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Immigration and the Evolution of Local Cultural Norms

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Abstract

We study the local evolution of cultural norms in West Germany in re-
action to the sudden presence of East Germans who migrated to the West
after reunification. These migrants grew up with very high rates of ma-
ternal employment, whereas West German families followed the traditional
breadwinner-housewife model. We find that West German women increase
their labor supply and that this holds within household. We provide ad-
ditional evidence on stated gender norms, West-East friendships, intermar-
riage, and childcare infrastructure. The dynamic evolution of the local effects
on labor supply is best explained by local cultural learning and endogenous
childcare infrastructure.

JEL codes: J16, J21, D1
Keywords: cultural norms, local learning, gender, immigration

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1 Introduction

Cultural norms influence individual behavior and aggregate outcomes (e.g. Giavazzi et al., 2013), especially when it comes to the labor supply decisions of women. However, important questions on the origins and the evolution of cultural norms remain unanswered. A series of seminal papers 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 change. Focusing on the dynamic evolution of norms, Fernández (2013) and Fogli and Veldkamp (2011) study cultural norms in the presence of learning. Fernández (2013) proposes a model of inter-generational learning where norms and women's labor supply decisions depend on a noisy public signal generated by women's decisions in the preceding generation. Fogli and Veldkamp (2011) model local information transmission that generates changes in participation that are geographically heterogeneous, locally correlated, and smooth in the aggregate, and use county-level data to compare the calibrated model to observed participation decisions.

This paper presents causal evidence on the evolution of local cultural norms and beliefs. We examine whether large inflows of immigrants speaking the same language, but with different gender identities and cultural norms, can trigger the local evolution of social norms and behavior of natives. We measure norms related to gender 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 wife. We carefully trace the evolution of these effects over time and examine heterogeneity. Using a combination of administrative, census, and survey data sets, we examine different potential channels. We provide direct evidence on the evolution of stated gender norms and beliefs, local friendship-ties and intermarriages, as well as on the endogenous local supply of publicly funded childcare infrastructure.

We exploit the setting of German reunification to investigate the effects of immigration on the evolution of local cultural norms. This setting is uniquely suited for two reasons. First, East and West Germans held very different cultural norms related to the role of women resulting in much higher female labor force participation in the East. As argued in the existing literature, this is the case because the different political-economic systems imposed on East and West Germany 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 GDR regime are less traditional than individuals in West Germany (e.g. Campa and Serafinelli, 2019; Lippmann et al., 2019; Bauernschuster and Rainer, 2012; Beblo and Görges, 2018). We describe these differences in detail in Section 2.1.

Second, the collapse of the Wall separating East and West Germany in 1989 resulted in a sudden und unexpected large inflow of several million people who were socialized under the regime of the German Democratic Republic (GDR) into the territory of the former West Germany.[1] These first-wave migrants were previously sealed off from western influence and had limited information about local differences in economic conditions and cultural norms within the West. We argue, and provide supporting evidence in Section 2.2 below, that this gives rise to meaningful and quasi-random variation in the presence of East Germans in the West.[2]

The combination of the large inflows of East Germans with different cultural norms present a unique opportunity to improve the understanding of the evolution of local cultural norms in the West. East Germans were not perceived as foreigners in West Germany and are very similar in many respects - but very different in their view regarding the role of women. 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 the evolution of local cultural norms: Exogenously switching cultural norms in large shares of the local population and then studying changes in norms and behavior in the remaining local population.

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

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[1]We refer to "West Germany" and "East Germany" using capitalized letters to describe the regions of the former two states within Germany, although strictly speaking this is incorrect post reunification.

[2]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) andFuchs-Schündeln and Schündeln (2009) examine migration patterns post reunification. Fuchs-Schündeln and Schündeln (2009) show that migrants of the second wave (after 1997/98) were more selected by age and education.

West Germany based on existing trends in local cultural 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 womens 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 increases in the hours worked of employed women, and in the Western women's share of within household working hours.

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 and different sample restrictions.

We then 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, persistent reactions at the intensive margin in the medium- and long run. These time-patterns are consistent with the mechanism of local cultural learning.

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.[3]

Using supplementary data sources, we move on to document that the presence of immigrants affects an index of agreement to stated cultural norms and beliefs. We measure effects on beliefs about how maternal employment affects children and the marriage. We find that western women exposed to a large influx of East Germans, adjust their cultural norms and become less conservative. This is in line with our interpretation of the labor supply effects.

Are these effects on labor supply and local cultural norms driven by personal interactions or by other channels? Using individual-level information on friendship

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[3]We return to and discuss the different impacts at the intensive and extensive margins in the conclusions in the light of childcare infrastructure, theories of identity formation and local cultural learning.

networks, we show that East Germans slowly befriend 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 cultural learning and against household bargaining.

Next, we document that the presence of immigrants with gender-egalitarian local norms has led to local-level increases in the public provision of childcare. In Germany, the public provision of childcare is governed at the district level and shortages of public provision are shown to affect female labor supply (e.g. Müller and Wrohlich, 2018). We find that districts with a larger influx of gender-egalitarian East Germans started expanding child-care provision faster starting several years after reunification. This immigration-induced change in public infrastructure potentially amplifies, or even triggered some of the labor supply responses we find in the medium- and long run.

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 Alesina et al. (e.g. 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: cultural norms regarding female labor supply.

Second, we provide quasi-experimental evidence on theories of identity formation and cultural change (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 cultural 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., ming), the previous literature assessing the question of identity formation and cultural 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

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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 generations due to changes in cultural norms. On the individual level, Maurin and Moschion (2009) and Mota et al. (2016) study short-run cultural 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). Dustmann et al. (2016) provide a framework to reconcile findings in this literature. They summarize that studies that examine sudden changes in the local composition of workers (the spatial approach) only find evidence for displacement or wage effects when focusing on specific skill-, occupation-, or age-groups, or interactions thereof. This also applies to the German context:[4] Most closely related to our setting, Prantl and Spitz-Oener (201X) study wage-effects of the same within-German first-wave migration post reunification that we focus on in this study. They find no evidence for effects on West German native' wages even exploiting variation within age- and occupation-specific cells, unless interacting the labor supply shock with product market regulation. In contrast to this literature, we study female and household-level labor supply decisions without focusing on particular subsets of skill-, occupation- or age-groups in the local labor markets, or product market interactions. We therefore believe our results cannot be rationalized through existing empirical findings on labor supply effects. In line with the existing literature, we document zero effects for males using this (only spatial) approach. Moreover, we document effects for females and at the household level for the medium- and long-run. Borjas (2006) points out that local labor

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[4]Glitz (2012) finds skill-specific displacement 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. Dustmann et al. (2016) study short-run age- and skill-specific local labor market responses to the sudden inflow of 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. Earlier papers do not find these negative effects on labor force participation for Germany (Bonin, 2005; D'Amuri et al., 2010).

supply effects disperse over time and space. Last but not least, we provide direct evidence that shows adjustment in stated local cultural norms.[5]

In sum, we believe this paper makes two important contributions to the literature. First, we document that immigrants with different cultural norms and beliefs can trigger the evolution of cultural norms and behavior in receiving regions. We discuss the dynamics that we find with respect to theories of identity formation and cultural 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 local cultural norms by changing public spending.

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 B.1 in the Appendix. In addition, we introduce the first wave of East-West migration after the fall of the wall, which we use to examine behavioral changes of women in West Germany.

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[5]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.

2.1 Female labor supply in East and West Germany

Throughout the Cold War following World War II[6], 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 formal child care infrastructure.

As shown in Figure 1, women's labor force participation in the former GDR increased sharply in the 1970's and 1980's. By 1989 about 78 % of women in the working age population[7] participated in the labor forces (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 public child care was massively expanded, reaching almost universal coverage in 1989 (Figure A1).[8]

In West Germany, on the other hand, policies and cultural 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 1 and discussed in more detail in Appendix B.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[9] 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 %). There was hardly any formal child care provision for children under the age of three and school-aged children before

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[6]Following WWII, 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. Startin in 1961, the border separating West and East Germany became sealed, to prevent further East-to-West migration and became known as the iron curtain. Prior to the construction of the Berlin Wall in 1961 it was possible for civilians to cross the border.

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

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

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

reunification, with the exception of West 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 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 as a non-working mother.

Previous studies show that the different politico-economic systems imposed on East and West Germany causally[12] triggered the evolution of different cultural norms regarding the appropriate role of women. For example, 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. The results by Lippmann et al. (2019) 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. Lippmann and Senik (2018) provide evidence on smaller gender gaps in math 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). These studies do not find convergence of cultural norms over time. East Germans still have different cultural norms after moving to West Germany.

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

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[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.

[12]Note that to examine cultural 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 cultural norms and the labor supply decision of women are different.

of West and East Germany on October 3, 1990. Decades of East-to-West (net) migration followed.

Extent of Migration We rely on administrative records from all West-German registration offices in order to identify migrants from the East. In Germany, by law (Bundesmeldegesetz §17) every person has to register any change in her 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. Panel (a) of Figure 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 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.[13]

First-Wave Immigration We focus on the first-wave immigrants for three reasons. First, this ensures that immigrants were socialized under the former GDR regime. As already described and discussed in detail in Section B.1 in the Appendix, individuals who grew up in reunified East Germany were exposed to different family policies and female labor market patterns, e.g. 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 in the region they were first observed to be around 75-85%.[14] This is important because cultural 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 not the economic conditions in the receiving counties.

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[13]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.

[14]This estimate is based on representative data from the German Socio-economic panel study (Wagner et al., 2007). See section 5 for details.

