(721)	(802)	(900)	(1873)	(423)	(276)
Observations	1728	1728	1728	1728	1728	1728	1728
Adj. R-squared	0.012	0.009	0.009	0.017	0.013	0.008	0.006
Panel B: inflow from other west regions		stratified by age groups					
	overall	[0,17]	[18,24]	[25,29]	[30,49]	[50,64]	≥65
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean of dep. variable	27387	4226	5517	5056	9069	2038	1482
HighInflow	-845	-947	-918	-1961	-356	-194	-5220
	(651)	(946)	(1044)	(1859)	(343)	(224)	(4996)
Observations	1728	1728	1728	1728	1728	1728	1728
Adj. R-squared	0.021	0.012	0.010	0.014	0.013	0.009	0.014

Notes: Outflow (number of individuals) in other West German regions (Panel A) and inflow (number of individuals) from other West German regions (Panel B) of treated relative to control regions in post re-unification years (1991 - 2015). Regressions control for year fixed effects. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: BBSR (2017), own calculation.

Table A3.10: SOEP - replication

	Dependent variable								
	Working hours of women			Working hours of employed women			Relative working hours within households		
Mean of dep. var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
before reunification	15.66	15.66	15.66	32.29	32.29	32.29	0.402	0.402	0.402
DiD coefficient	-0.952	0.007	-0.324	0.966	0.649	0.617	0.009	0.008	0.009
	(0.647)	(0.768)	(0.721)	(0.720)	(0.904)	(0.889)	(0.008)	(0.011)	(0.011)
State x year FE		✓	✓		✓	✓		✓	✓
Ind. controls			✓			✓			✓
Observations	102259	102259	102259	66961	66961	66961	49893	49893	49893
Adj. R-squared	0.018	0.025	0.099	0.024	0.026	0.043	0.016	0.022	0.029

Notes: Difference-in-difference coefficients from equation (3.1). For set of individual controls see Table A3.4.
* 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: SOEP 1985-2017, BBSR (2017), own calculation.

Table A3.11: Difference-in-differences estimates - inference

	Dependent variable								
	Working hours of women			Working hours of employed women			Relative working hours within households		
Mean of dep. var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
before reunification	21.62	21.62	21.62	34.78	34.78	34.78	0.42	0.42	0.42
DiD coefficient	-0.167	0.443	0.343	0.919	0.984	0.865	0.008	0.006	0.005
Clustering of se									
Ror level	(0.299)	(0.334)	(0.308)	(0.282)***	(0.357)***	(0.300)***	(0.002)***	(0.002)***	(0.002)***
State level	(0.533)	(0.512)	(0.457)	(0.423)*	(0.618)	(0.544)	(0.003)**	(0.004)	(0.003)
No clustering	(0.090)*	(0.112)***	(0.111)***	(0.072)***	(0.092)***	(0.091)***	(0.001)***	(0.001)***	(0.001)***
Aggregated data	(0.308)			(0.280)***			(0.002)***		
State x year FE		✓	✓		✓	✓		✓	✓
Ind. controls			✓			✓			✓
Observations	1,373,594	1,373,594	1,373,594	1,026,126	1,026,126	1,026,126	648,386	648,386	643,503

Notes: Difference-in-difference coefficients from equation (3.1) using different levels and methods to cluster standard errors. For set of individual controls see Table 3.1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Table A3.12: Expansion of publicly funded child care

Panel A: under 3 year olds	(1)	(2)	(3)	(4)	(5)	(6)
Mean of dep. variable in 1986	1.438	1.438	1.395	1.438	1.438	1.395
HighInflow	1.264**	1.266**	1.014***			
	(0.493)	(0.499)	(0.344)			
Distance to East boarder				-0.013***	-0.018***	-0.015***
				(0.003)	(0.003)	(0.003)
State x year FE		✓	✓		✓	✓
Pre-treat county char.			✓			✓
Observations	3,785	3,785	3,713	3,785	3,785	3,713
Adj. R-squared	0.814	0.822	0.874	0.798	0.835	0.901
Panel B: full-day care over 3 year olds	(1)	(2)	(3)	(4)	(5)	(6)
Mean of dep. variable	27.076	27.076	26.827	27.076	27.076	26.827
HighInflow	3.135**	3.135**	3.647***			
	(1.315)	(1.328)	(0.912)			
Distance to East boarder				-0.018**	-0.032***	-0.045***
				(0.009)	(0.008)	(0.008)
State x year FE		✓	✓		✓	✓
Pre-treat county char.			✓			✓
Observations	2,219	2,219	2,177	2,275	2,275	2,177
Adj. R-squared	0.470	0.467	0.785	0.096	0.473	0.792

Notes: All estimates include state and year fixed effects. Columns (3) and (6) include the rich set of pre-treatment county characteristics shown in Table A3.2. Standard errors clustered at regional level. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.
Source: Statistisches Bundesamt (2017), Regionaldatenbank DJI (1993), BBSR (2017), own calculation.

Appendix B: Additional background

B3.1 Identifying West and East Germans in various datasets

B3.1.1 Mircrocensus

In the Microcensus, we cannot directly observe where people grew up, i.e. whether they grew up in West Germany or under the regime of the former German Democratic Republic (GDR) in East Germany. Instead, we rely on information about the highest schooling or vocational degree. We restrict the analysis to individuals born between 1945 and 1975 to ensure we capture all movers and exclude them from our analysis, i.e. individuals who grew up under the former GDR regime and then moved to West Germany.

We define someone as West German if they did not grew up under the former GDR regime and thus have no degree from a POS (*Politechnische Oberschule*), a degree from an EOS (*Erweiterte Oberschule*) or a degree from one of the GDR colleges (*Fachschulen*). In the former GDR, the POS were established in 1959 and replaced the former comprehensive primary schools (*Einheitsschule*). All children from the age of six were obliged to enroll in POS, which was first designed as an eight year track and later extended to 10 years of schooling (e.g. Anweiler; 2013). A small fraction of children was allowed to continue in an EOS (about 10 %) which prepared pupils for entry into higher education (*Fachschulen*). The fraction of children leaving without a schooling degree was relatively low. Handicapped and/or children with learning disabilities were taught in special schools. We can not identify East Germans if they leave without a schooling degree or a degree from a special school. To adress the former, we exclude individuals without a schooling degree or missing information from our estimation sample. Since the rate of marriage between East and West Germans in West Germany is very low (see also table 3.5), we use a household definition to best capture and exclude all individuals who grew up in East Germany from the analysis.

B3.1.2 SOEP

Identifying individuals who grew up in West Germany in the German Socio-Economic Panel (SOEP) is straightforward. All respondents are asked if they lived in East or

West Germany in 1989. We define all individuals who lived in West Germany in 1989 as West Germans.

B3.1.3 ALLBUS

In the German General Social Survey (ALLBUS), we have information on the state where the respondent spent their youth and were they were born. Thus, we can infer if someone grew up in West Germany. Individuals growing up in Berlin are excluded from our estimation sample.

B3.1.4 Migration data

In the migration data we have yearly, county level information on the total number of individuals who moved to one of the West German counties and had their last place of residence in one of the East German counties. Thus, we know the county of origin and the destination county for each individual who moved between 1991 and 2015. In particular, in the early years after the fall of the wall, there was hardly any West to East migration. Thus, we can precisely capture inflows from East Germany. In later years, we can not assume with certainty that individuals moving from East to West Germany actually grew up under the GDR regime. However, we cannot track individuals over time. Thus, we are unable to observe subsequent moves and cannot exclude that some of the East Germans moved from one to another county in West Germany .

B3.1.5 Bounding the potential measurement error in the Microcensus

One major threat to our interpretation would be to misclassify East German women as West Germans. This would mechanically bias our estimates upwards since East German women exhibit strikingly different labor market outcomes even after moving to the western part of Germany. In the following, we provide a simple back of the envelope calculation to bound the potential effect bias in the Microcensus caused by this measurement error. To do this, we first estimate the share of women from East Germany who are now living in West Germany (overall and by treatment status) using different data sets. Second, we validate our Mircrocencus measure using the East German sample to estimate the fraction that we misclassify. Third, we bound

the potential effect bias, using actual labor market outcomes of East German women in West Germany.

Estimating the overall share of women (or men) in West Germany who grew up under the former GDR regime is difficult. This is one major reason why we rely on exact migration statistics and do not take crudely estimated stocks of East Germans as our main independent variable. In the Microcensus, based on educational degrees, we obtain an average share of East German women in West Germany of about 3.77 %; 3.86 % (6.51 % in 2015) in treated (HighInflow) and 2.72 % (4.76 % in 2015) in control regions (see also figure B3.1).

Using SOEP data and applying the same age and cohort restriction as in our main analysis gives an estimate of about 2.6 % (standard deviation of 15.80), 3.1 % (4.3 % in 2015) in treated regions and 2.1 % (2.9 % in 2015) in control regions. Remember that in the SOEP every individual is asked about the place of residence in 1989. However, given the small sample size and the panel structure of this data set, this share is not very precisely estimated. We use this share as a lower bound. Estimating the share of East Germans in West Germany using our migration data (BBSR; 2017), and assuming that all individuals stayed in West Germany after migrations, gives an averages share of about 3.7 % in post-reunification years (6.5 % in 2015); 4.8 % (8.3 % in 2015) in treated and 2.7 % (4.9 % in 2015) in control regions. There are several reasons why this share is likely to be overestimated. Some East Germans might move abroad, back to East Germany or die. In addition, we might misclassify some West Germans who moved to East Germany and then returned. Also note that we can not differentiate between men and women. We use this estimate as an upper bound, for the "true" share of East Germans in our data set.

Next, we validate the Microcensus measure that is based on reported GDR specific educational degrees by estimating the share of East Germans based on the schooling definition in East Germany. Using our sample restrictions described above, we get a share of 95 % in 1991 (the first wave available in East Germany). Under the assumption that East German women in West Germany exhibit similar reporting errors, we only miss 5 % of East German women in West Germany. This remaining 5 % could either be individuals who went to one of the special schools or individuals who misreport their highest schooling degree. Under the assumption that the measurement error does not differ between East German movers and stayers as well as

taking the average share of East German women in West Germany from the Microcensus (3.77 %), we can identify 99.8115 % (100 - 0.05 * 3.77) of West stayer women correctly, i.e. we have about 0.1885 % East German women in our West German sample. In treatment regions this corresponds to 99.807 % correctly identified West German women and 99.864 % correctly identified West German women in control regions. Thus, the difference between treatment and control regions in the fraction of correctly identified West German women amounts to about 0.057 %.

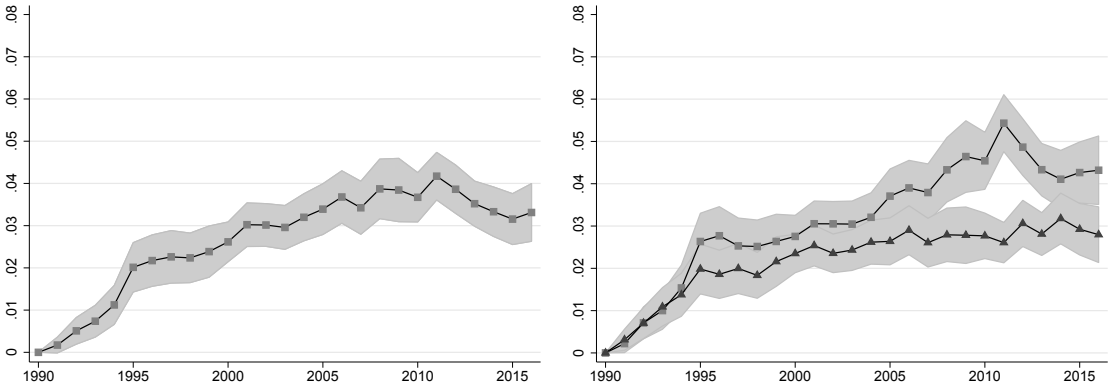
Using the estimates SOEP numbers, gives us a lower bound of 99.87 % (100 - 0.05 * 2.6) of correctly identifies West German women and using the migration statistic an upper bound of 99.815 % (100 - 0.05 * 3.7). Differentiating these numbers by treatment and control regions provides us with the following estimates: in treated regions a lower bound based on SOEP data of 99.845 % (100 - 0.05 * 3.1) and an upper bound based on migration statistics of 99.76 % (100 - 0.05 * 4.8). The respective shares in control regions are 99.895 % (100 - 0.05 * 2.1) based on SOEP data and 99.865 % (100 - 0.05 * 2.7) based on migration statistics. Thus, the difference between treatment and control regions in the fraction of correctly identified West Germans amounts to 0.05 % in SOEP data and 0.085 % in the migration statistic.

Now assume that East German women exhibit similar labor supply patterns in treatment and control regions: They work on average 3.6 hours more per week than West German women, employed East German women work 1.9 hours more than employed West German women and a 3.1 ppt higher share of total working hours within households. Applying the estimated differences in misclassification between treatment and control regions to these different labour market outcomes, gives the following result: The misclassification might cause a positive bias of 0.0021 hours per week (0.00057 * 3.6 hours), 0.0011 hours (0.00057 * 1.9 hours) and 0.0018 ppt (0.00057 * 0.31 ppt). The lower bound based on SOEP data corresponds to 0.0020 hours (0.00055 * 3.6 hours), 0.0011 (0.00055 * 1.9 hours) and 0.0002 ppt (0.00055 * 0.31 ppt) for the respective outcomes. The upper bound based on migration statistics correspond to 0.0031 hours (0.00085 * 3.6 hours), 0.0016 (0.00085 * 1.9 hours) and 0.0003 ppt (0.00085 * 0.31 ppt), respectively.