Location Decisions of Migrants   Panel (b) of Figure 3 maps the inflows in 1991 relative to the population in each district (equivalent to U.S. counties). It is 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 A2 plots the district-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 1986 Census data on the district-level barely changes the estimated slope coefficient. In contrast, there is no distance-relation for West-West migration shown by the horizontal slopes in the lower half of the figure. Both of this holds within States (panels b and d). Second, we examine balancing of migration in Table A2.[15] In contrast to early East-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. Out of 27 local controls on industry structure, firms, religion, voting, child care, demographics, housing and female labor supply, only four are significant at the 10 percent level or higher for East-West migrants (column 2). In contrast, 23 are significant at the ten percent level of statistical significance for West-West movers. Moreover, distance to the border strongly predicts East-West mobility, but is virtually unrelated to West-West mobility. All in all, first-wave migrants thus appear uninformed even in respect to levels in local characteristics. Note that in our main Diff-in-Diff strategy, it is sufficient if these migrants were uninformed of, and their migration decisions unrelated to, trends in local outcomes.

3   Empirical framework

We use a combination of administrative and survey data to study local cultural learning effects in West Germany following German reunification. The various datasets come at different levels of aggregation and we always use the lowest-level possible.[16]

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[15]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.

[16]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 districts and is a commonly used definition of local labor markets based on commuter flows (e.g. Pischke and Velling (1997)).

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.Hence, we have information on four pre-reunification years and 14 post waves to study long-run cultural 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 grew 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.[17] In our main estimation sample, we restrict the analysis to cohorts born between 1945 and 1975. This ensures that we can identify women growing up in the West. Descriptive statistics for the main sample are reported in Table 1.

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).[18] In addition, we include a vector

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[17]For a detailed description on how we identify individuals who grew up under the former GDR regime and plausibility checks, see section B.2 in Appendix B. Our results are not driven by remaining very small number of misclassified East Germans living in the West.

[18]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 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).

of exogenous 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.

3.2 Further data and outcomes

To examine mechanisms, we use a number of supplementary data sets. Table A1 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. Besides our three main outcomes of interest, we also examine effects on other measures of female labor force participation, such as the decision whether to work at all or the decision to work full-time.

3.3 Empirical strategy

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

$$Y_{irt} = \beta_0 + \beta_1 \, \text{HighInflow}_r * \text{Post} + X'_{irt}\beta_2 + \kappa_t + \mu_r + \epsilon_{irt} \tag{1}$$

Post is an indicator variable taking the value of one in post reunification periods and HighInflow$_r$ is our treatment indicator that is equal to one if a woman i lives in a region r that received above median inflow from the former GDR after the fall of the wall.[19] 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 vary in pre- and post-reunification periods. We cluster standard

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[19]We conduct several robustness checks using different treatment definitions, all yielding similar results (see section 4.2).

errors ϵ_{irt} at the regional level to allow for within-region correlations.[20]

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 (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:

$$Y_{irt} = \gamma_0 + \sum_{t \neq 1989} \gamma_1^t \, \text{HighInflow}_r + X'_{irt}\gamma_2 + \kappa_t + \mu_r + u_{irt} \tag{2}$$

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 cumulative effects 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 border as a source of exogenous variation for the exposure of East Germans and estimate the following reduced form model:

$$Y_{irt} = \delta_0 + \delta_1 \, \text{Distance}_r * \text{Post} + X'_{irt}\delta_2 + \kappa_t + \mu_r + u_{irt} \tag{3}$$

where $Distance_r$ is the distance of the (population weighted) regional centroid to the next point on the former border (Iron curtain) 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 (1) and (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 (within states) as a function of distance in post relative

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[20]In section 4.2, we conduct several sensitivity checks with respect to how we estimate standard errors.

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.[21]

4   Results

4.1   Female labor supply

Table 2 reports estimates for equation (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 7. 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 DiD 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.

To examine the effect evolution, Figure 4 plots coefficients from equation (2) for our main outcomes. The estimated coefficients are close to zero and not statistically

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[21]As a robustness check, we also show non-parametric distance gradients by estimating $Y_{birt} = \sigma_0 + \sigma_1 \text{Post} + \mu_r + u_{irt}$ within each 30 km bin.

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 (3.2% 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 percentage points. As before, effects at the extensive margin of labor supply are only mildly positive, see panel (a).

Table 3 shows δ_1 coefficients in equation (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 (6) of Table 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.[22]

The findings are consistent with our DiD and event-study estimates, though the interpretation differs a bit. While the findings in Table 2 and Figure 4 reflect labor supply responses of West German women due to the presence of East Germans, distance correlates shown in Table 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 A2, though they are highly statistical significant.[23]

Overall, the findings of the different empirical specifications are consistent with our prior assumption on slow moving cultural learning effects, as reflected by 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

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[22]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.

[23]Appendix Figure A6 shows *Post* estimates in different distance bins. There are obtained from regression $Y_{birt} = \sigma_0 + \sigma_1 Post + \mu_r + u_{irt}$ within each 30 km bin and then plotting σ_1 coefficients.

the local childcare infrastructure, or identity formation which happens maybe only once in life, issues which we return to in sections 4.3 and 5.

4.2 Robustness

4.2.1 Treatment definition, identifying East Germans and sample restrictions, placebos

Table A3 in the Appendix presents a series of robustness checks in Panels A to C.

Panel A of Table A3 shows results for different functional forms to capture the inflow of East Germans, either using different cut-offs to define "high" inflow or continuous measures. Using a 25% vs 75% instead of the median split generates larger estimates. Estimates based on continuous measures are also statistically significant. Our results are thus not sensitive to the functional form for measuring the inflow of East Germans

Panel B of Table A3 presents results imposing different sample restrictions. One challenge of our main data set is that respondents are not directly asked if they grew up in East Germany. Thus, one potential threat to the cultural 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 mitigate 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 B.2 in the Appendix for details). The downside of using this cohort restriction is that our sample grows older with time. As expected from section B.2, 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 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 after German division.[24] In addition, in 1971 the West German government introduced a subsidy program ("Zohnenrandfördergesetz") for regions within 40 kilometers of

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

the border (e.g. Seidel and von Ehrlich, 2014). Estimates from this "no border" sample are very similar to the baseline. Overall, the results of Panel B confirm that our findings are robust to different sampling choices.

Finally, in Panel C of Table A3 we estimate placebo regressions with male labor supply as the outcome variable. Here, we fail to detect significant effects, for all outcomes. This finding is maybe not surprising given our approach and the findings of the literature on migration and labor supply.[25] Nevertheless, the fact that there are no effects on males further strengthens our argument that local labor market trends are unlikely driving our results. Furthermore, in Panel C of Table A3 we construct an equivalent treatment measure using West-West migration, i.e. mobility within West Germany and equally do not find a significant treatment effect, suggesting that local demand spillovers that 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), thus lowering the prices of these goods (e.g. Cortes, 2008).[26] 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 occupations like West Germans, and rarely work in the child care sector (about 4 %). Second, we observe larger effects for lower skilled West German women, who are very unlikely to employ private child minders. Third, informal child care by child minders is generally not very common in Germany (e.g. Büchel and Spieß, 2002). Only very few German households purchase other household services in the market (e.g. Schupp et al., 2006).

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[25]See discussion of this literature on page 5.

[26]We show in section 5 that the presence of East Germans lead to an expansion of the child care infrastructure. Similar 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.

4.2.2 Compositional changes

Fourth, we carefully 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 chose to capture slow moving cultural learning effects. In Table A8 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 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 A8 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 regions.

In addition, we estimate models with a more extensive set of individual controls 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)[27]. Note, that some of these additional controls might be endogenous to local cultural learning effects, in particular in the long run. However, they can better control for any potential compositional changes. Estimated coefficients for our baseline DiD model are depicted in Table A7 and event versions in Figure A3. They are very similar across different control specifications. We also assess compositional changes more directly by replacing the outcomes with the extensive set of control variables and re-estimate our models. None of these coefficients are statistically significant.[28]

Further robustness checks In addition, we assess the sensitivity to modeling time trends. Figure A4 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 4, results are stable using different trend-

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[27]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.

[28]These additional results can be obtained from the authors upon request.

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.[29]

As mentioned in section 3.3, we also assess the sensitivity of inference, i.e. to how we calculate our standard errors. Table A10 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 this 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 remain significant. We do not regard clustering at the state level as appropriate due to the small number of states in West Germany (nine).

Finally, in Appendix Figure A2 estimate effects non-parametrically using 30km distance bins, moving away from the former border. These plots show clear patterns for working hours of employed women in panels (b) and (c), and that our results are not driven by particular observations or outliers in particular locations.

4.3 Heterogeneity and further outcomes

This section presents results by different household types. The estimated coefficients in Table 4 are obtained by stratifying our baseline DiD estimates by highest educational schooling degree, marital status and age of the youngest child within the household.[30]

When stratifying the results by education, it is evident that the results are primarily driven by women with low and medium levels of education, especially

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[29]There is on 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).

[30]As mentioned above, restricting out sample to cohorts born between 1945 to 1970 has the potential caveat that our sample grows older with time. This is why the stratification by 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.

within households.

Married women exhibit slightly stronger responses, but these differences are not significant.

The last row of Table 4 splits the effect by the age of the youngest child present in the household. The estimates in columns 1 to 3 show effects that include the extensive margin of not working/working at all, and these are larger for women with small children (0.813 age below three; 0.273 age above six), although these coefficients as well as their differences are not statistically significant from zero or each other at conventional levels of statistical significance.[31] In contrast, the effects on female working hours for employed women, both in absolute terms (columns 4 to 6) and relative terms (columns 7 to 9), are clearly driven by women with the youngest child above the age of three in the household. We believe these women we least constraint by the local childcare infrastructure. In West Germany, children above the age of three either attended kindergarden or school, enabling women to increase working hours at the intensive margin. We believe that working women with younger children were possibly constrained by the lack of formal childcare, which we examine directly in Section 5.3 below. Finally, in Figure A7 we present estimates of equation 2 for other outcomes: Labor force participation, full-time employment defined as working above 35 hours per week, and full-time employment of employed women. These findings mirror our results found in our three main outcomes.

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 behavior of east Germans (Akerlof and Kranton, 2000), that there is some sort of information and cultural norm transmission (Fogli and Veldkamp, 2011) through social interactions or that east Germans change the local infrastructure for families (e.g. child care provision) either through their direct demand or indirectly through voting outcomes. All of these potential mechanisms

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[31]If taken at face value, the finding that extensive margin effects appear stronger for women with young children might emerge through changes in identity formation, rather than cultural learning, which occurs when children are young.

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 cultural learning effects. The additional survey and administrative data used to examine effects on local cultural norms, East-West friendship and intermarriage as well as the local child care infrastructure are summarized in Appendix Table A1. Descriptive statistics are presented in Table A5 and Table A6.

5.1 Local cultural norms

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

To empirically examine if cultural 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 costs of maternal employment for children and the marriage using data from the General Social Survey (ALLBUS) (GESIS - Leibniz-Institut fr Sozialwissenschaften, 2018). We combine the agreement to the single items shown in Figure 2 to a single index by standardizing each variable (measured on 4-point scale ranging from 1 "completely agree" to 4 "completely disagree") and then add up each item such that lower values correspond to less "traditional" gender attitudes and 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 whether individuals living in high inflow counties exhibit less traditional cultural norms after reunification, controlling for a rich set of covariates including state times year fixed effects.[32]

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

Estimated coefficients in Table 5 are negative and significant, suggesting that individuals living in high inflow counties in West Germany in post-reunification periods exhibit less "traditional" gender attitudes and 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 2), while attitudes toward the appropriate role of women (last three statements in figure 2) are less affected. Similarly, in Table 5 we find a significant distance gradient after German reunification, indicating that West Germans adjust their beliefs more strongly if they live living closer to the former east border.

5.2 Social interactions: friendships and intermarriages

The transmission of cultural norms or information 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 Socio-economic panel study (GSOEP).[33] The GSOEP is an annual household-panel survey that is representative of the entire population in Germany (Wagner et al., 2007). 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 come from East Germany and an indicator whether a person states to have

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[33]As an additional robustness check, we also conduct the main analysis based on GSOEP data. The estimated coefficients are similar; however, due to much smaller sample sizes, they are less precisely estimated (Table A9).

at least one friend from East Germany.[34]

Table 6 shows that in treated regions the share of friends who are originally from east Germany is significantly higher (about 0.5 percentage points) 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 percentage point 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 percentage points), though the coefficients are not statistically significant.[35] Examining the coefficients over time shows that while treated and control regions exhibit the same friendship outcomes in 1996 (first year available), the coefficient subsequently increases to 1.2 percentage points and 3 percentage points 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, it increased substantially in high inflow regions in the years that followed.

5.3   The local child care infrastructure

As described in section 2, in East Germany almost all children were in formal childcare from a rather early age. In West Germany, on the other hand, child care places[36] for young children or after-school care for school-age children were very rare (see section 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. Administrative data on the number of children in publicly funded child care on the county level is available

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[34]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.

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

[36]In Germany - in contrast to other industrialized countries - about 98% of all 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. **?**). The administration in Germany is up to the states and counties.

starting in 1986.[37] We construct childcare ratios separately for children under the age of three and for children aged three and above (all-day child care). Childcare ratios are defined as the fraction of children using subsidized formal child care in the respective age group.[38]

Figure 5 plots the estimated treatment effect on child care attendance.[39] Average effects are reported in Appendix Table A11. It is evident that in regions with above median inflow formal child care supply for under three year olds expanded at a much faster pace than in other regions. By 2015 the coefficient amounts to about 2.5 percentage points (7 % relative to the mean in 2015). The coefficients averaged over all years corresponds to 1.2 percentage points (see Table A11). 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. Thus, one might have expected an immediate increase caused by the direct demand of east Germans themselves. One explanation why it takes so long for the supply to respond to the demand is that the expansion of institutionalized 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 (and provided money) 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 formal child care amounts to about 3 percentage points (11 % relative to the overall mean). In Appendix Table A11, we also report reduced form estimates using distance to the former east border as a measure of exposure to East Germans.[40] Coefficients are highly statistically significant and robust across different specifications.

Overall, our empirical exercise suggests that there were substantial spillover

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[37]Until 2002 this dataset 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 anually. 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 Familien-Atlas of the Deutsches Jugendinstitut (1993).

[38]It would also be interesting to examine the impact on 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.

[39]Since in 1986, there are some missings in the data, we also show estimates when using 1994 as a baseline.

[40]Unfortunately, we have no information on full-day child care ratios before reunification. Thus we report distance coefficient based on equation 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 ($p = 0.311$).

effects on the childcare infrastructure that potentially amplified or even triggered some of the labor supply responses of women that we see in the data.

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 maternal employment affects children and the family can have 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 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 find these effects best accommodated by models of cultural learning and endogenous childcare infrastructure. We support this interpretation by providing direct evidence on the evolution of stated beliefs and attitudes, local social interaction between East and West Germans and the evolution of formal child care provision. In contrast, we find very limited evidence for effects at the extensive margin of labor supply, suggesting that slow-moving changes in local cultural norms cannot easily affect identity formation. Here, we find some evidence that mothers of very young children, for whom identities might still be malleable, react at the extensive margin. We believe the potential interplay of cultural learning and identity formation presents an exciting route for future work.

We argued that the historical setting that we study is uniquely suited to better understand the impact of immigrants on local cultural norms. But what does this imply for external validity? The immigrants that we study have different cultural norms, but speak the same language; they also have accredited educational degrees, and are fairly 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 cultural norms of natives through the learning channel and might not even do so in the second generation. However, the absence of direct immigrant-native interaction does not mean that such less integrated immigrants have no impact on natives at all. Instead, they might have an effect via changes in the local infrastructure, which does not depend on direct immigrant-native interaction.

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Figures and Tables

Figure 1: Female labor force participation rates 1959 - 2015
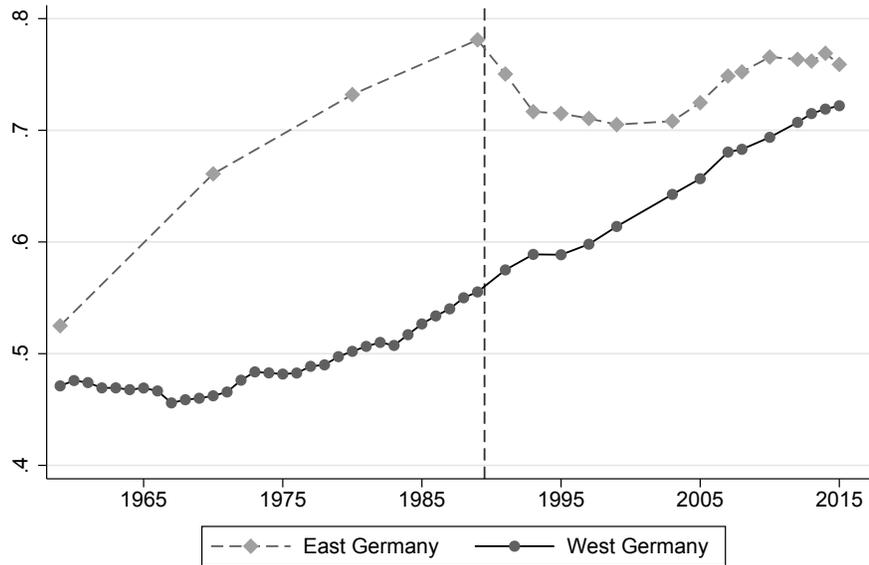
Notes: The figure shows labor force participation rates of women aged 15 - 65 in East and West Germany over time. The vertical line indicates German reunification in 1989.
Sources: Statistisches Amt der DDR (1996-1990), Statistisches Bundesamt (2017), MZ (1991 - 2015), own calculation.