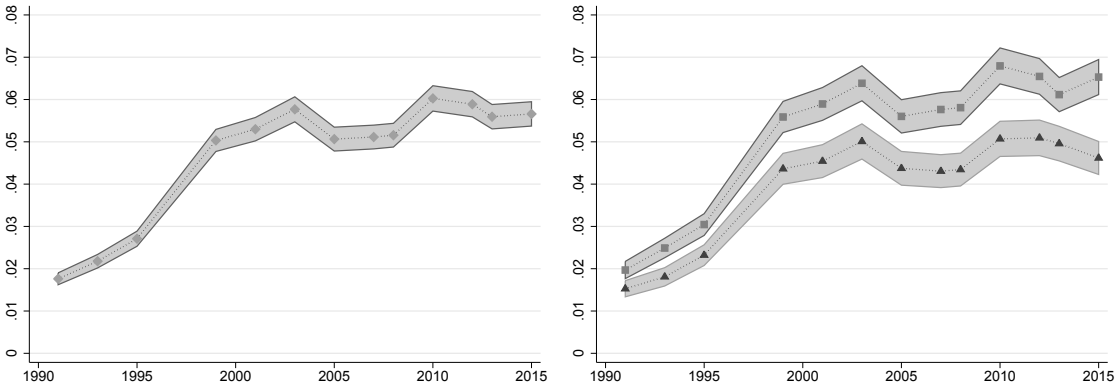
To sum up, the size of measurement error and the resulting effect bias is negligible and cannot drive our results.

Figure B3.1: Share of East Germans in West Germany

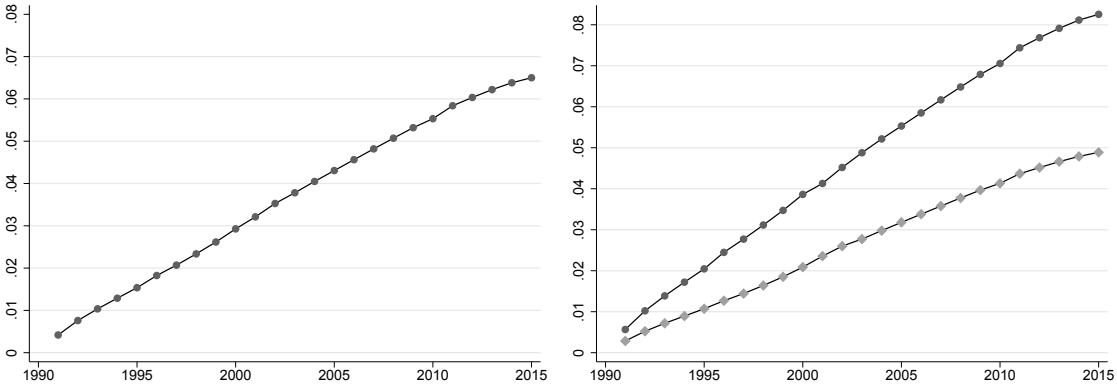
(a) SOEP data



(b) Microcensus data



(c) Migration data



Notes: The figures plot the share of East Germans who live in West Germany relative to the total population in West Germany using different data sets. The right hand figures show the share overall and the right hand figures the share separately for treatment (HighInflow) and control regions.

Source: SOEP 1990-2015, Microcensus 1991 - 2015, BBSR (2017), own calculation.

B3.2 Context

In this section, we provide a more detailed description of the context, especially with respect to women's labor supply and family policies in East and West Germany before and after reunification.

B3.2.1 East and West Germany before reunification

Women in the labor market The socialistic regime in the former GDR promoted female qualified employment for several reasons (e.g. Trappe; 1996, 2014; Behrend; 1990). First, the government of the GDR was committed to the socialist idea of equality, in particular with respect to gender. The constitution of the former GDR established equal legal and political rights of women and men already in 1949, though women's emancipation was primarily focused on labor market integration and only later on educational attainment. Thereby, full-time employment was propagandized as the moral duty of women. Second, there was an economic need to integrate women in the labor force due to the aftermath of World War II and the resulting need to reconstruct. The demand for labor was further intensified by the big wave of outmigration between 1949 and the construction of the wall in 1961; about 2.7 million (14 % of the 1949 population) left the GDR in that time window. In addition, families faced strong economic incentives to live the full-time-dual-earner model, i.e. they were economically dependent on two full incomes to make a living.

Despite the propagandized equality of sexes in terms of intensive and extensive margin labor force participation, the labor market in the former GDR remained segregated by gender, both with respect to occupation but also within occupations, e.g. leadership positions were still primarily hold by men (e.g. Winkler; 1990; Langenhan and Roß; 1999; Trappe; 2014). Regarding non-paid work, e.g. housework or child rearing, the division between sexes remained fairly "traditional". For example, based on data from time use surveys in the former GDR, which were conducted every 5 years starting in 1974, it is evident that, although women between the age of 16 and 65 provided only about 1 hour per day less paid work than men (including weekends), the time devoted to housework was about three times higher than men's in 1974. However, it decreased substantially through 1990 (to about double than men). In addition, it was primarily women who devoted time to caring for the children (e.g. Priller; 1993).

In West Germany, on the other hand, policies and social norms set strong incentives for people to live within traditional role patterns, i.e. the traditional "breadwinner and non-employed housewife" model (e.g. Wippermann; 2015). Gender equality by law was only established in 1958. Until 1977, a married women was, by law, only allowed to work if she did not neglect her domestic responsibilities and the husband had the sole right to decide on family issues. The labor force participation of women remained rather low until the 1990s. Women usually either stayed at home after they had children or entered part-time employment after an extended break. Labor force participation of women and men (overall and with children)is depicted in Figure B3.2, working hours in Figure B3.3, and full-time employment in B3.4.

Publicly funded child care and other family policies In order to improve reconciliation of work and family life, in the former GDR the provision of publicly funded child care was massively expanded starting in the 60's (Figure A3.1). Nursery schools (*Krippen*) for children under the age of three, kindergartens for children above age three until school start (*Kindergarten*) and after-school care (*Hort*) for primary school aged children were available almost universally, with no fees. Nursery schools were under the authority of the Ministry of Health (*Ministerium für Gesundheitswesen*) and mainly provided by public providers (only a small fraction was provided by companies and churches). Kindergartens and after-school care was organized by the Ministry of Education (*Ministerium für Volksbildung*). By 1989, about 80 % of children under the age of three, more than 95 % of children above the age of three (see also figure A3.1) and 85 % of primary-school-aged children attended after-school care. In urban regions, the respective shares were almost 100 % (e.g. Statistisches Amt der DDR; 1950–1990).

Formal child care was propagandized as more professional and of better quality than informal care provided by friends or grandparents (e.g. Konrad; 2012). The structural quality was evaluated and improved constantly, e.g. the child-teacher ratio for children above the age of three was reduced from about 16:1 in 1955 to 10:1 in 1988 (e.g. Statistisches Amt der DDR; 1950–1990). It was characterized by long opening hours (from 6 am to 7 pm from Monday to Friday), a fixed curriculum (*Bildungs- und Erziehungsplan*) and provided meals. Up to 10 % (in 1960) of the slots for children were provided in so called *Dauerheime* or *Wochenkrippen* - institutions where children remained during the whole week (Monday-Friday) without going home. Other family policies that sought to increase the reconciliation of work

and family life and support families in general were gradually expanded, e.g. maternity leave policies became more generous, there were housing subsidies for families with children, and it became prohibited to dismiss pregnant women and women with small children (e.g. Obertreis; 1986).

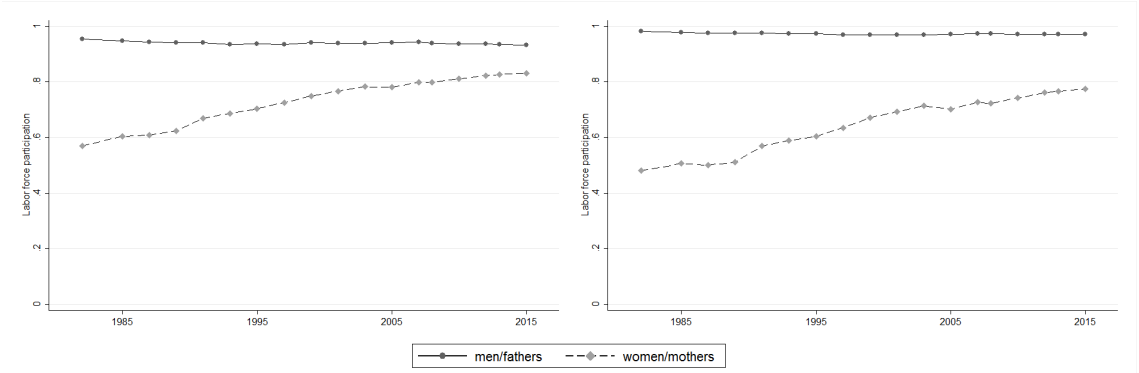
In West Germany on the hand, there was hardly any provision of publicly funded child care for children under the age of three and school-aged children before reunification, with the exception of West Berlin. In 1990 almost 30 % of available child care places in West Germany were provided in West Berlin, 20 % of children younger than three attended publicly funded child care and 30 % were enrolled in after-school programs. In our analysis, we exclude West Berlin. The fraction of children attending publicly funded child care remained below 2 % until 1998 and only about 5 % of elementary school-aged children in West Germany attended after-school programs before 1989. Most child care was provided informally be the mother, grandparents or friends (e.g. Büchel and Spieß; 2002; Spieß; 2011). Other family policies, including the tax system and maternal leave regulations, also promoted the traditional division of work within households. There was a heated public, political and scientific debate (e.g. Schütze; 1986; Fthenakis; 1989) about the consequences of maternal employment and formal child care (often called *Fremdbetreuung* - an innately negative term for formal care) for children and marriage.

B3.2.2 East and West Germany after reunification

Since reunification, female labor force participation in West Germany increased strongly, though large regional variations persist. By 2015, almost 84 % of women in West Germany participated in the labor force, compared to only 63 % in 1989 (Figure B3.2). The increase in labor force participation was even stronger for mothers, i.e. from 52 % in 1989 to 78 % in 2015. However, as shown in figure B3.3, the increase in average weekly hours worked by women (and mothers) was only about 5 hours, for women in employment it decreased from around 33 hours to 30 working hours per week (for mothers from 32 to 27 hours). Similarly, in figure B3.4, the share of women (mothers) working full-time decreased from around 62 % in 1989 to about 47 % in 2015 (for mothers from 48 % to 29 %). This indicates that in Germany (in contrast to other OECD countries) the change in labor supply happened along the extensive margin, i.e. women entering in part-time employment.

Figure B3.2: Labor force participation in West Germany (1982 - 2015)

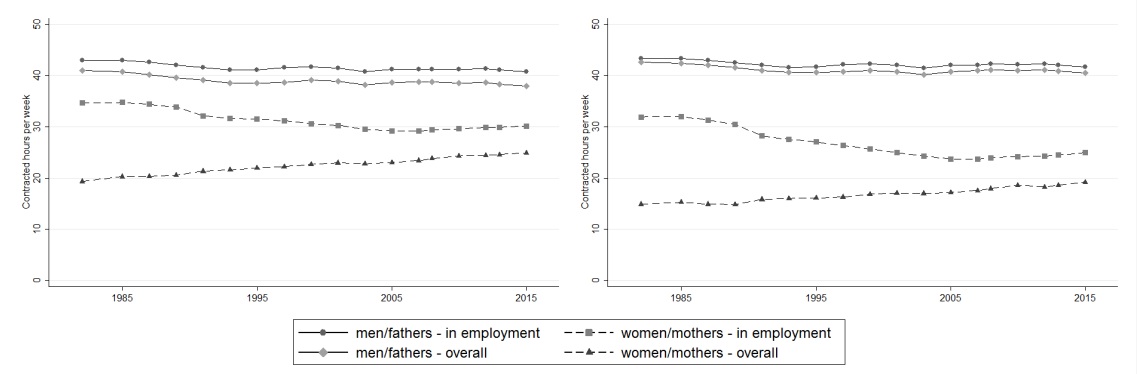
(a) Women and men (b) Mothers and fathers



Notes: The figures plots labor force participation of (a) women and men and of (b) mothers and fathers over time. The sample is restricted to individuals aged between 25 and 55 living in West Germany.
Source: Microcensus 1982-2015, own calculation.

Figure B3.3: Working hours in West Germany (1982 - 2015)

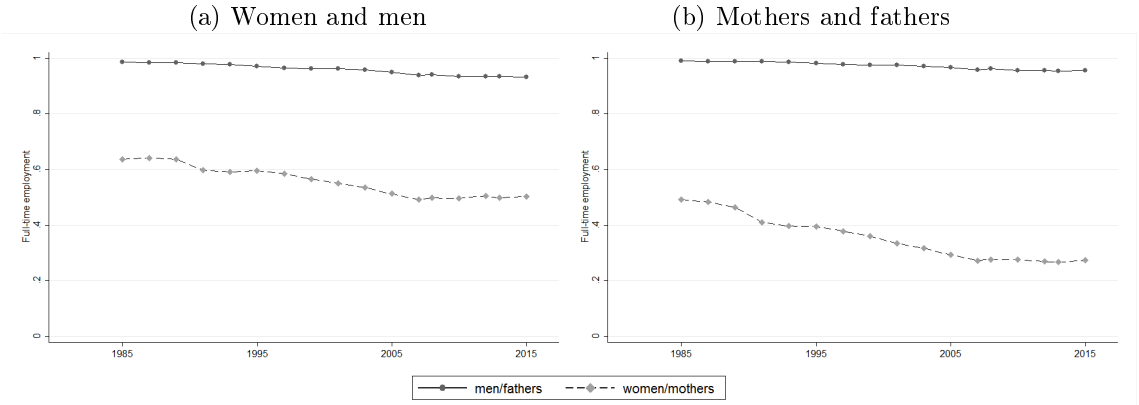
(a) Women and men (b) Mothers and fathers



Notes: The figures plots working hours of (a) women and men and of (b) mothers and fathers over time. The sample is restricted to individuals aged between 25 and 55 living in West Germany.
Source: Microcensus 1982-2015, own calculation.