Figure 2: Cultural Norms and beliefs of West and East Germans in 1991
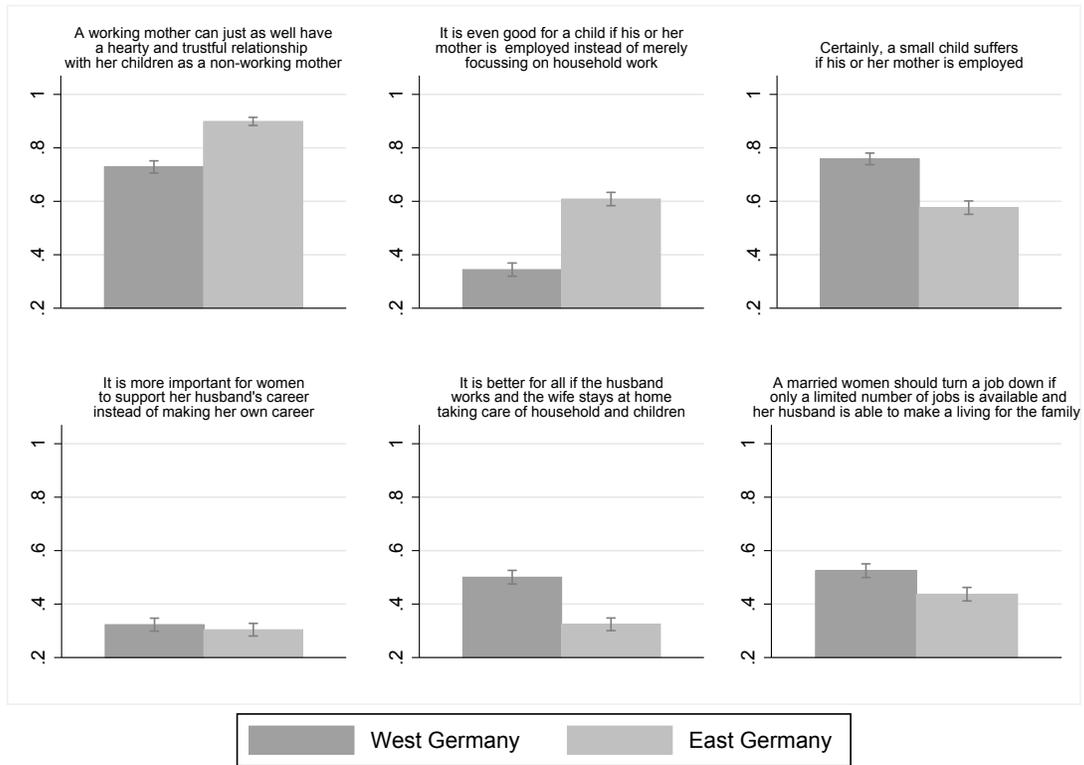
Source: The figure shows the fraction of individuals agreeing to a certain statement by East and West Germans in 1991.
Notes: ALLBUS 1991, own calculation

Figure 3: Immigration from East to West Germany

(b) Inflows in 1990-1991

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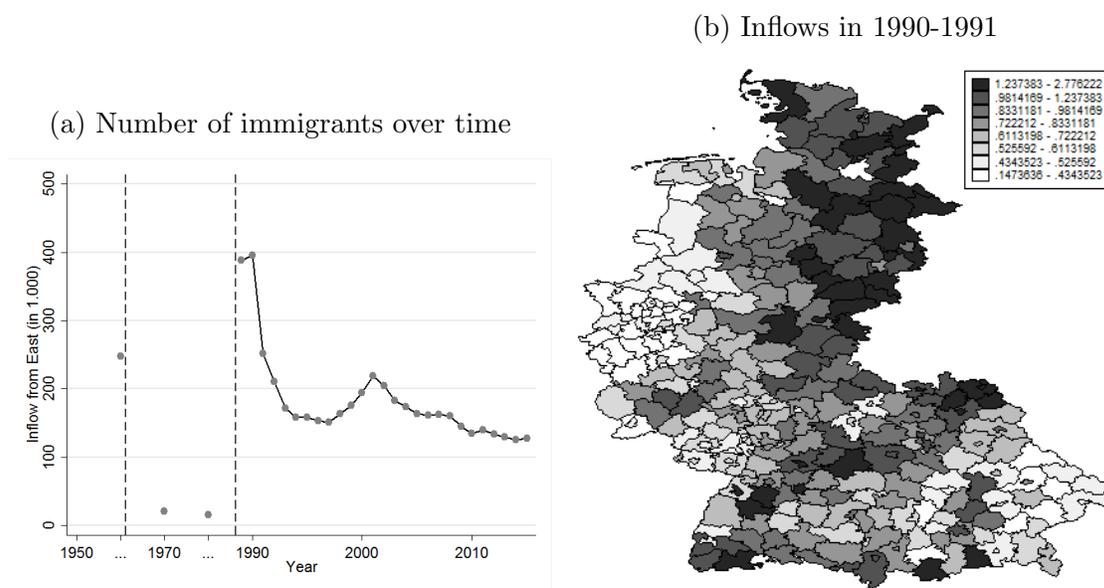
Notes: The figures plots (a) the number of immigrants from East to West Germany over time. The vertical lines indicate the construction of the wall in 1961 and the fall of the wall in 1989; (b) the inflow from East Germany as share of the local county-level population in 1990.
Source: BBSR (2017), German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

Figure 4: Event analysis

(a) Working hours of women
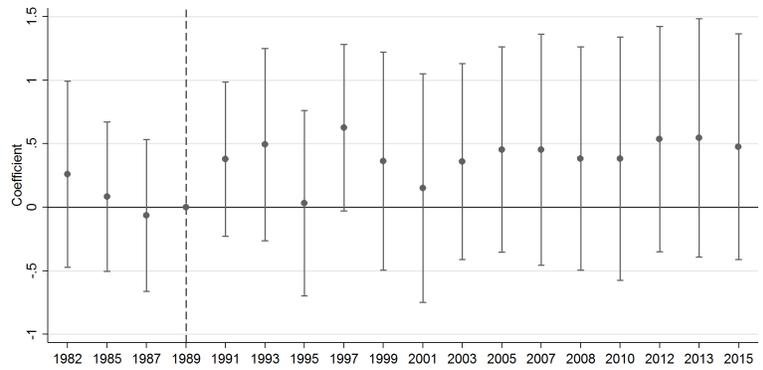
(b) Working hours of employed women
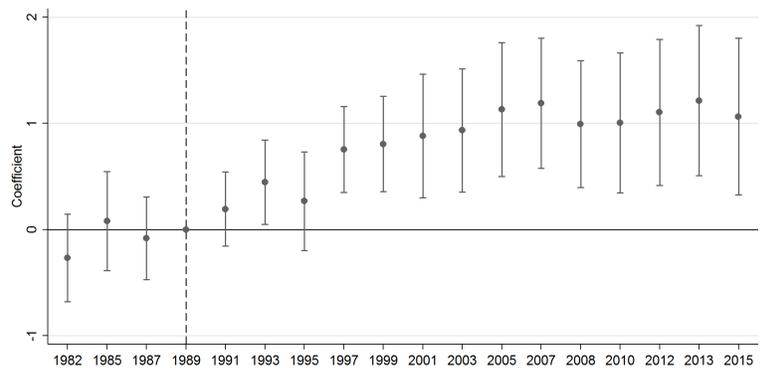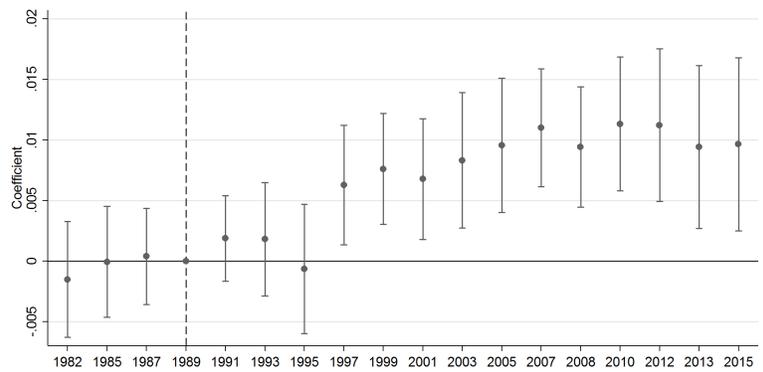
(c) Working hours within households

Notes: The figures plots the estimated γ_1 coefficients from equation (2) and corresponding 95% confidence intervals.

Source: MZ 1982-2015, BBSR (2017), own calculation.

Figure 5: Formal child care provision for children below age three
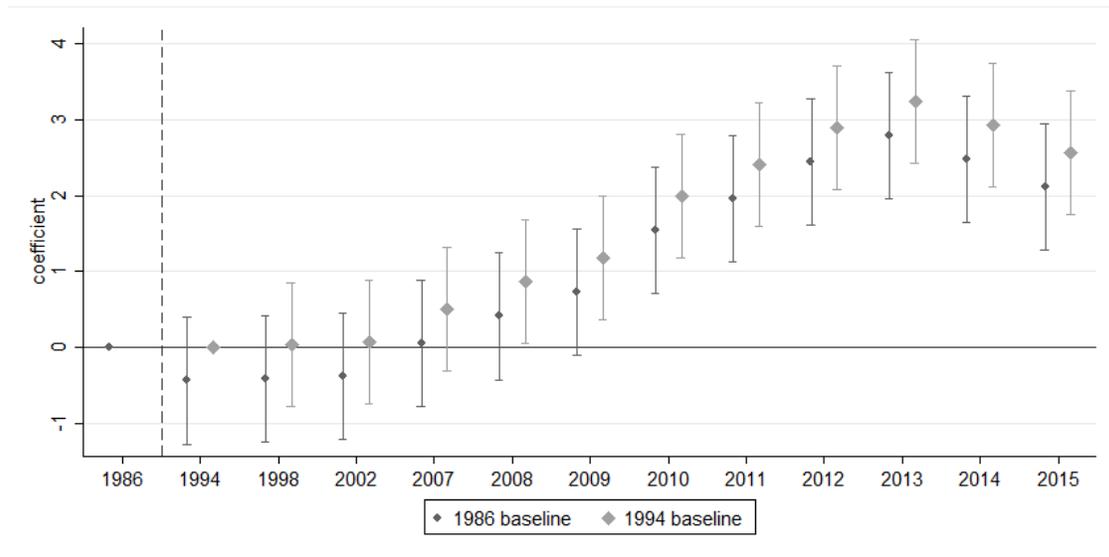
Notes: The figures plots the estimated γ_1 coefficients from equation (2) and corresponding 95% confidence intervals using 1986 and 1994 as baselevels.
Source: Statistisches Bundesamt (2017), BBSR (2017)

Table 1: MZ descriptives 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

Note: The sample includes all women aged 25 - 55 with non-missing information on individual controls, who are currently living in west Germany and do not have an east German educational degree.

Source: MZ 1982-2015, own calculation

Table 2: The labor supply effect of exposure to East Germans

	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

Note: Difference-in-difference coefficients from equation (1). For set of individual controls see Table 1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.

Source: MZ 1982-2015, BBSR (2017), own calculation.

Table 3: The labor supply effect of exposure to East Germans: Distance specification

	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

Note: Reduced form coefficients from equation (3). For set of individual controls see Table 1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.

Source: MZ 1982-2015, BBSR (2017), own calculation.

Table 4: Difference-in-Differences estimates: Heterogeneity

Stratified by	Working hours of women			Working hours of employed women			Relative working hours within households		
	(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)

Note: Difference-in-difference coefficients from equation (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: MZ 1982 - 2015, BBSR 2017, own calculation.

Table 5: Cultural norms and beliefs

	(1)	(2)	(3)	(4)	(5)
HighInflow	-0.0579**	-0.0611**	-0.0626**		
	(-2.02)	(-2.13)	(-2.45)		
Distance to east border				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

Note: 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: Source: ALLBUS 2000-2016, BBSR (2017), own calculation.


Table 6: Friendships and intermarriages in West Germany

	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

Note: All estimated include year fixed effects. Covariates are depicted in Table A5. 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

Appendix A: Additional Figures and Tables

Figure A1: Child care ratios 1950 - 2015

(a) Children < 3 years (b) Children ≥ 3 years
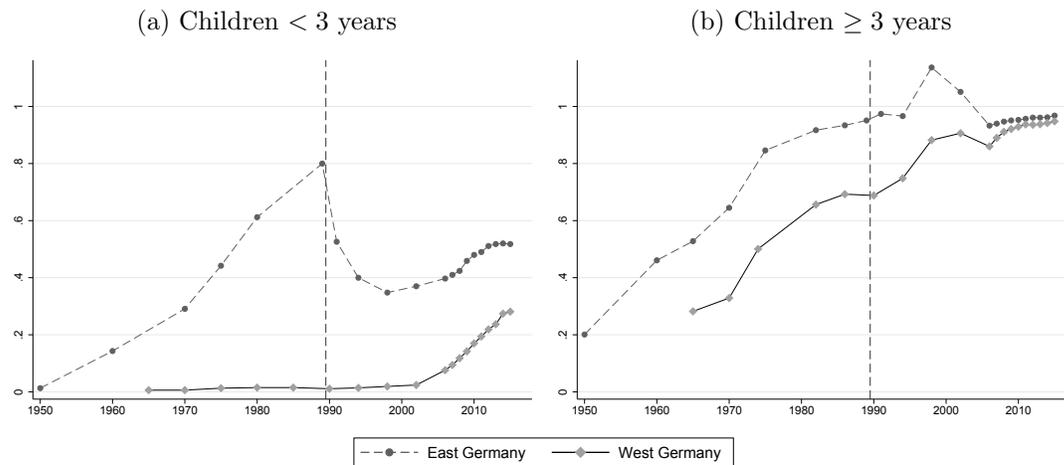
Notes: The figure shows the fraction of children in different age groups being cared for in formal child care in East and West Germany over time. For West Germany there is no data available before 1965. The vertical line indicates German reunification in 1989.

Sources: Statistisches Bundesamt (2018), BMFSFJ (1994), Winkler (1990)

Figure A2: Immigration from East and West Germany by distance to East border

(a) From East

(b) From East (within states)

(c) From West

(d) From West (within states)
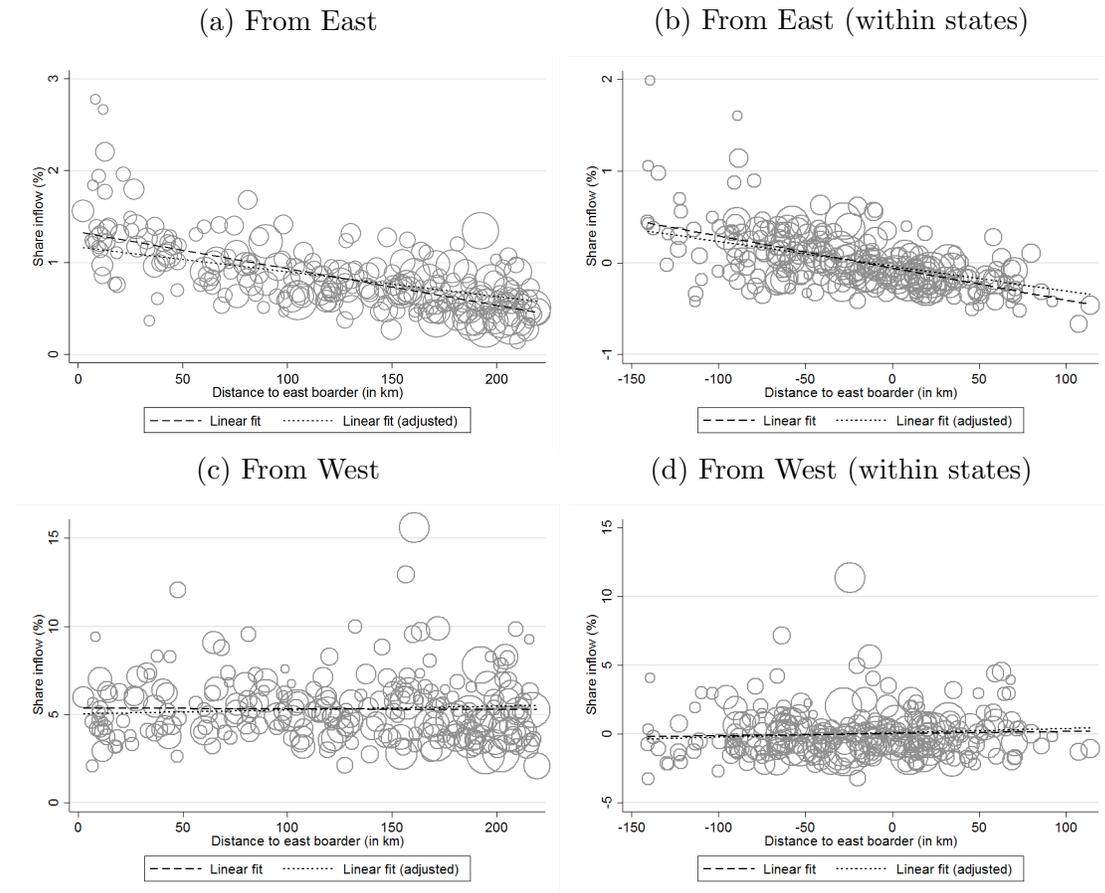
Notes: The size of the bubbles reflect the population size of each county. Distance is measured as the distance of the county's centroid to the nearest border point. Inflows shares are defined as inflow relative to the population in each county. (b) and (d) show inflow shares using only within state variation, i.e. relative to the state mean. Linear regression lines are shown without and with the adjustment by observable county characteristics (see Table A2 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: Event analysis - controls

(a) Working hours
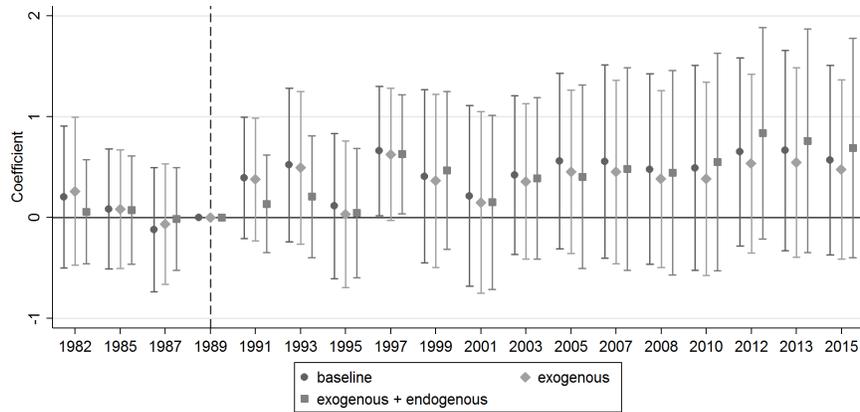
(b) Working hours of employed women
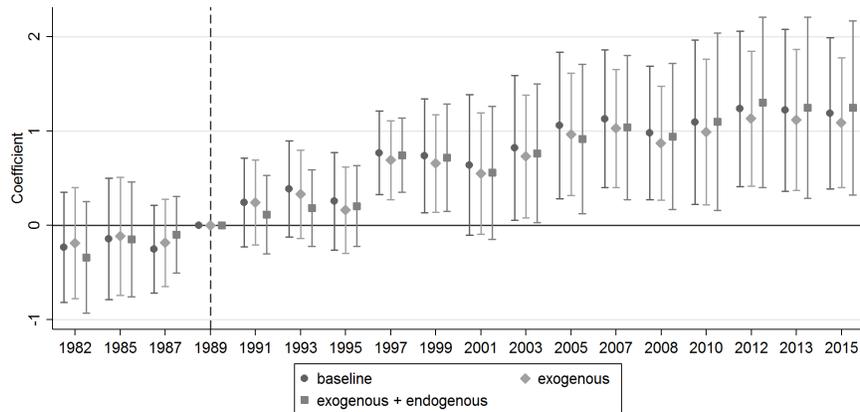
(c) Working hours gap within households

Notes: The figures plots the estimated γ_1 coefficients from equation (2) and corresponding 95% confidence intervals using different sets of control variables. See Table 1 for details.
Source: MZ 1982-2015, own calculation.