In addition, in West Germany there was a massive expansion of publicly funded child care along the intensive and extensive margin. The fraction of children below the age of three in publicly funded child care increased from 1.4 % in 1994 to 33 % in 2016. For children aged three and over, the share increased from 75 to 94 %, respectively. However, the increase in child care provision happened heterogeneously across counties. Other family policies, e.g. the parental leave benefit reform

Figure B3.4: Full-time employment in West Germany (1985 - 2015)



Notes: The figures plots the fraction of (a) women and men and of (b) mothers and fathers in full-time employment (conditional on labor force participation) over time. The sample is restricted to individuals aged between 25 and 55 living in West Germany.
Source: Microcensus 1982-2015, own calculation.

in 2006 (Spieß and Wrohlich; 2008), also shifted toward supporting reconciliation of work and family life. However, family policies in reunified Germany reflect the ongoing conflict between supporting and incentivizing traditional family models and increasing the compatibility of work and family duties for dual-earner families. For example, married couples are taxed jointly within a splitting income taxation system that sets strong incentive for an unequal division of paid work within married couples. Another example is a family subsidy for stay-at-home mothers who do not use publicly funded child care. It was introduced on the federal level in 2013 and then abolished in 2015, but continued to be in place in some German states.

In East Germany, there was a substantial decrease in labor force participation of women, partial was driven by a significant cut in child care funding, and thus, in the number of available places (see also Figure A3.1), the adoption of West German family policies, and the general economic crisis that triggered substantial mass layoffs.

Chapter 4

The impact of publicly funded child care on parental well-being: Evidence from cut-off rules*

*For copyright reasons, this chapter is not included in the online version of my dissertation. It is published as Schmitz S. (2019): The impact of publicly funded child care on parental well-being: Evidence from cut-off rules. *European Journal of Population*, online first, https://doi.org/10.1007/s10680-019-09526-z.

Chapter 5

Understanding day care enrolment gaps*

5.1 Introduction

By school starting age, children of less-educated or foreign-born parents are often behind their peers on measures of child development (e.g. Bradbury et al.; 2015; Carneiro and Heckman; 2003). In many cases, these inequalities are already so deeply ingrained that they are difficult to address through the school system. Day care is considered an effective means of influencing child development in pre-school years, especially for children of less-educated or foreign-born parents.[1] As a result, day care is increasingly seen as an opportunity to "level the playing field" for children of different family backgrounds (e.g. Cornelissen et al.; 2018; Felfe and Lalive; 2018; Havnes and Mogstad; 2011, 2015). However, despite expanding access to day care, there remain enrolment gaps across many OECD countries (e.g. OECD; 2018).

In countries with universal day care, enrolment gaps by family background may be explained by different preferences for day care (i.e. demand) or different barrier to access (i.e. supply). On the demand side, less-educated or foreign-born parents may be less likely to want a day care spot if they prefer informal care arrangements, have more critical attitudes toward day care, expect lower returns to investment in their children, or expect lower returns to working (Boneva and Rauh; 2018; Cunha et al.; 2013). On the supply side, those parents may be disproportionately affected by barriers such as a shortage of places or day care fees (parental contributions).[2] Shortages may disproportionately affect less-educated or foreign-born parents if they have fewer resources (e.g. financial, social, information) to secure scarce slots, or if

*This chapter is based on joint work with Jonas Jessen and Sevrin Waights.

[1]Payoffs exist in general because many skills develop early in life (e.g. Phillips et al.; 2000) and because longer payoff periods make early learning more productive (Becker; 1975). There may also be important "dynamic complementarities" since early inputs strongly affect the productivity of later inputs (e.g. Cunha and Heckman; 2007).

[2]Many OECD countries are characterized by severe day care shortages and high parental fees (OECD; 2017).

the combination of higher workloads and excess demand results in greater applicant discrimination by day care centers.[3] Finally, the presence of day care fees, even if income-adjusted, may discourage lower-income parents from enrolling in day care. The existence of any such mechanisms, in particular those on the supply-side, would have important policy consequences.

In order to investigate demand- and supply-side causes of day care enrolment gaps, we use a large representative survey data set of more than 62,000 children younger than three in Germany. Documenting gaps in day care enrolment, specifically by parental education and parental country of birth,[4] we explore the demand-side role as an explanation for observed gaps by making use of the fact that our data set reports stated preferences for day care irrespective of actual enrolment and examine the supply-side factors of regional availability and cost of places. We create a measure of shortages by taking the difference between demand and supply at the county level that is used in a panel fixed effects model subject to the identifying assumption that changes in shortages are unrelated to changes in other determinants of enrolment gaps within counties, conditional on controls for labor market conditions. Finally, we use the synthetic control method to estimate the impact on enrolment gaps of a substantial reduction of fees due to a policy change in one German federal state.

Our findings indicate that children from less-educated and foreign-born parents are 27 and 39 % less likely to be enrolled in day care, respectively. We show that the demand gaps are much smaller than the enrolment gaps for these children. In some cases, i.e. for children with migrant family backgrounds, there are no demand gaps at all. Thus, differences in demand cannot fully explain the enrolment gaps. Results for shortages are consistent across different fixed effects models; scarcity has a significant effect on the gaps by parental education but not by parental country of birth. The synthetic controls results show that the closing of the enrolment gap by parental education comes about from increasing enrolment by children of less-educated parents with enrolment by children of better-educated parents remaining unchanged after a large reduction in fees. Reducing day care fees (or introducing a more progressive fee structure) and reducing shortages would go a large way toward eliminating the enrolment gap by parental education entirely. However, the enrolment gap for children of foreign-born parents does not respond to changes in

[3] In a randomized controlled trial, Andersen and Guul (2018) show that discrimination by public school teachers is most acute when workloads are high.

[4] These factors are more fixed than income, which is endogenous with day care enrolment.

either shortages or fees as seen in our data, indicating that barriers to access affect this group disproportionately. In light of this result, two things may help reduce the migrant-native enrolment gap: (a) to directly address the potentially greater barriers faced by foreign-born parents, e.g. discrimination, and/or (b) to reduce the shortages of places to below the levels that we observe in our data (i.e. to zero).

This paper is closely related to the literature on the evolution and causes of educational inequalities and intergenerational educational mobility (see e.g. Björklund and Salvanes; 2011, for an overview). The existing economic literature mainly focuses on exploring socio-economic status (SES) gradients in educational attainment or achievement, with a particular focus on higher education (e.g. Boneva and Rauh; 2017; Machin and Vignoles; 2004; Hanushek et al.; 2019). Such gaps are both well documented and well understood in terms of their major determining factors. Conversely, gaps in early educational settings are less well understood, despite the crucial importance of this early phase of life for later outcomes. Large and persistent SES-gaps in enrolment in early education and care are well documented across different institutional settings (e.g. Greenberg; 2011; Magnuson and Waldfogel; 2016; Stahl and Schober; 2018; Zachrisson et al.; 2013). However, the literature on the underlying drivers of such gaps is thin. In particular, it lacks good data capturing demand and regional supply side factors, thus failing to answer convincingly why SES-gaps in enrolment in day care exist. Most previous research on the different demand and supply side factors is purely descriptive and based on cross-country variation (e.g. Pavolini and Van Lancker; 2018) or time variation within a single country or region (e.g. Sibley et al.; 2015).[5] The evidence from these studies is mixed. There is some suggestive evidence that supply-side factors, for example, the availability of day care or its fees, are important for explaining the large SES-gaps in day care enrolment (e.g. Abrassart and Bonoli; 2015; Bainbridge et al.; 2005; Sibley et al.; 2015; Pavolini and Van Lancker; 2018). Others find the fee structure and the level of provision to be less important (Van Lancker; 2018; Van Lancke and Ghysels; 2012). Regarding demand side factors, previous studies show that lower-SES parents of children who are not in day care are somewhat more likely to state that they want to raise their child themselves (e.g. Schober and Spieß; 2013).

[5] In addition, many previous studies define low-socioeconomic status by household income, a problematic approach since the labor supply decision of women on the intensive and extensive margin are likely to be endogenous to day care enrolment.

We address this gap in the literature by using a large and representative data set of children below the age of three in Germany that allows us to not only observe actual day care enrolment but also demand for day care. Thus, we can provide evidence on whether gaps in enrolment in early education and care simply reflect differences in demand between groups. In addition, we use different empirical methods to investigate the role of regional availability of day care spots and fees in explaining gaps by family background. The paper proceeds as follows: Section 5.2 outlines the institutional background, Section 5.3 describes the data used and our empirical strategy. Section 5.4 presents the results, where we start by examining the role of demand, followed by an analysis of day care shortages and day care fees. Section 5.5 concludes.

5.2 Institutional Background

In recent years, there has been a strong political effort to increase the provision of publicly subsidized day care in Germany. Thanks in part to a legal claim for children older than three, in place since 1996, enrolment rates have consistently been above 90 % in the 2010s for this age group. For under threes, enrolment rates were persistently low until around 2005. In 2005, *(TAG)*, and, in 2008, *(KiföG)*, two laws, came into effect on the federal level, committing the federal states and counties to gradually expand day care supply for children under the age of three. From August 2013 onward, every child above the age of one has a legal claim to a place in day care. The reforms lead to a large increase in enrolment rates of children under three. Whereas in 2006 the fraction of children under the age of three enrolled day care was about 12 %, the enrolment rates in 2018 were just under 34 %. Despite this increase, there are large and persistent day care shortages; i.e. demand for day care far exceeds its supply (Alt et al.; 2017). In addition, the expansion has happened heterogeneously across states and counties, resulting in large variation in day care shortages across regions.

In Germany, day care is provided within a universal and strongly subsidized system. Almost all day care places are publicly subsidized and provided by the municipalities themselves or by non-profit organizations, including churches and welfare associations. For example in 2017, 33% of day care institutions were public providers, 59.2% other non-profit organizations, and only 2.6% of institutions were

private and non-charitable (Statistisches Bundesamt; 2017b). On average, public subsidies cover about 70% of day care costs (Spieß; 2013), with some states covering 100% for certain age groups and households.

The remaining proportion of day care costs is partly covered by parental fees. The fees parents pay are usually income-dependent with a progressive fee structure.[6] In some states and municipalities, it also depends on other factors, such as the number of siblings, hours of day care, and type of provision (Autorengruppe Bildungsberichterstattung; 2018). Some low income parents, particularly all welfare recipient families,[7] are exempted from paying fees. Overall, parental fees amount to about 5-10% of average earnings. Thus, they are lower than the OECD average and much lower than in countries with low public subsidies like the US (OECD; 2016, 2019b). However, fees vary widely across regions, income, and family structure (Schmitz et al.; 2017).

Before the introduction of the legal claim to day care for all children above the age of one in August 2013, the federal law (*KiföG*) stipulated that children whose parents (or the single parent) are employed, in education, or receive unemployment benefits (*Leistungen zu Eingliederung in Arbeit im Sinne des Zweiten Buches*) must be granted access to day care.[8] Ultimately, these regulations provided preferential access to households without a stay-at-home parent.

Generally, families can freely decide which day care institution they choose. However, due to severe day care shortages, the number of applications is typically much larger than the number of available spots.[9] The allocation of scarce slots is largely uncoordinated (e.g. Fugger et al.; 2017) and varies by region and the type of provider. Some providers and counties have transparent selection criteria and a centralized application systems, many others do not. For example, public providers sometimes prioritize children who already have or had a sibling in the same facility or live close

[6]Parental fees are not paid to the individual day care institution. Thus, day care centers usually have no financial incentive to take in children from families with higher income. However, they get larger subsidies when they take in children with special needs.

[7]Children from welfare recipient families are in principle entitled to free day care. However, the law is not binding.

[8]Some states and municipalities had additional regulations. For example, they gave priority in access to single parent families or families who do not speak German at home (e.g. Spieß; 2008).

[9]Despite the legal entitlement for all children above the age of one, there are few cases of legal action. According to KiBS data, less than 1% of parents who state having demanded a slot but not receiving one, report having undertaken legal action already.

by. Day care provided by churches might in addition select families based on their religious affiliation (e.g. Herzog and Klein; 2018).

5.3 Data and empirical strategy

5.3.1 Data

In our empirical analysis, we use a unique representative data set, the German Child Care Study *(KiBS)* of the German Youth Institute (DJI).[10] The KiBS is an annual survey of children and their households with a specific focus on children's care arrangements (Alt et al.; 2018). The survey was first conducted in 2012 and we use information from all available waves, covering 2012 through 2016. We focus on children in the under three age group, where there is still considerable variation in day care enrolment. In total, we observe 62,437 children below the age of three, making the data set the largest available to analyze day care enrolment in Germany.