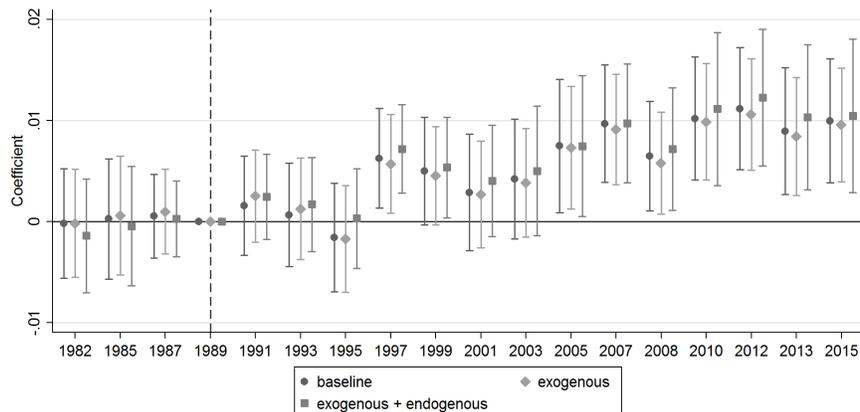## Figure A4: Event analysis - trend specification

(a) Working hours

(b) Working hours of employed women
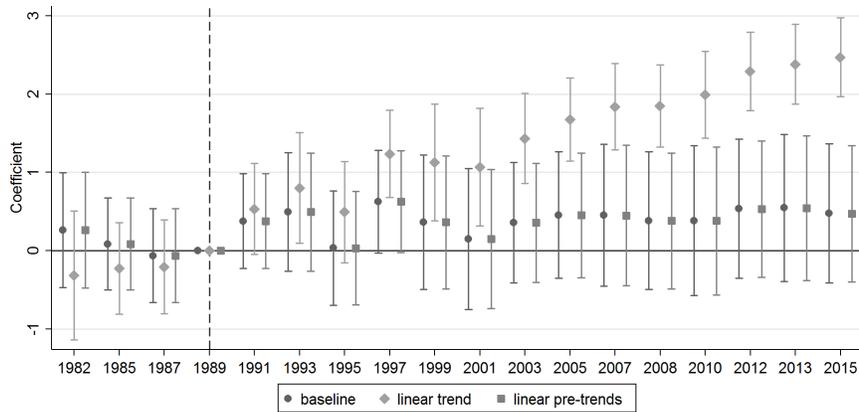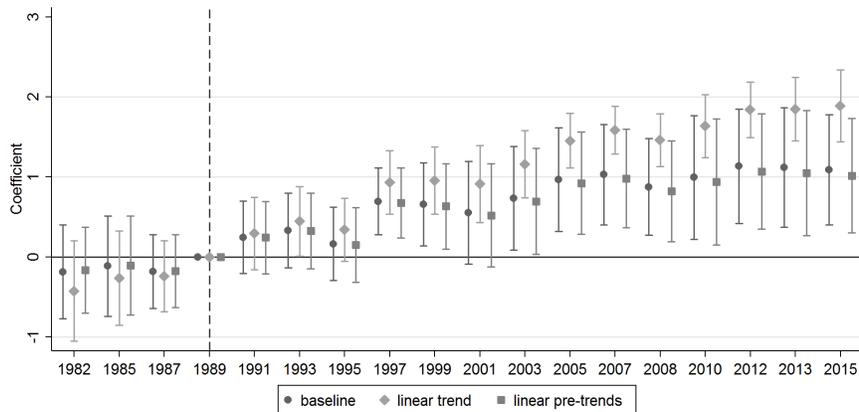

(c) Working hours within households

Notes: The figures plots the estimated γ_1 coefficients from equation (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.

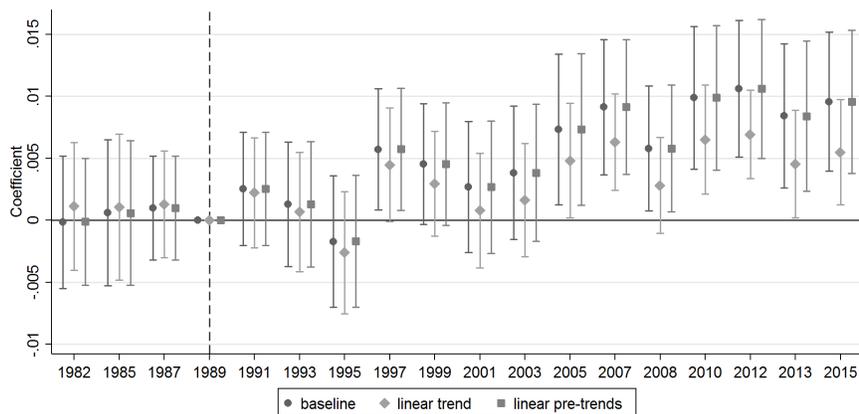## Figure A5: Event analysis - all pre-periods as baseline

(a) Working hours
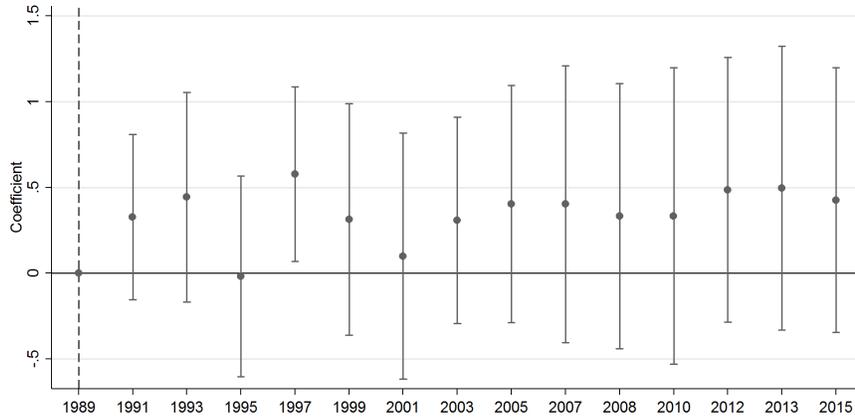
(b) Working hours of employed women
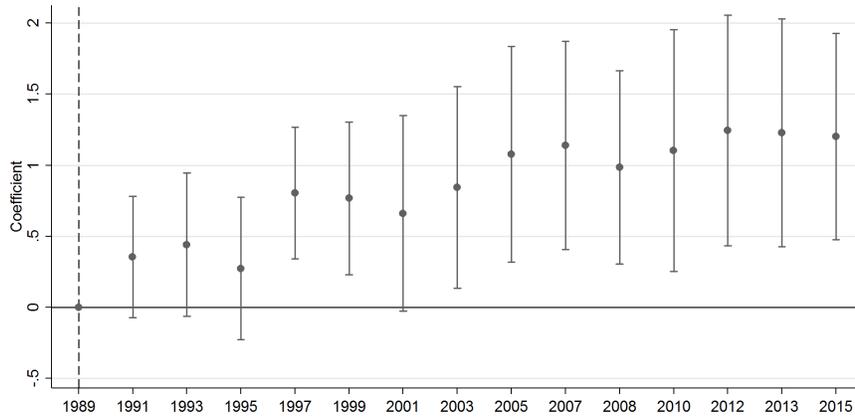
(c) Working hours within households
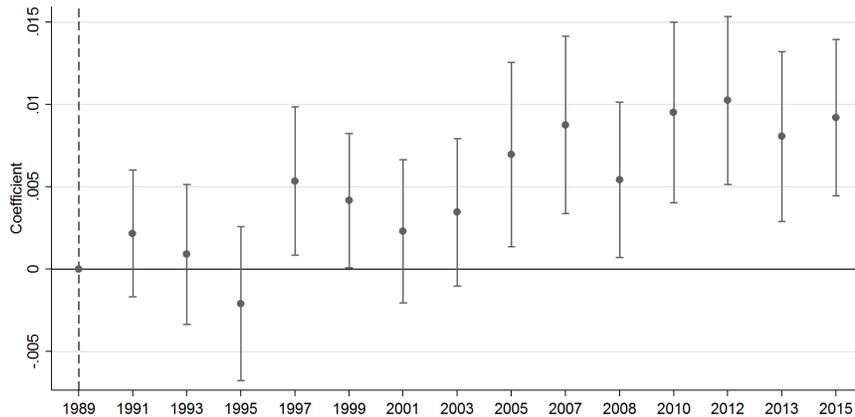
Notes: The figures plots the estimated effects when using the average of all pre-periods in equation (2) as a reference point and corresponding 95% confidence intervals.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Figure A6: Distance gradients

(a) Working hours
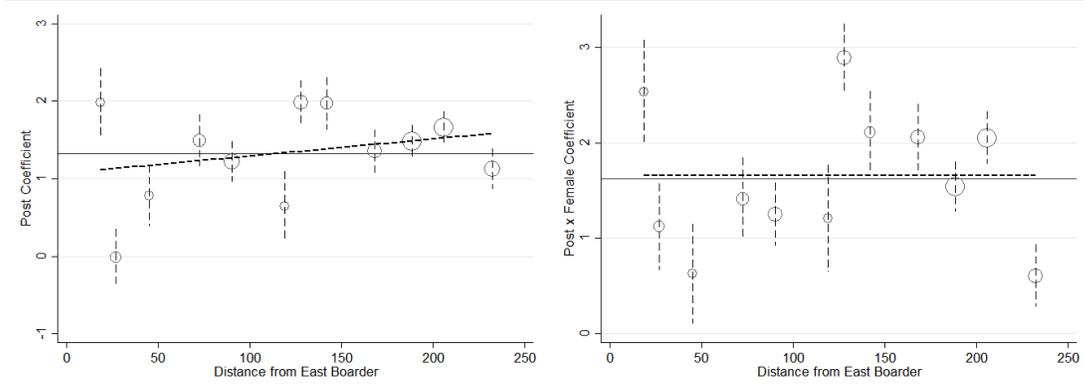
(b) Working hours of employed women
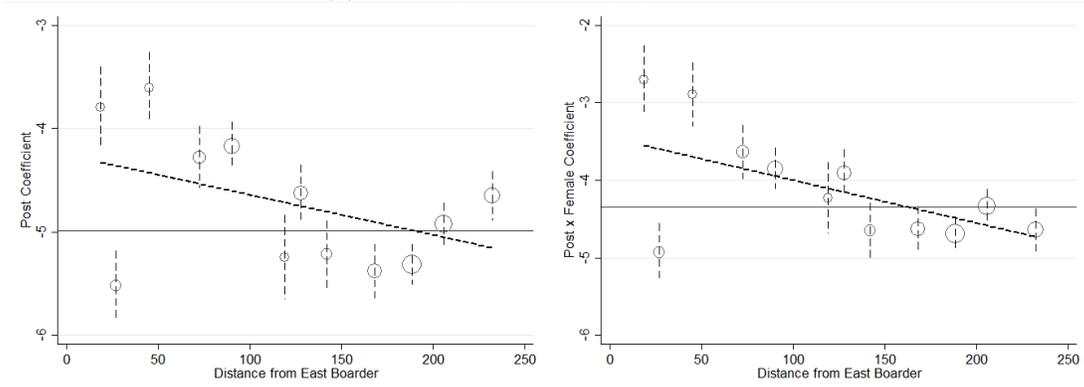
(c) Working hours within households
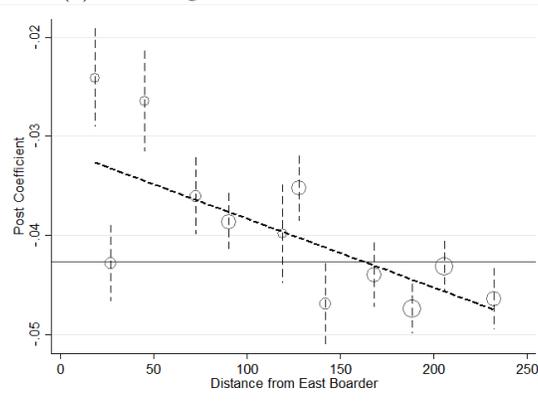
Notes: The left hand panel plots σ_1 coefficients (bubbles) for each 30 km bin from
$Y_{birt} = \sigma_0^b + \sigma_1^b \text{ Post} + \mu_r + u_{irt}$. The size of the bubbles reflect the number of observations in
each bin. The dashed lines are 95% confidence intervals. The solid lines indicate the 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 $Y_{birt} = \sigma_0^b + \sigma_1^b \text{ Post} * \text{Female} + \sigma_2^b \text{ Female} + \mu_r + u_{irt}$.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

46

Figure A7: Event analysis - other outcomes

(a) Labor force participation
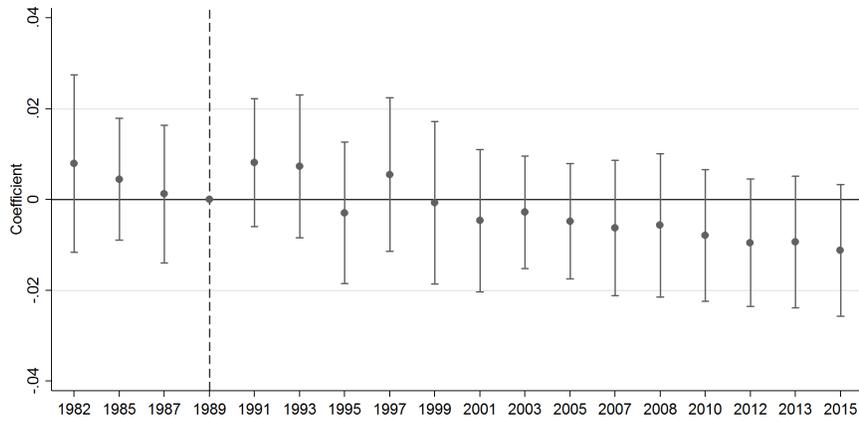
## (b) Full-time employment
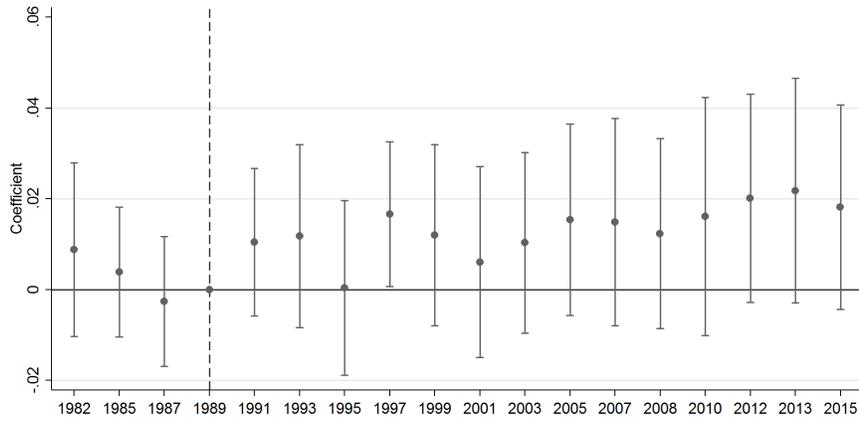
(c) Full-time employment of employed women
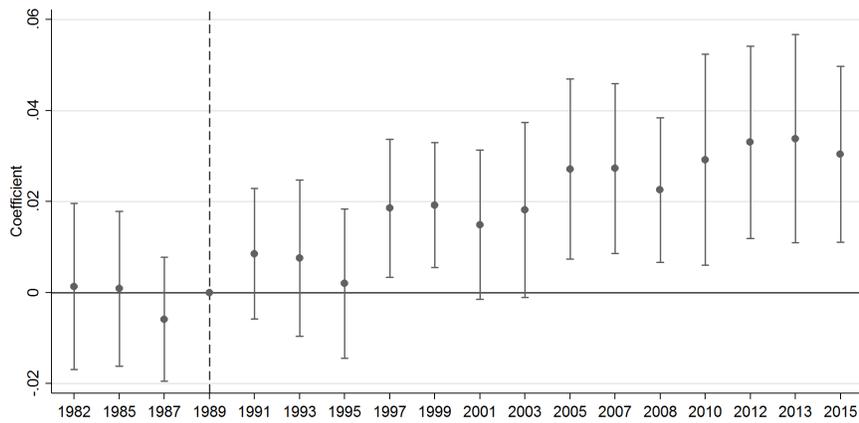
Notes: The figures plots the estimated γ_1 coefficients from equation (2) and corresponding 95% confidence intervals for alternative outcomes.
Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Table A1: 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

Note: Data on district-level migration statistics was purchased from the Federal Statistical office for use in this project. Microcensus (MZ) data: The MZ data that includes regional identifier is accessible on-site (https://www.forschungsdatenzentrum.de/en/household/microcensus) through any of the statistical offices' Secure Data Centers. Researchers are also required to sign a special usage agreement and output is cleared by the statistics office to ensure anonymity. ALLBUS data: 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. SOEP Data: the SOEP data including regional itentifiers is available to resarchers, after signing a special usage agreement, on-site at the DIW Berlin.

Table A2: Can county characteristics in 1987 predict migration after fall of wall?

	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)
			Continued on next page	

	High inflow from East Germany		High inflow from West Germany	
	(1)	(2)	(3)	(4)
After-school care ratio (6–9 year olds)	-0.725	-0.844	2.960***	3.595***
	(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. East/West inflows are normalized for comparisons between inflows from East and from West Germany. Column (2) and column (4) include state fixed effects. *Source:* Census 1987 based on DJI Regional Database (1993), BBSR 2017, own calculation.

Table A3: 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	

Note: Difference-in-difference coefficients from equation (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 1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.

Source: Microcensus 1982-2015, BBSR (2017), own calculation.

Table A4: Microcensus descriptives 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

Note: 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: MZ 1982-2015, own calculation

Table A5: 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
≥ 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

Note: 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 A6: 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

Note: The sample includes all individuals with non-missing information, who are currently living in west Germany and did not spend their youth in east Germany.

Source: Gesis (2018), own calculation

Table A7: 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

Note: Difference-in-difference coefficients from equation 1 using different vectors of controls. For the different set of individual controls see Table 1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.

Source: MZ 1982 - 2015, BBSR 2017, own calculation

Table A8: Compositional changes - outflows and inflows

Panel A: outflow in other west regions		stratified by age groups					
	overall (1)	[0,17] (2)	[18,24] (3)	[25,29] (4)	[30,49] (5)	[50,64] (6)	≥65 (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 (1)	[0,17] (2)	[18,24] (3)	[25,29] (4)	[30,49] (5)	[50,64] (6)	≥65 (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

Note: 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 A9: 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

Note: Difference-in-difference coefficients from equation (1). For set of individual controls see Table A5. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.

Source: SOEP 1984-2017, BBSR (2017), own calculation

Table A10: Main difference-in-difference - 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

Note: Difference-in-difference coefficients from equation (1) using different levels and methods to cluster standard errors. For set of individual controls see Table 1. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.