Demand and supply side factors. A unique feature of the data is that parents report whether or not they would like to have a day care place for their child irrespective of actual enrolment. This feature of the data provides us with a convenient measure of day care demand. Given pervasive shortages in the German context, we use actual enrolment as a measure of day care supply.[11] Using these measures, we can calculate day care demand, supply, and shortages (i.e. excess demand) for any given group of children, e.g. in a specific county or of a specific age. Figure 5.1 plots day care demand, supply, and shortages aggregated by the child's age *in months*. Below the age of one, both demand and enrolment rates are very low, but demand jumps when the child turns one.[12] Day care enrolment exhibits a much smaller jump, which results in a substantial increase in shortages at this age. Afterwards, both demand and enrolment increase continuously with a slightly steeper slope in

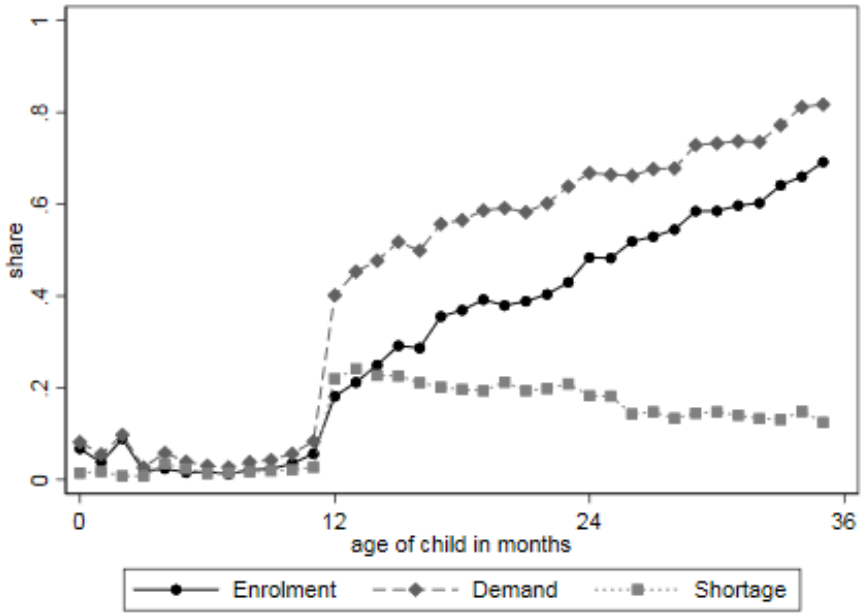
[10]The KiBs samples the same number of children (approx. 800) in each of the 16 federal states per wave. This disproportional sampling design leads to smaller states being oversampled. Survey weights, calculated on the state level, account for this. A comparison of the weighted share of children under the age of three in day care with administrative statistics in Appendix Table A5.1 shows that they resemble each other closely. All figures and tables in this paper are based on weighted calculations using the KiBS data unless indicated otherwise.

[11]Official day care statistics in Germany take the same approach, based on the (reasonable) assumption that the number of free spaces is negligible.

[12]The sudden jump in demand between the 11th and 12th months is likely due to the end of paid parental leave (e.g. Kluve and Schmitz; 2018) and the start of the legal claim to day care (introduced in 2013).

enrolment. Overall, in our sample, 31% of children below three years are in day care. The fraction of parents stating a demand for a place in day care amounts to about 44%. This implies that only 71% of demand is met, thus describing a situation of severe day care shortages.

Figure 5.1: Day care enrolment, demand and shortage by age



Notes: Figure shows day care enrolment, demand and shortages by age of the child.

In our analysis, we consider county level shortages as one main explanatory variable for the existence of enrolment gaps. County-specific day care shortages are defined as the fraction of parents who state that they have demand for a slot in day care but whose children are not enrolled in day care (see Figure A5.2 for the distribution of county-level shortages and the deviations from state averages — the effective variation used for our first specification).[13] County shortages range from 0 to 39.2%.

For our analysis of shortages, we make use of two types of variation: (i) across counties within states, and (ii) within counties over time. Since we aggregate individual data points to create county measures, we restrict the sample to have a minimum of 50 observations per county and year to reduce measurement error. This reduces

[13]When calculating shortages for an individual i in county c and time period t, we always leave individual i out of the calculation, i.e. $S_{-ict} = \frac{1}{N-1} \sum_{n \neq i}^{N} Shortage_{nct}$.

the sample size from 62,473 to 43,691 (and the number of counties from 252 to 95), which has implications for the external validity of our results that we explore in Appendix Table A5.2. In short, our results are a little more relevant for larger, wealthier, and more urban counties. While our restricted sample is no longer perfectly representative of Germany, it remains a significant advancement on previous studies that focus on individual regions or highly selective groups. Furthermore, the results are robust to the removal of this sample restriction.

The data also contains information on day care fees, as reported by parents in one of the study years (2015). As described in the institutional context, fees vary by household income and other characteristics. For those already in day care, average fees are just below 240 Euros a month. Note that this number is larger than hypothetical average monthly fees if *all* children were enrolled in day care, as fees are progressive.

We also have information on a number of other demand side factors, including the number of applications submitted to day care institutions and hours of day care demanded. Furthermore, the respondents are asked about reasons for not enrolling in day care. They are discussed in more detail in section 5.4.1.

Family background. The data sets contains various socio-economic characteristics of the main respondent and the household. We focus on two main indicators to measure enrolment gaps: parental education and parental country of birth. The less-educated parents indicator is equal to one for children where the respondent parent has no university entrance qualification (Abitur) and zero otherwise.[14] The foreign-born parents indicator is defined as being equal to one for children where both parents (or the single parent) are born in a non-Western European and non-North American country.[15] Overall 48% of children are defined as being from a less-educated household and 14% are defined as having foreign-born parents. Our selection of these indicators is based on several factors. Firstly, these are the sub-groups for which enrolment gaps are often documented in research and in the public debate. Secondly, these are the sub-groups most commonly found in the literature

[14]Educational differences by Abitur vs. no-Abitur are reflected in financial resources of the household and tertiary education obtained, making it a variable that captures socio-economic status. Another common distinction made in the literature is whether parents have obtained tertiary education. As this information is not available in all waves, we do not use this measure in our main specification, but report results in the appendix.

[15]We make this distinction since Western European and North American immigrants are less likely to experience discrimination in Germany.

to have greater child development benefits from day care enrolment. Thirdly, these indicators are thought to be more fixed (exogenous) with respect to day care enrolment compared with alternatives such as household income. Fourthly, it is plausible that both of these groups face barriers to accessing public services, with each exploring a slightly different dimension. For example, the foreign-born group may be more exposed to structural discrimination. In the appendix, we investigate enrolment gaps by alternative indicators: no university degree (57% of our sample), main language at home not German (16%), welfare recipients (19%) and below median pre-birth income (the last two measures are only available in wave 4, and waves 4 and 5, respectively).

Table 5.1 presents summary statistics of our sample. Observation numbers differ between the variables, as not all questions are asked in each wave and some are conditional on day care enrolment.

Table 5.1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Day care enrolment and demand					
Day care enrolment	62473	.31	.463	0	1
Day care demand	62435	.436	.496	0	1
Day care shortage	62435	.125	.331	0	1
Total monthly fees	6149	238.363	137.622	0	730
Hours of day care demanded	57970	13.499	18.002	0	60
Number of applications	35710	2.417	3.718	0	25
Family background indicators					
No Abitur	62473	.48	.5	0	1
No university degree	49664	.571	.495	0	1
German not main language at home	62287	.162	.369	0	1
One foreign-born parent	62473	.028	.164	0	1
Two foreign-born parents (& non-Western)	61338	.151	.358	0	1
Welfare recipient	23758	.185	.388	0	1
Other household and child characteristics					
Age of child (months)	62473	18.294	9.326	0	35
Female child	62473	.483	.5	0	1
Nbr. children in household	61993	1.812	.859	1	5
Respondent has a partner	62271	.969	.173	0	1
Married	62473	.789	.408	0	1

Notes: Summary statistics pooled over all waves. Question on total costs for day care only asked in wave 4 for those enroled in formal day care. Questions on pre-birth income only in wave 4, on number applications in waves 3 to 5, on welfare payments in wave 4 and 5. Monthly fees, number of applications, pre-birth income and number of children in household are winsorised at the 99th %ile.

5.3.2 Empirical strategy

To investigate possible differential impacts of county-level supply-side factors on day care enrolment, we start out running simple pooled OLS estimation:

$$Y_{icst} = \alpha_0 + \alpha_1 L_i + \alpha_2 S_{-ict} + \alpha_3 (L_i * S_{-ict}) + X'_{it}\alpha_5 + \lambda_{st} + \epsilon_{icst} \tag{5.1}$$

where Y_{icst} is day care enrolment of child i from county c in state s in year t, L_i is an indicator of either less-educated or foreign-born parents, S_{-ict} are regional shortages, $X'_i t$ is a vector of exogenous household controls (i.e. the age of the child in three categories and its gender as well as the marital status of the respondent) and an indicator for urban counties, while λ_{st} are state-year fixed effects. The state-year effects control for time-varying unobservables at the state level that might differentially affect day care enrolment, such as educational reforms, economic shocks, or labor market conditions. Our coefficient of interest, α_3, indicates whether gaps in enrolment differ by the level of shortage in a county. However, the parameter is inconsistently estimated if changes in supply-side factors within state-year cells are correlated with determinants of the enrolment gap conditional on controls. This seems plausible since county-level shortages (i.e. enrolment and demand) may reflect local labor market conditions or attitudes and norms that certainly affect day care enrolment, potentially with different impacts based on family background.

Our preferred specification is one that includes county fixed-effects:

$$Y_{icst} = \beta_0 + \beta_1 L_i + \beta_2 S_{-ict} + \beta_3 (L_i * S_{-ict}) + X'_{ist}\beta_4 + \mu_c + \theta_t + \varepsilon_{ict} \tag{5.2}$$

where S_{-ict} are county level shortages in year t, μ_c and θ_t are county and year fixed effects, and X_{ist} is the same vector of exogenous controls but including in addition time-varying controls at the state level (unemployment, population density, GDP per capita, and migration share). Here the identifying assumption is that time-variation in shortages within a county is uncorrelated with unobservables that impact day care enrolment differently by family background. This assumption holds if time-variation in shortages within counties arises from exogenous changes in demand or supply. This is plausible if supply changes reflect county-level differences in the timing of roll-out of day care spots in response to the federal level introduction of a legal entitlement to day care. Such differences in speed or timing of roll-out are used in several previous studies as a source of exogenous variation in day care supply (e.g.

Cornelissen et al.; 2018; Felfe and Lalive; 2018). Furthermore, demand side factors such as norms are likely to be relatively fixed within counties over a short time-frame. Conditional on state-level labor market conditions, local time-variation in demand most likely reflects random fluctuation in birth cohort sizes. Nevertheless, despite the plausibility of the identifying assumption, the variation we exploit is not fully random.

We further examine alternative specifications to investigate potential non-linear effects of shortages and fees b estimating a model with shortages as a binomial:

$$\begin{aligned} Y_{icst} =& \gamma_0 + \gamma_1 L_{it} + \gamma_2 S_{-ict} + \gamma_3 S^2_{-ict} + \gamma_4 (L_{ict} * S_{-ict}) \\ &+ \gamma_5 (L_{ict} * S^2_{-ict}) + X'_{ist}\gamma_6 + \mu_c + \theta_t + u_{ict} \end{aligned} \tag{5.3}$$

We also estimate a semi-parametric model:

$$Y_{icst} = \sum_b \delta_b S_{b,-ict} + \sum_b \pi_b (L_{ict} * S_{b,-ict}) + X'_{ist}\gamma_6 + \mu_c + \theta_t + e_{ict} \tag{5.4}$$

where S_b are bins for shortages 5 %age points (ppt) in width. The advantage of the non-linear specifications is to gain insight into the effect size at different initial levels of shortages. For example, the non-linear specification might reveal that marginal changes have little effect on the enrolment gap at high levels of shortages, suggesting that only a large change would be effective.

In the second part of our analysis, we estimate the impact on the enrolment gaps of a significant reduction of fees in one federal state in Germany using the synthetic control method; further detail is provided in that section.

5.4 Results

We present our results in three sections. In the first section, we provide descriptive evidence on the size of the enrolment gap by family background. In addition, we explore the role of demand as an explanation for this gap. The exploration of demand as a driving factor relies on our data set's unique feature that day care wishes are directly reported. In the second section, we investigate the impact of regional day care shortages on the enrolment gaps using the empirical approaches outlined in the previous section. Finally, the third section examines the role of day care fees. We analyze a policy that eliminated day care fees for the under three age group in one

German state, Hamburg. Since this is the only state to experience such a policy shift in our time window, we make use of the synthetic control method to explore the effect.

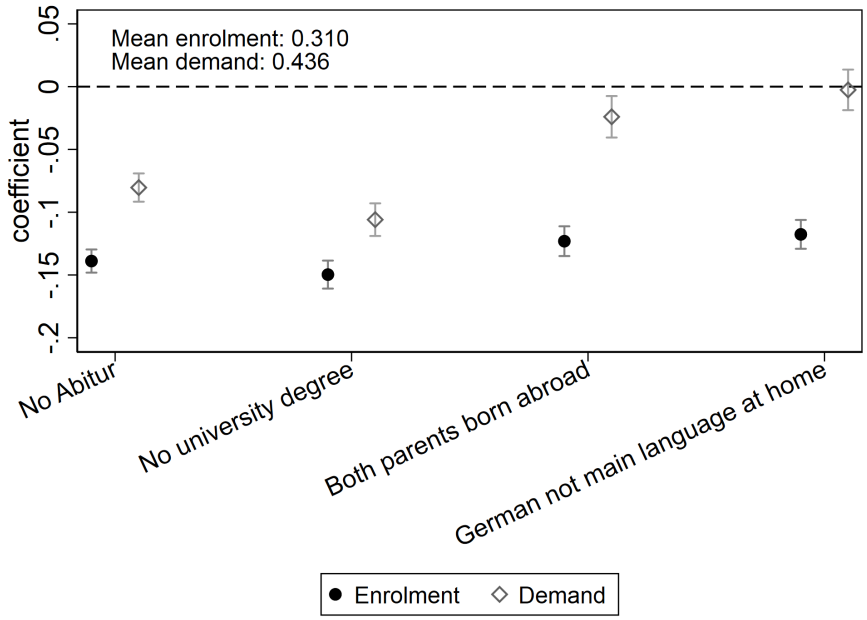
5.4.1 Enrolment gaps and the role of demand

Figure 5.2 plots the gaps in enrolment and demand for our two main categories (no Abitur and both parents born abroad) plus two alternative categories (no university degree and German not main language at home).[16] Children from less-educated parents have on average about 14 ppt lower enrolment rates than children from more-educated parents (about 37% lower) but only about 8 ppt lower demand (17% lower). Comparing the gaps in relative terms, demand would not seem to be able to explain much more than one half of the gap. Children with both parents born abroad also have a significant enrolment gap of about 12 ppt (37% lower) but have almost no demand gap (2 ppt, or 5% lower). Thus, the demand-side does not seem to be an explanation for the migrant-native gap. The gaps for our two alternative categories are quite consistent with our main categories.

Appendix Table A5.4 provides potential explanations for the different levels of stated demand in Figure 5.2. It shows the share of respondents by family background who would enroll in day care under hypothetical scenarios and who agree with reasons for not enrolling in day care. About 15-20 % of families state that they would enroll in day care if was free, the registration and application was easier, and if some quality measures, like group size and opening hours, were improved. The most commonly stated reasons by parents for not enrolling in day care is that the child is too young (85 %) and that parents want to raise the child themselves (75 %). Almost all stated reasons and hypothetical scenarios under which parents would like to enroll in day care differ by our measures of parental education and parental country of birth, whereby the differences are more pronounced for the latter group.

[16] These plots show the coefficients obtained from regressing enrolment and demand on the binary categories. Appendix Figure A5.1 shows these gaps specifically by parents' country of origin, Appendix Table A5.3 compares the distribution of birth countries in our data with official statistics and characterizes the sample by country of origin.

Figure 5.2: Gaps in day care enrolment and demand



Notes: Figures show differences in day care enrolment and demand by four measures of family background. Coefficients stem from regressing the dependent variable on the indicator for family background in separate regressions. The mean value among all respondents is indicated in the figure. Whiskers indicate 95% confidence intervals.

5.4.2 Supply-side: Day care shortages

Table 5.2 presents results from pooled OLS regressions based on equation (5.1) and county fixed effects regression based on equation (5.2). We find a negative and highly significant relationship between regional day care shortages and the enrolment rates of children from less-educated parents; an increase in shortages by 10 ppt is associated with a decrease in day care enrolment for children from less-educated parents of about 5 ppt, while there is no effect on the enrolment rate of children from better-educated parents.

To control for unobserved heterogeneity *within* federal states, we include county fixed effects in columns (3) and (4). The identifying variation now comes from changes in shortages within counties over time, arising from the differential roll-out across counties and changes in demand. The results are very similar to the pooled OLS estimates, indicating that regional day care shortages may account for a significant fraction of the enrolment gap by parental education. As shown in

Appendix Table A5.5, very similar patterns emerge when differentiating by whether the respondent parent has a university degree.

Columns (5)-(8) of Table 5.2 examine the role of regional shortages for enrolment gaps by parental country of birth. In contrast to the estimates by educational background, the results suggest that regional shortages play a minor role in explaining the foreign-born parents enrolment gap. The foreign-born interaction with regional shortages is not significant and very close to zero in both empirical specifications (with and without county fixed effects). Appendix Table A5.5 shows estimates based on the indicator "German not main language at home.â Again, results are robust to using this alternative measure of migrant family background.[17]

Next, we examine if there is a non-linear relationship between shortages and the enrolment gap in alternative specifications. Figure 5.3 presents the results of the estimation of equation (5.3) and equation (5.4). For the less-educated parents group, there appears to be a clear non-linear relationship between day care enrolment and regional shortages. Specifically, the enrolment gap is close to zero and not statistically significant when shortages are very low and then quickly increases to around 10 ppt before effectively flattening out at higher levels of shortages (above about 20 ppt). The binomial specification finds a zero intercept (in contrast to the less flexible linear specification) and the enrolment gap in the first shortages bin (0 ppt–5 ppt) is insignificant. This implies that the enrolment gap may be reduced substantially when shortages are zero. For the foreign-born parents background category, a very different picture emerges: the enrolment gap is fairly flat at about 10 ppt at all levels of shortages. This is consistent with findings from the linear model in Table 5.2.

Overall the findings suggest that reducing regional day care shortages may lower the enrolment gap by parental education substantially, but it does not necessarily help to reduce the migrant-native enrolment gap. That the enrolment gap reduces for the less-educated parents group when shortages are lower is consistent with the idea that this group finds it more difficult compared to the better-educated parents to get spots when spots are scarce. As previously discussed, this could be the result of discrimination or the lack of certain resources that may help with the search. As shortages become smaller, day care centers would begin to take nearly everyone who

[17]Additionally, results are also robust to imposing the restriction that both parents have to be non-European (in contrast to the current definition of parents being non-Western European and non-North American). These results are available upon request.

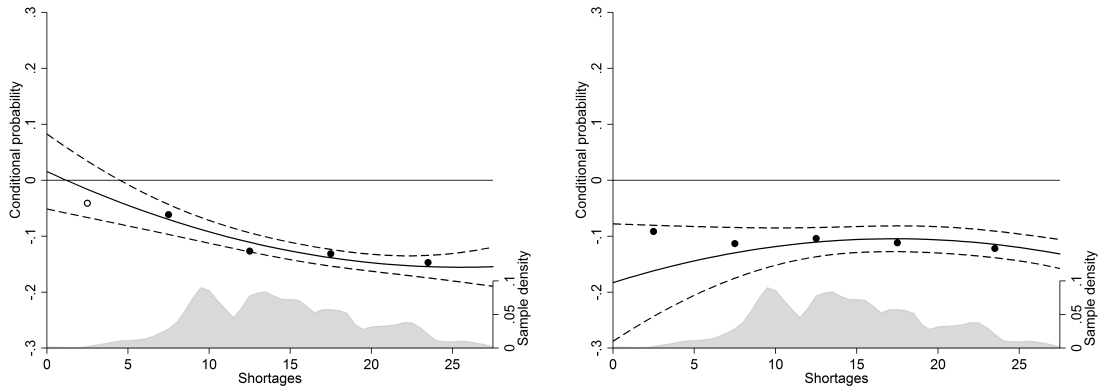
Table 5.2: Day care enrolment, family background and regional shortages

	Day care enrolment							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mean of dep. var	0.375	0.375	0.375	0.375	0.376	0.376	0.376	0.376
Less-educated	-0.131***	-0.055***	-0.123***	-0.065***				
	(0.006)	(0.014)	(0.006)	(0.014)				
Less-educated × shortage		-0.005***		-0.004***				
		(0.001)		(0.001)				
Migration background					-0.114***	-0.114***	-0.112***	-0.121***
					(0.008)	(0.023)	(0.008)	(0.024)
Migration × shortage						-0.000		0.001
						(0.001)		(0.001)
Shortage	-0.001	0.002*	0.001	0.002***	-0.001	-0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
State × wave FEs	Y	Y			Y	Y		
County FEs			Y	Y			Y	Y
Wave FEs			Y	Y			Y	Y
Observations	43,668	43,668	43,668	43,668	42,845	42,845	42,845	42,845

Notes: County level correlates based on equations (5.1) and (5.2). Migration background indicates that both parents are born abroad and non-Western. The sample is restricted to a minimum of 50 observations per county (Appendix Figure A5.3 shows robustness to different cut-offs.). All estimates control for the sex and age of the child, marital status of the respondent and an indicator for urban counties. The county fixed effects estimates include regional controls at the state by year level (unemployment, population density, GDP per capita and migration share). Standard errors, clustered at the individual level, in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 5.3: Non-linear effects of shortages on the enrolment gap

(a) Less-educated parents (b) Both parents born abroad



Notes: Graphical illustrations of the results of the estimation equation (5.3) and equation (5.4). The solid line plots the probability of being enrolled in day care conditional on being in the less-educated or foreign-born parents group at different levels of shortages. The solid line plots the estimates retrieved from the binomial specification and equals $E[Y_i cst|Lit = 1] = \gamma_1 + \gamma_4 \times Short_{ct} + \gamma_5 \times Short_{ct}^2$. The dashed lines represent the 10% confidence intervals reflecting meaningful standard errors computed for marginal effects following Aiken and West (1991). The markers plot the enrolment gap in each shortages bin b, i.e. the parameters δ_{1b}. The filled markers are significant at the 10% level whereas the empty markers are insignificant. The grey area represents a kernel density plot of the sample distribution.

applies, meaning there is less scope for discrimination and the search for a spot is less resource-intensive.

The migrant-native enrolment gap does not decrease, even at the lower level of shortages.[18] A possible explanation is that the foreign-born parents group faces even greater barriers to day care access than the less-educated parents group, on average. It seems plausible, for example, that migrants may be subject to more discrimination than the less-educated group, on average. The literature shows that discrimination exists in a wide range of contexts, including at day care centers (e.g. Batsaikhan et al.; 2019). It could also be that foreign-born parents have an even greater lack of certain resources than the group of less-educated parents. For example, migrant parents may have a smaller network of German acquaintances and a lower level of German-language skills, things that may give an edge in securing a spot in a competitive environment.

[18]It should be noted that in the data, there are few counties with no shortages at all. Even in the smallest shortage bin of 0 ppt–5 ppt, the observations are stacked toward the higher end of the bin. The average shortage in this bin is nearly 4 ppt. Thus, if migrants face greater barriers than less-educated households, then they would always be at the 'back of the queue' and a large enrolment gap could exist even in instances of relatively low levels of shortages.

5.4.3 Supply-side: Day care fees

In this section, we focus on the role of day care fees as a determinant of the enrolment gap. Due to the lack of time variation in the fee data and as counterfactual fees for those not enrolled are lacking, we follow a different approach to analyze the role of shortages and use synthetic control methods (SCM) to analyze the effect of a substantial reduction in fees. Specifically, we examine the case of the federal state of Hamburg, where fees were abolished for the first five hours of care per day in August 2014.[19] Hamburg was the only state to change its fees regulation during our sample window of 2012–2016.[20] For those enrolled in half-day care, fees were eliminated completely, and for those enrolled in more than half-day care, fees were reduced by an amount equal to the half-day fee they would have paid previously (depending on the household income and number of persons in the household). Thus, all parents of children 0-2 had a significant fee reduction. Since Hamburg has a fixed fee regulation, only dependent on net household income and household size (which we have in our data), we are able to compute the theoretical reduction in fees for all Hamburg children in our sample (including those not in day care). Fees for the average household were reduced by a total of 178 Euros per month (63% of the pre-reform fees). For the children of less-educated parents in our sample, fees are reduced by 162 Euros and for the children of better-educated parents, the reduction amounts to 184 Euros. Thus, the magnitude of the reduction was roughly comparable for both groups.[21]

The large reduction of fees in Hamburg provides a quasi-random treatment that we use to estimate the impact of fees on the enrolment gap using the synthetic control method of Abadie et al. (2010). Specifically, we examine the evolution of the enrolment gap for Hamburg ($N = 3,724$ for Hamburg) before and after the

[19] Each German federal state independently sets broad regulations for day care fees, e.g. which types of households are exempted from fees. The detailed fee structure itself is set by counties or the individual institutions. Typically, fees vary by hours of day care enrolment, household income and other household characteristics (see section 5.2 for more details). Beginning in 2005, some states started abolishing childcare fees, initially for older children, subsequently for younger children.

[20] Before 2012, three states had abolished fees for the last day care year (6 years old), two states (Berlin and Hamburg) had abolished fees for the last three years (3–6 years old), and Rhineland-Palatinate had abolished fees for the last five years (1–6 years old). For Hamburg, fees were abolished for the first five hours of daily care only, while the other states abolished fees for all-day care.

[21] When expressed as a share of net income, fees are reduced by 0.044 overall, 0.043 for children of less-educated parents and 0.047 for children of better-educated parents.

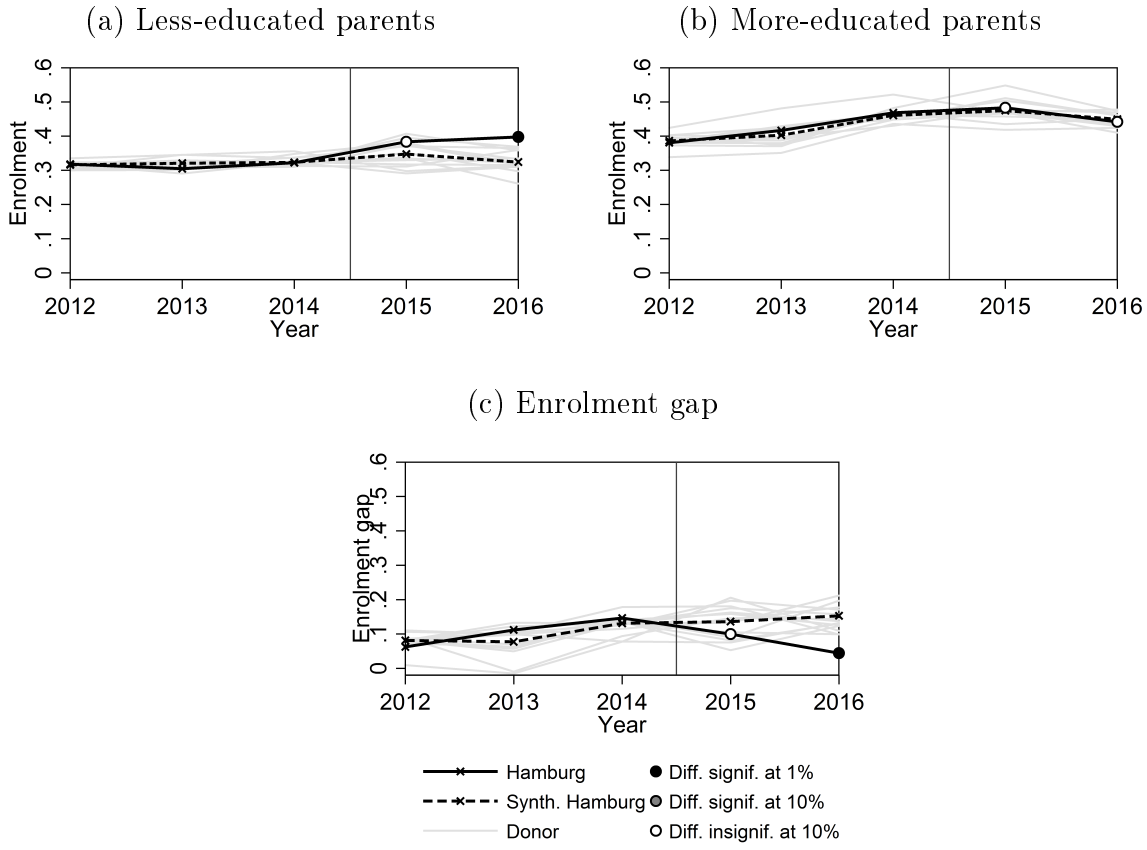
reduction of fees, comparing it to the evolution for a *synthetic Hamburg* constructed as a weighted average of the remaining federal states, none of which changed their fees in the sample window. The weights for creating synthetic Hamburg are chosen so as to best approximate the real Hamburg based on pre-treatment values of the outcome variable and covariates.[22] Following Kaul et al. (2015), we choose two of the three available pre-treatment outcomes (2012 and 2014) and four covariates (unemployment, population density, GDP per capita, and migration share) to be used in selecting the weights matrix.

Figure 5.4 shows the results. Panels (a), (b), and (c) plot the evolution of enrolment from less-educated parents, enrolment from better-educated parents, and the enrolment gap, respectively, over time for Hamburg and synthetic Hamburg.[23] The figures show that enrolment of children from less-educated parents increases, while more-education enrolment holds constant, and the enrolment gap decreases relative to the synthetic control. These differences emerge in the first post-intervention period and become statistically significant by the second post-intervention period.[24] Overall, the average of both post-intervention periods suggests a decrease in the enrolment gap by 7.3 ppt. This is an economically significant effect size since and approximately halves the enrolment gap.

To help provide a sense-check for this estimate, we also carry out a pooled OLS regression of equation (5.1) using the fees information reported for one wave in the place of the shortages variable. We report the results in appendix Table A5.7. Taking the estimate on the interaction between fees and less-educated parents from column (2) and multiplying it with the average fee reduction in Hamburg provides an expected reduction in the enrolment gap of $0.06 \times 1.78 = 10.7$ ppt, which is comparable to our SCM estimate. Overall, we conclude that reducing fees appears to have large effects on the enrolment gap by parental education, even when fees are income dependent. As the effect is driven by an increase in the number of children from less-educated parents - rather than a decrease by those from better-educated parents - this may also suggest a more stringent progressive fee structure.

[22]Weights are chosen to minimize the mean squared prediction error (MSPE) for the outcomes variable over the pre-treatment period. For more detail on the process, see Abadie et al. (2010).
[23]The light grey lines are "donors,â which is an synthetic control method term for non-treated units used as a placebo treatments. In our case, we use the 15 non-treated federal states.
[24]In the synthetic control method, significance levels are based on comparing the deviation between the treated unit and the synthetic control to the typical deviation between the donors and the synthetic control.

Figure 5.4: The effect of fee elimination in Hamburg on the enrolment gap (by parental education)



Notes: Figures show the evolution in Hamburg vs. synthetic Hamburg of (panel a) the enrolment rate of children from less-educated parents; (panel b), the enrolment rate of children from better-educated parents; and (panel c) the enrolment gap. All interviews for the 2014 wave occurred before fees were eliminated, making this the last wave with fees - as indicated by the vertical line. Weights for the synthetic Hamburg were chosen to best approximate the three pre-treatment values for the outcome variable in each case, i.e. for waves 1, 2, and 3. Synthetic Hamburg for panel (a) is 36.3% Bavaria, 5.8% Brandenburg, and 34% Saxony-Anhalt. Synthetic Hamburg for panel (b) is 63.6% Saarland and 36.4% Brandenburg. Synthetic Hamburg for panel (c) 39.3% Bremen, 33.4% Baden-Württemberg, and 27.3% Brandenburg.

We also carry out the synthetic control analysis for the enrolment gap by parental country of birth and present the results in appendix Figure A5.4. Consistent with our other results, a reduction in fees does not decrease the enrolment gap for this group.[25]

[25]The enrolment of children with migrant family background is unaffected by the change in fees. The native group sees an increase in enrolment; however the effect is small and does not seem to persist, nor is there a significant increase in the enrolment gap in any post-intervention period.

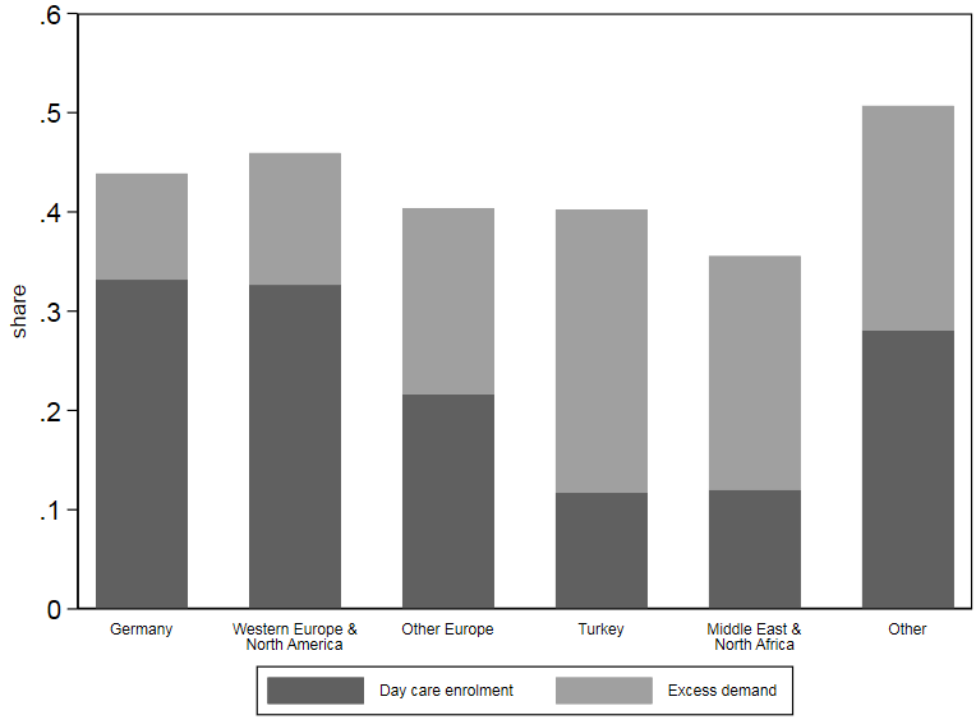
5.5 Conclusion

Despite expansions in day care provision for under three year olds in Germany, there are substantial gaps in day care enrolment by family background. We show that demand for day care only accounts for a small fraction of the enrolment gap. Instead, results suggest that day care fees and local day care shortages play a significant role in explaining gaps by parental education. Reducing day care fees (or a more progressive fee structure) and reducing regional day care shortages can lower enrolment gaps by parental education substantially. However, enrolment gaps by parental country of birth are less affected by changes in local supply-side factors. In light of this result, two things may help reduce the migrant-native enrolment gap: (a) to directly address the potentially greater barriers faced by foreign-born parents, e.g. discrimination; and/or (b) to reduce the shortages of places to below the levels that we observe in our data (i.e. to zero).

Given the great potential of high quality day care to reduce inequalities in later life outcomes by family background, it is important to have a comprehensive understanding of why enrolment gaps in day care exist and how to reduced them. Our study provides a first comprehensive analysis based on large sample data. We capture important supply side factors, such as the availability of day care slots and parental fees. One factor that we do not observe is the quality of applications and the persistence of parents in securing a scarce day care slot. Further, we know little about the magnitude and type of discrimination facing less-educated or foreign-born parents. Field experiments could contribute to filling this gap and help to better understand the nature of enrolment gaps in day care, while also proposing solutions to reduce them. We leave this for future research.

Appendix: Additional figures and tables

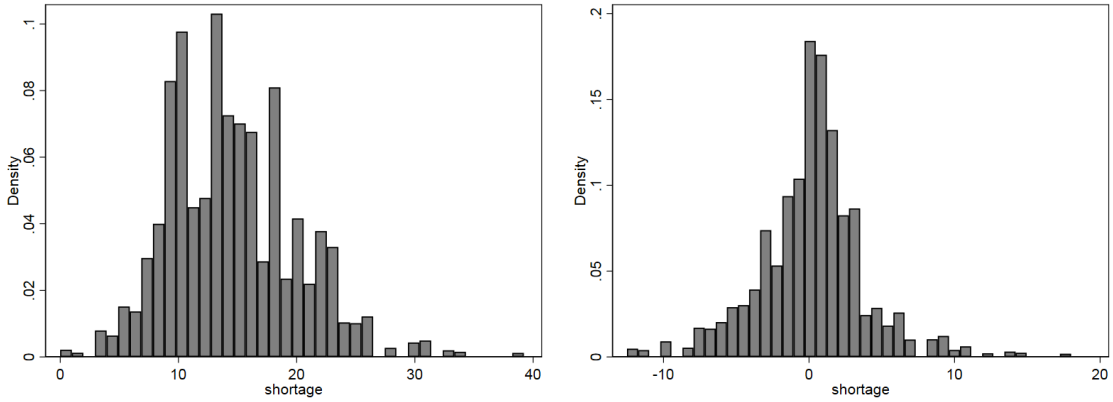
Figure A5.1: Day care enrolment and demand by birth country of the parents



Notes: Figure shows day care enrolment and demand by birth country of the responding parent.

Figure A5.2: Shortages in day care

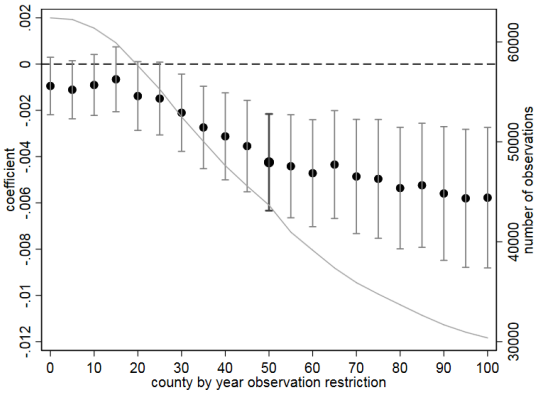
(a) County shortages in percent (b) Demeaned county shortages



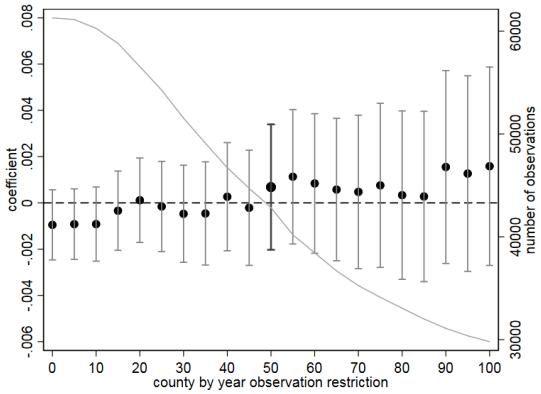
Notes: Figures show (a) raw shortages in day care at the county level; and (b) demeaned county shortages subtracting the state level average. An individual shortage denotes that a day care spot is desired for the child, but the child is not enrolled. Shortages are calculated at the county by year level. Sample is restricted to 50 county by year observations. Panel (b) omits the city-states of Berlin and Hamburg as these are absorbed in our analysis by state and county fixed effects.

Figure A5.3: Interaction term by sample restriction

(a) Less-educated parents



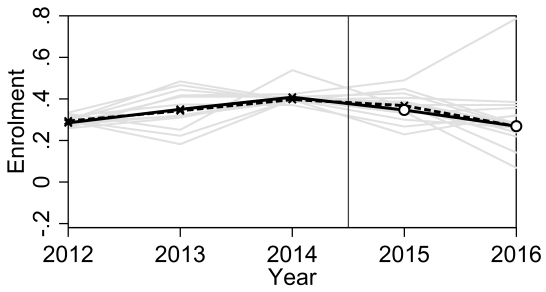
(b) Both parents born abroad



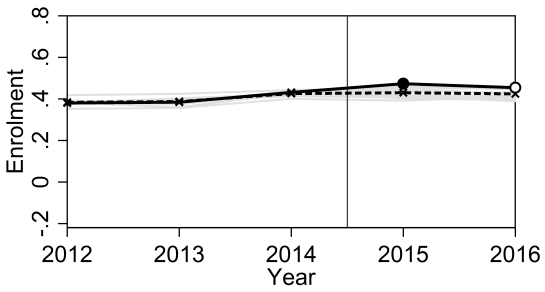
Notes: Figures show the coefficient of the interaction term of the county fixed effect model in Table 5.2 for different county by year number of observation restrictions (in intervals of five). The coefficients are obtained from the specification shown in columns (4) and (8) for less-educated parents and foreign-born parents, respectively. The bold markers indicate the coefficients shown in the table. Whiskers present 95 % confidence intervals. The grey line and the y-axis on the right show the number of observations used in each estimation.

Figure A5.4: The effect of fee elimination in Hamburg on the enrolment gap (by parental country of birth)

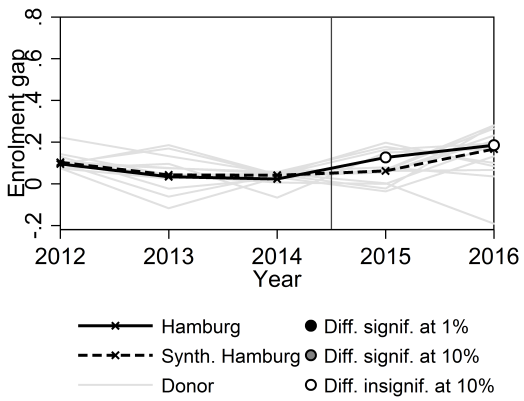
(a) Both parents born abroad



(b) At least one parent not born abroad



(c) Enrolment gap



Notes: Figures show the evolution in Hamburg vs. synthetic Hamburg of (panel a) the enrolment rate of children with both parents born abroad; (panel b) the enrolment rate of children with at least one parent not born abroad; and (panel c) the enrolment gap. All interviews for the 2014 wave occurred before fees were eliminated, making it the last wave with fees—as indicated by the vertical line. Weights for the synthetic Hamburg were chosen to best approximate the three pre-treatment values for the outcome variable in each case, i.e. for waves 1, 2, and 3. Synthetic Hamburg for panel (a) is 28.8% Baden-Württemberg, 53.9% Berlin, and 17.3% Brandenburg. Synthetic Hamburg for panel (b) is 38.5% Lower Saxony, 45.5% Berlin, and 16.1% Brandenburg. Synthetic Hamburg for panel (c) 28.4% Baden-Württemberg, 17.6% Bavaria, 40.1% Berlin, and 13.9% Brandenburg.

Table A5.1: Share of children enroled in day care - comparison of KiBS and official statistics

	2012		2013		2014		2015		2016	
Federal state	KiBS (1)	Difference (2)	KiBS (3)	Difference (4)	KiBS (5)	Difference (6)	KiBS (7)	Difference (8)	KiBS (9)	Difference (10)
Schleswig-Holstein	0.241	-0.001	0.262	-0.001	0.295	-0.008	0.320	0.006	0.311	0.002
Hamburg	0.358	0.000	0.384	0.000	0.427	-0.003	0.453	0.020	0.429	0.000
Lower Saxony	0.220	-0.001	0.244	0.000	0.275	-0.004	0.283	0.000	0.285	0.001
Bremen	0.212	0.000	0.232	0.000	0.264	-0.005	0.281	0.010	0.271	0.001
North Rhein-Westphalia	0.181	0.000	0.198	-0.001	0.233	-0.005	0.266	0.007	0.257	0.000
Hesse	0.236	-0.001	0.256	-0.001	0.283	-0.005	0.306	0.009	0.297	0.000
Rhineland-Palatinate	0.269	-0.001	0.282	0.000	0.304	-0.002	0.312	0.006	0.301	0.002
Baden-WÃ¼rttemberg	0.231	0.000	0.248	-0.001	0.274	-0.004	0.285	0.007	0.279	0.002
Bavaria	0.230	0.000	0.247	-0.001	0.269	-0.002	0.281	0.006	0.272	0.000
Saarland	0.220	-0.001	0.245	-0.001	0.263	-0.007	0.286	0.003	0.287	0.004
Berlin	0.425	-0.001	0.436	-0.001	0.459	-0.001	0.475	0.016	0.459	0.000
Brandenburg	0.534	0.000	0.536	0.000	0.572	-0.006	0.579	0.011	0.572	0.000
Mecklenburg-Vorpommern	0.536	0.000	0.544	-0.001	0.556	-0.005	0.562	0.002	0.560	0.000
Saxony	0.464	0.000	0.472	0.000	0.494	-0.005	0.511	0.005	0.507	0.001
Saxony-Anhalt	0.575	0.000	0.577	0.000	0.577	-0.006	0.583	0.004	0.572	0.002
Thuringia	0.497	-0.001	0.513	-0.001	0.519	-0.005	0.527	0.003	0.524	0.002

Notes: Comparison of the share of children below three years in day care as calculated with the KiBS data with official statistics provided by the Federal Statistical Office of Germany.

Table A5.2: Comparison of analysis sample with dropped observations

	Analysis sample (1)	Dropped observations (2)	Difference (3)
Panel A: individual characteristics			
Day care enrolment	0.374	0.243	0.131***
	(0.003)	(0.003)	(0.005)
Day care demanded	0.490	0.380	0.110***
	(0.004)	(0.004)	(0.006)
Day care shortage	0.115	0.136	-0.021***
	(0.002)	(0.003)	(0.004)
Lower education (no Abitur)	0.403	0.560	-0.157***
	(0.004)	(0.005)	(0.006)
No university degree	0.493	0.660	-0.167***
	(0.004)	(0.006)	(0.007)
German not main language at home	0.169	0.155	0.014***
	(0.003)	(0.004)	(0.005)
Both parents born abroad (& non-Western)	0.144	0.158	-0.014***
	(0.003)	(0.004)	(0.005)
Employed	0.451	0.415	0.036***
	(0.004)	(0.006)	(0.007)
Necessity weighted net equivalent income	1984.15	1729.88	254.28*
	(38.715)	(26.626)	(46.987)
Panel B: share of federal states			
Schleswig-Holstein	0.046	0.019	0.027***
	(0.001)	(0.001)	(0.001)
Hamburg	0.049	-	-
	(0.001)		
Lower Saxony	0.083	0.103	-0.019***
	(0.002)	(0.002)	(0.003)
Bremen	0.016	-	-
	(0.000)		
North Rhein-Westphalia	0.051	0.389	-0.338***
	(0.003)	(0.005)	(0.006)
Hesse	0.078	0.076	0.002
	(0.002)	(0.002)	(0.003)
Rhineland-Palatinate	0.063	0.031	0.033***
	(0.001)	(0.001)	(0.002)
Baden-Württemberg	0.104	0.166	-0.062***
	(0.003)	(0.004)	(0.004)
Bavaria	0.177	0.140	0.037***
	(0.003)	(0.003)	(0.005)
Saarland	0.020	0.001	0.019***
	(0.000)	(0.000)	(0.000)
Berlin	0.097	-	-
	(0.002)		
Brandenburg	0.037	0.019	0.019***
	(0.001)	(0.001)	(0.001)
Mecklenburg-Vorpommern	0.033	0.004	0.029***
	(0.001)	(0.000)	(0.001)
Saxony	0.077	0.024	0.053***
	(0.001)	(0.001)	(0.002)
Saxony-Anhalt	0.033	0.017	0.016***
	(0.001)	(0.001)	(0.001)
Thuringia	0.036	0.014	0.022***
	(0.001)	(0.000)	(0.001)
Observations	43,691	18,782	62,473

Notes: Comparing characteristics of observations used in the analysis sample and observations dropped due to the sample restricting of having at least 50 observations per county and year. Panel A shows individual characteristics, Panel B displays the share of observations coming from each federal state. *** *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix Table A5.2 compares the analysis sample with the dropped observations. The sampling design favors observations coming from counties with a *larger* population (especially urban counties) and those from federal states with a *smaller* population as these have fewer counties and every state has roughly the same number of unweighted observations per year. The analysis sample is positively selected; day care enrolment, income, and employment rates are higher, the share with a foreign-born parents and less-educated parents levels is smaller (all differences are significant at the 1 % level). Although the sample restriction means that our sample is not representative for the whole of Germany, the data used still covers a large fraction of the German population and advances on previous studies looking at specific groups or smaller regions.

Table A5.3: Characteristics by country of origin

	Share of migration population		Day care					
	Microcensus 2017 (1)	KiBS (2)	Enrolment (3)	Demand (4)	Shortage (5)	Number of applications (6)	Lower education (7)	Household net income (8)
Germany	-	-	0.332	0.439	0.107	2.789	0.457	4084.169
Western Europe and North America	0.091	0.177	0.327	0.461	0.133	2.954	0.393	4063.182
Other Europe	0.360	0.519	0.216	0.404	0.188	2.137	0.589	3122.679
Turkey	0.136	0.090	0.117	0.402	0.285	1.56	0.801	2906.720
Asia	0.221	0.105	0.18	0.438	0.257	2.081	0.64	2985.501
Africa	0.062	0.060	0.257	0.479	0.220	1.957	0.534	2826.919
Others	0.127	0.049	0.321	0.502	0.180	3.159	0.368	3554.822

Notes: Table shows characteristics of children with different migration backgrounds. Shares of the Microcensus data refer to children aged 0-5, KiBS data 0-3. For *Western Europe and North America*, and *Other Europe* the composition between Microcensus and KiBS data differs slightly as the Microcensus data only contains the number of children from EU28 and the 12 countries with the largest migrant population share of those. Western European countries not listed are thus assigned to *Other Europe*, leading to an underestimation of the *Western Europe* share in the Microcensus. When countries are assigned to EU28 and residual European countries the share in the Microcensus are 0.291 and 0.286, and 0.344 and 0.386 in the KiBS respectively. In the KiBS data, the country refers to birth country of the responding parent. Microcensus data obtained from the Federal Statistical Office.

Table A5.4: Reasons for not using day care

Family background	All	No Abitur	No university degree	Both parents born abroad	Other main language at home
	(1)	(2)	(3)	(4)	(5)
Would use day care if ...					
day care was for free	0.15	0.18	0.17	0.23	0.25
the child had a full-day slot	0.09	0.10	0.09	0.15	0.16
the child had a half-day slot	0.15	0.17	0.16	0.25	0.24
opening hours were more suitable	0.17	0.19	0.18	0.26	0.28
staff was multilingual	0.07	0.09	0.08	0.18	0.22
groups were smaller	0.18	0.20	0.20	0.28	0.31
culture / religion would be considered more	0.05	0.07	0.06	0.13	0.16
day care institution was nearby	0.14	0.17	0.15	0.27	0.29
registration / application was easier	0.18	0.22	0.22	0.35	0.35
Reasons for not using day care					
Did not get a spot	0.11	0.12	0.10	0.17	0.15
Insufficient opening hours	0.07	0.08	0.08	0.08	0.08
I'm home myself	0.61	0.68	0.64	0.68	0.63
Want to raise child myself	0.75	0.78	0.77	0.80	0.72
Child is too young	0.85	0.84	0.85	0.84	0.83
Child should spent time with siblings	0.36	0.40	0.39	0.49	0.38
Grandparents can take care of child	0.32	0.37	0.37	0.32	0.26
Fear of negative influences	0.07	0.09	0.08	0.11	0.09
Insufficient fostering at institution	0.11	0.11	0.10	0.13	0.12
Insufficient consideration of culture	0.02	0.03	0.03	0.08	0.07
Willingness to pay					
Maximum fee for a day care spot	244.44	182.95	189.84	194.36	201.53

Notes: The table shows hypothetical scenarios under which parents would use day care and reasons for not using day care. Each cell shows the share of affirmative responses for the corresponding question. Multiple affirmative responses are possible. Questions are only asked if the child is currently not in day care. Number of observations in the first column ranges between 4,527 and 31,375. All but five variables have above 10,000 observations.

Table A5.5: Day care enrolment, family background and regional shortages - alternative family background definition

	Day care enrolment							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mean of dep. var	0.379	0.379	0.379	0.379	0.375	0.375	0.375	0.375
No university	-0.137***	-0.059***	-0.129***	-0.069***				
	(0.006)	(0.016)	(0.006)	(0.016)				
No university × shortage		-0.005***		-0.004***				
		(0.001)		(0.001)				
Migration background					-0.110***	-0.113***	-0.110***	-0.121***
					(0.008)	(0.022)	(0.008)	(0.023)
Migration × shortage						0.000		0.001
						(0.001)		(0.001)
Shortage	-0.001	0.003**	0.002*	0.004***	-0.001	-0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
State × wave FEs	Y	Y			Y	Y		
County FEs			Y	Y			Y	Y
Wave FEs			Y	Y			Y	Y
Observations	35,603	35,603	35,603	35,603	43,536	43,536	43,536	43,536

Notes: The sample is restricted to leave-one-out shortages calculated from at least 50 observations per county. Migration background indicates that German is not the main language at home. All estimates control for the sex and age of the child, marital status of the respondent and an indicator for urban counties, the county fixed effects estimates include regional controls at the state by year level (unemployment, population density, GDP per capita and migration share). Standard errors, clustered at the individual level, in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A5.6: Day care enrolment, family background and regional shortages

	Day care enrolment			
	(1)	(2)	(3)	(4)
Mean of dep. var	0.378	0.378	0.391	0.391
Below median pre-birth income	-0.160***	-0.126***		
	(0.011)	(0.034)		
Below median income × shortage		-0.003		
		(0.002)		
Welfare recipient			-0.202***	-0.253***
			(0.013)	(0.032)
Welfare × shortage				0.003
				(0.002)
Shortage	0.001	0.002	-0.003**	-0.003***
	(0.002)	(0.002)	(0.001)	(0.001)
State × wave FEs	Y	Y	Y	Y
Observations	8,422	8,422	17,090	17,090

Notes: County level correlates based on equation (4.1) and (4.2). The sample is restricted to a minimum of 50 observations per county. All estimates control for the sex and age of the child, martial status of the respondent parent. Information on pre-birth income and welfare recipient status is available in wave 4, and wave 4 and 5 respectively. Standard errors, clustered at the individual level, in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A5.7: Day care enrolment, family background and fees

	Day care enrolment			
	(1)	(2)	(3)	(4)
Mean of dep. var	0.378	0.378	0.377	0.377
Less-educated	-0.141***	-0.027		
	(0.011)	(0.035)		
Less-educated x fees		-0.062***		
		(0.019)		
Migration background			-0.095***	-0.081*
			(0.016)	(0.048)
Migration x fees				-0.008
				(0.025)
Day care fees	0.037***	0.060***	0.051***	0.052***
	(0.012)	(0.014)	(0.012)	(0.013)
State FEs	Y	Y	Y	Y
Observations	8,987	8,987	8,941	8,941

Notes: County level correlates based on equation (5.1) and (5.2). The sample is restricted to a minimum of 50 observations per county. All estimates control for the sex and age of the child, marital status of the respondent and indicators for urban counties and terciles for the GDP per capita of the counties. As fees are only available for those in day care, we use our data set to impute hypothetical fees for all children. For this we regress observed day care fees on a number of variables that commonly determine day care fees (number of children in household, 15 household net income bins, age dummies for the children, desired hours corrected by the median gap between desired and actually used hours for those enrolled in day care, and a binary indicator for welfare recipient). Regressions are run by state and include county fixed effects to allow for regional variation in fee structure. In a second step, we predict hypothetical fees for each child based on the coefficients obtained above and then compute the county average. Standard errors, clustered at the individual level, in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Chapter 6

Conclusion

This dissertation explores different societal changes and policies that are related to promoting the current and future education and labor force potential of individuals. It pays particular attention to the role of social norms, formal child care, and the interplay between these two areas. The following chapter draws conclusion and policy implications from each chapter. In addition, it addresses limitations in the internal and external validity of the individual chapters and the resulting scope for future research.

Chapter 2 studies the intergenerational transmission of social norms and behaviour, taking into account early socialization of women and their partner. The results indicate that women with a partner who grew up with a working mother have a substantially higher probability to participate in the labor force, work longer hours, and achieve higher labor income. Growing up with a working mother changes the perception of men regarding their beliefs about how women's employment affects children and the family. The intergenerational correlations cannot be explained by assortative mating; rather, the results suggest that gender attitudes and beliefs of the partner play a decisive role for the labor supply decision of partnered women.

The results of this chapter highlight that policies aiming to increase maternal employment might have large spillovers on the next generation by changing social norms. The results also indicate that social norms are slow moving, since they are transferred from one generation to the next, but play a significant role in explaining economic outcomes, such as labor supply decision of women. There seems to be a particular large scope for policy to provide information and change potentially outdated beliefs about how female employment affects children and the family. In particular, those of men who have, in general, more traditional norms and are more concerned that having a working wife might have detrimental effects on their children and family. This scope for policy has received little attention.

The magnitude of the intergenerational correlations are not necessarily generalizable to other countries or settings. Heterogeneity analysis suggests that the intergenerational labor supply link is larger if the women has less bargaining power than her partner. Thus, the average magnitude of the intergenerational link might be much higher in for example countries where women are poorly educated or in patriarchal societies. Another reason for limited external validity are changes in market forces such as rising educational achievement of women or gains in women's labor market opportunities. These factors might make it more costly to stick to social norms, resulting in much smaller intergenerational links.

One obvious methodological limitation of this study is that it does not use exogenous variation in maternal employment status. Yet, finding a credible source of exogenous variation in maternal employment status is difficult. Previous studies, for example, use parental leave policies, child care infrastructure, or local averages to instrument for individual working status. However, there are severe concerns of endogeneity that might even amplify potential effect bias. Instead of using a potentially bad instrument, this chapter carefully rules out alternative explanations for the observed pattern in the data, thereby arguably approaching the identification of causal effects. Another potential caveat is that it is not possible to pin-down a single mechanism for the observed correlation in the data. We can only provide suggestive empirical evidence that supports our hypothesis. There might be other channels that can not be examined due to data availability, e.g. attitudes toward men taking over care and housework responsibilities or beliefs about the effects of formal child care on children.

Since the economic literature on social norms is still relatively small, there is much room for future research. In particular, this strand of the literature lacks quasi-experimental evidence on how social norms are formed and whether the endogenous process of transmission of social norms can be changed by an exogenous shock to, for example, the information set of individuals. Another question that we can only provide suggestive evidence on is the bargaining process within households. Existing literature on women's labor supply frequently disregards that the labor supply decision of partnered women is a decision that many couples take jointly; in particular if children are present. We know relatively little about how, and if, individuals trade-off paid and unpaid work within households and what role social norms play in this bargaining process.

Chapter 3 examines social learning effects after German reunification. We exploit the fact that individuals who grew up under the GDR regime had very different social norms and beliefs regarding the potential costs of maternal employment for children and the family than individuals in West Germany, who were mainly exposed to the traditional breadwinner-housewife model when growing up. To identify these social learning effects, in our main analysis, we use event-study and difference-in-difference estimations, comparing regions with high inflows of East Germans to other regions before and after German reunification. Our results suggest that there are substantial social learning effects, with consequences for both the intensive margin of labor supply and for stated beliefs about how maternal employment effects children and the family. We find these effects best explained by gradual social learning effects that are amplified by endogenous changes in the local child care infrastructure.

The findings of this chapter suggest that immigrants can trigger the evolution of attitudes regarding working women and actual working behaviour of women in receiving regions. In light of globally increasing migration flows and a growing population diversity, this finding could be of general interest to policy makers. The main policy implication is that a change in the social norm composition of the local population can trigger larger multiplier effects, resulting in a very heterogeneous evolution of labor supply across regions. The evidence on endogenous child care provision has additional policy relevance as it implies that governments can affect the evolution of local social norms by changing public spending, i.e. by expanding formal child care provision and promoting potential benefits for families. In the previous literature, this area of research has not received a lot of attention.

However, generalizing the results of this chapter to other cultural traits, beliefs or behaviour is very difficult. Traits like religion are likely to be much more persistent. Thus, conclusions have to be drawn carefully, since the external validity of this chapter is limited. In addition, the setting in Germany after reunification was unique. Immigrants from East Germany were quite similar to natives, except for their social norms and beliefs about maternal employment and the labour supply of women. For example, they spoke the same language and had similar levels of education. Thus, they are in no way comparable to labor immigrants or refugees. Furthermore, at that time, West Germany was mainly characterized by the traditional breadwinner-housewife model. Both maternal employment and formal child care provision was low. As labor force participation and formal child care provision have been increas-

ing in almost all OECD countries, the effects identified in this chapter are likely to be at a different margin that only a very few OECD countries still exhibit. Thus, results do not necessarily transfer to other countries and settings.

In this chapter, we consider social learning effects at a local level. However, due to data availability it is not possible to go down to a finer regional level. Rather, in our main specification, we estimate effects on the regional level of counties and "Raumordnungsregion", which is a commonly used definition of local labor markets. Thus, one research question for future research would be to examine social learning effects within neighbourhoods or peer groups. As we observe the effect at the intensive margin of labor supply of employed women, another promising field for future research would be to examine social learning effects in the workplace.

Chapter 4 examines how publicly funded child care provision affects the well-being of parents by exploiting cut-off rules as a source of exogenous variation in child care utilization. Using SOEP data, the results indicate that providing publicly funded child care can increase the subjective well-being of mothers, while fathers are less affected.

The chapter shows that by providing a sufficient quantity of child care places, policy makers can increase the life satisfaction of mothers, specifically mothers with higher labor market attachment who were previously constrained due to the lack of child care supply. Abandoning child care rationing allows them to shift time from non-market to market activities, thereby reducing the incongruence between actual and desired employment. This finding might not only be of policy relevance for Germany but also other countries considering the expansion of formal child care provision.

However, the effects found in this chapter are not necessarily generalizable to other policy interventions that increase the provision of, and access to, formal child care, e.g. child care provision for younger children, through subsidies or employment-based programs. This lack of external validity is due to the specific institutional context in Germany and the empirical strategy that identifies a local average treatment effect, i.e. the effect for a specific complier population. The group of compliers are parents who send their child to child care if they are eligible to do so by the cut-off rules but would not have done so otherwise. Empirically, the group of compliers mainly consists of parents with higher socio-economic background. Another potential caveat of this chapter is that it focuses on short-run effects. There is an

ongoing debate in the well-being literature, whether policy has the scope to change well-being in the long-run. However, it is beyond the scope of the chapter to address any long-run or general equilibrium effects, though they would be interesting from a policy perspective.

The estimation is based on a rather small data set, making it difficult to examine heterogeneities or precisely estimate null effects. In addition, the small sample size requires expanding the estimation window around the cut-off by quite a lot. The downside of this strategy is that I need to impose additional functional form assumptions on the outcomes variable. Thus, future research should examine the impact of family policies on well-being in larger data set.

Looking at potential mechanisms shows that mothers respond by taking up part-time employment. Thus, potential issues of second shifts-effects that are observed in other studies, i.e. mothers working full-time and nevertheless doing a second shift of unpaid work such as childrearing and housework, are mitigated. However, they could play a role when studying the effects of child care on parental well-being in other settings. Thus, examining well-being effects of child care policies that a larger duration of care or policies which are aimed at younger children is an interesting area for future research.

It is also evident that paternal supply of paid and unpaid labor is inelastic to the type of formal care arrangement. A promising field for future research would be to identify policies that promote a more equal division of labor within households.

Chapter 5 explores the role of several demand and supply side factors in explaining the large day care enrolment gaps by family background. The analysis is based on a large and representative data set of children under the age of three in Germany. We show that differences in demand can only partially account for this gap. For families with a migration background, stated demand is even identical to families with no migration background. When examining potential supply side factors, the results suggest that local day care shortages and fees have disproportional effects on enrolment rates of less-educated families. However, we find that these supply factors are less relevant for enrolment rates of children with foreign-born parents.

Despite the well-established empirical finding that children with lower socio-economic and migration background benefit substantially from high quality formal day care, in many countries there are large gaps in day care enrolment. The results from this chapter help to gain valuable understanding of the underlying reasons and

identify some scope for policy action. The results suggest that an expansion in the availability of day care and a more stringent, progressive fees structure might not necessarily lead to higher enrolment for children with foreign-born parents but can narrow gaps by parental education substantially. Thus, it proposes one solution to realize the potentially large returns for this group of children. In order to reduce the migrant-native enrolment gap, three things may help: first, to directly address the potentially greater barriers faced by foreign-born parents, e.g. discrimination; second, to reduce the shortages of places to below the levels that we observe in our data, i.e. to zero; and third, as we find certain quality aspects of day care to be more important for families with foreign-born parents, to adjust the quality in a way that day care becomes more attractive to foreign-born parents.

The German day care system is very different to other countries like the US or the UK. In Germany, day care is provided within a universal and highly subsidized system. Parental fees are low and almost all day care is provided by public or non-profit organizations. Thus, the policy implications of this chapter do not necessarily apply to other countries that do not have a universal day care system, countries with higher parental fees or a large share of private day care providers.

In addition, the study has several methodological shortcomings. First, in our analyses, we only control for time-constant confounding factors at the county level and some time-varying factors at the state level. Thus, there might be other unobservable time varying characteristics at the county level that impact both, day care shortages as well as the difference in the enrolment rates between groups. Second, it is not possible to identify other demand side factors that might explain the large socio-economic gaps. For example, in our data set we can not observe whether higher educated parents or parents without migration background are more effective in securing slots because of their social capital, better understanding of the application system or because they submit higher quality applications. Thus, it is difficult to conclude that lower educated and foreign-born parents are discriminated against in the day care admission process. Third, we miss one important supply side factor: quality of day care. For example, the quality of day care might impact on enrolment gaps if some groups rate it to be more important than others. In addition, there might exist additional inequalities by family background with respect to access to quality of day care.

Disentangling these other demand and supply side related factors is a fruitful question for future research. In addition, it would be interesting to examine why families with less-educated parents exhibit lower levels of demand. In particular, a promising question for future research would be to explore the role of information deficits, e.g. with respect to potential benefits of day care or the admission process. For example, the randomization of information provision to parents is an experiment that is relatively easy to implement and financially feasible.

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