Source: MZ 1982 - 2015, BBSR (2017), own calculation

Table A11: Formal child care provision

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

Note: All estimates include state and year fixed effects. Columns (3) and (6) include the rich set of pre-treatment county characteristics shown in Table A2. Standard errors clustered at regional level. * 10% level of significance, ** 5% level of significance, *** 1% level of significance.

Source: Source: Statistisches Bundesamt (2017), Familien-Atlas I (1993), BBSR (2017)

Appendix B: Context and measurement error

B.1 Detailed institutional context

B.1.1 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 in 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 held 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 B1, working hours in Figure B2, and full-time employment in B3.

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 A1). 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 A1) 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, 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, 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; **?**). 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.

B.1.2 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 B1). 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 B2, 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, 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 B1: Labor force participation in West Germany (1982 - 2015)
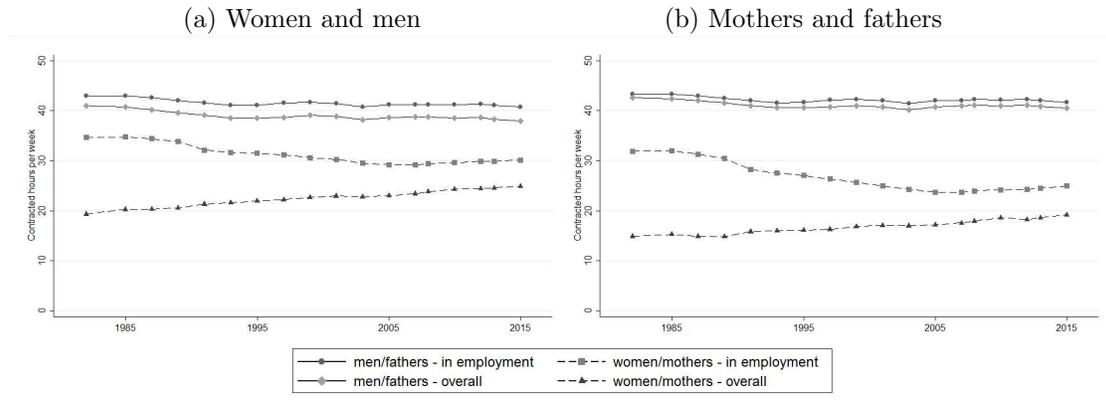
(a) Women and men　　　　　　　　(b) Mothers and fathers
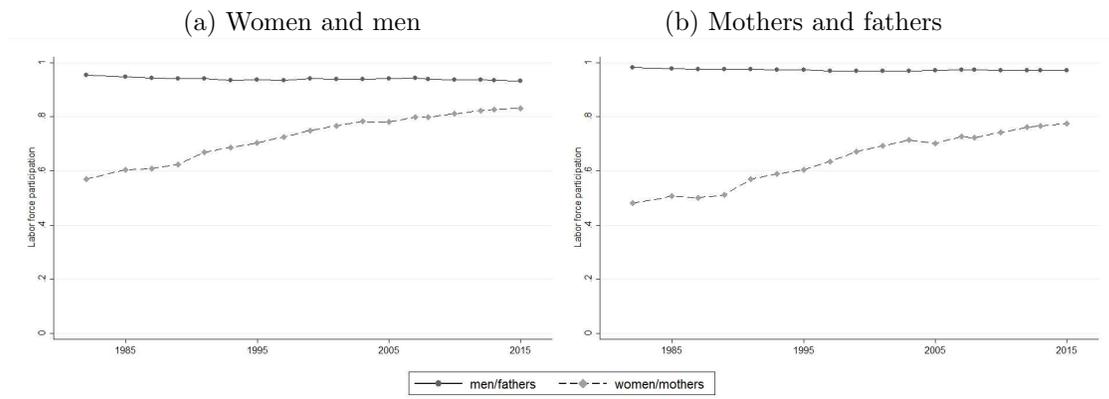
Notes: The figures plots labor force participation of (a) women and men and of (b) mothers and fathers over time. The sample is restricted to individuals aged between 25 and 55 living in West Germany.
Source: Microcensus 1982-2015, own calculation.

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 in 2006 (**?**), 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

Figure B2: 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.

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

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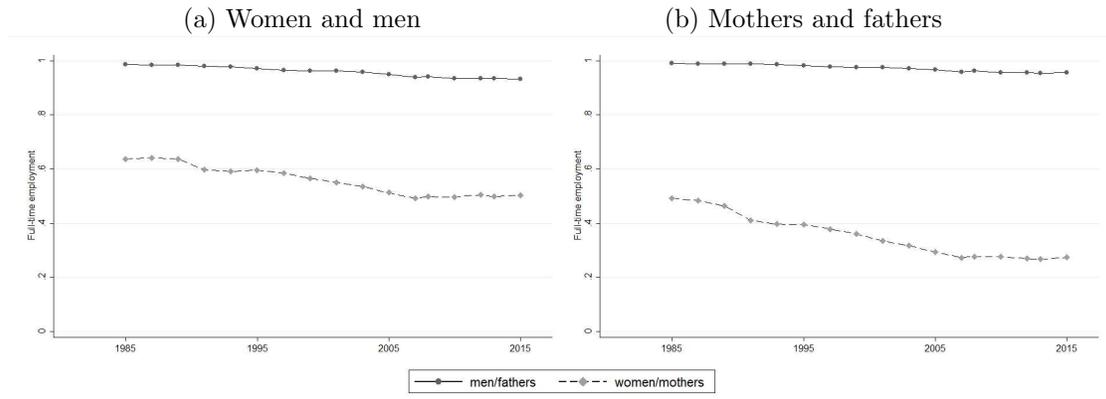
Notes: The figures plots the fraction of (a) women and men and of (b) mothers and fathers in full-time employment (conditional on labor force participation) over time. The sample is restricted to individuals aged between 25 and 55 living in West Germany.
Source: Microcensus 1982-2015, own calculation.

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, partially driven by a significant cut in child care funding, and thus, in the number of available

62

places (see also Figure A1), the adoption of West German family policies and the general economic crisis that triggered substantial mass layoffs.

B.2   Measurement Issues

B.2.1   Identifying West Germans in the various datasets

Mircrocensus   In the Microcensus, we cannot directly observe where people grew up, i.e. whether they grew up in East or West 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 a 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 schools. To address 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 6), we use a household definition to best capture and exclude all individuals who grew up in East Germany from the analysis.

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.

ALLBUS   In the German General Social Survey (ALLBUS), we have information on the state where the respondent spent their youth and where 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.

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.

B.2.2 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 Mircrocensus 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 2.7 % (4.76 % in 2015) in control regions (see also figure B4).

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 cannot 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

Using the estimates SOEP numbers, gives us a lower bound of 99.87 % (100 - 0.05 * 2.6) of correctly identified 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 labor 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.
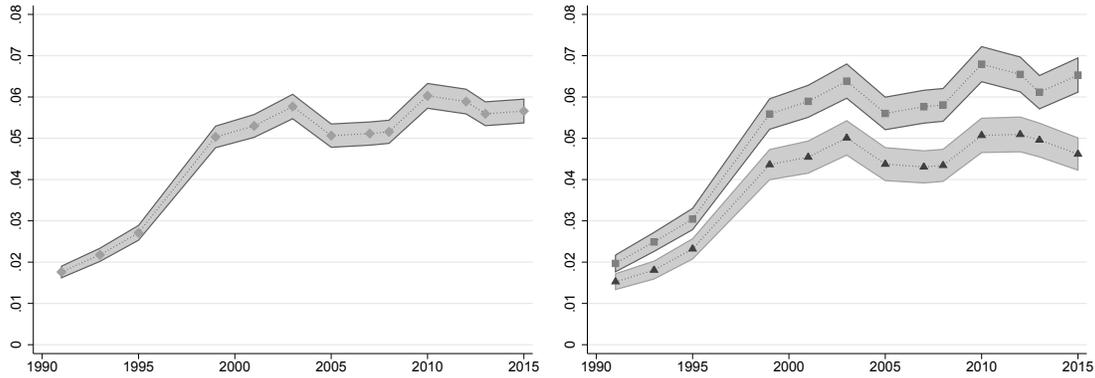
To sum up, the size of measurement error and the resulting effect bias is negligible and cannot drive our results.

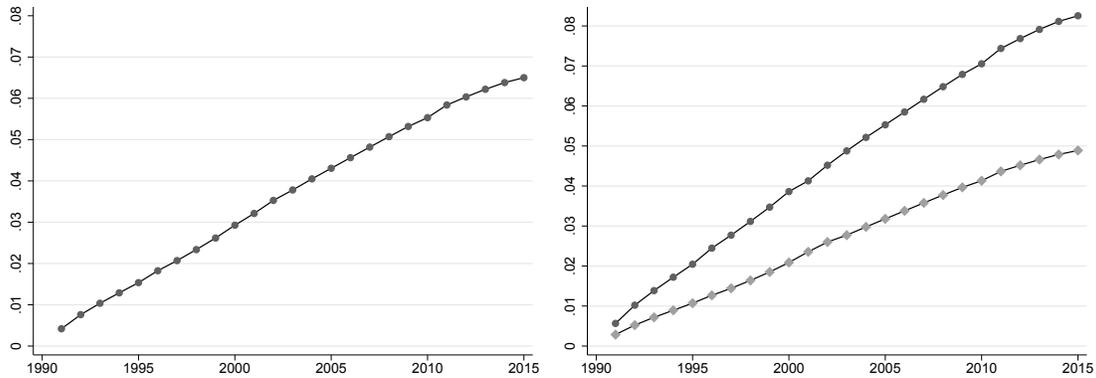Figure B4: Share of East Germans in West Germany

(a) SOEP data
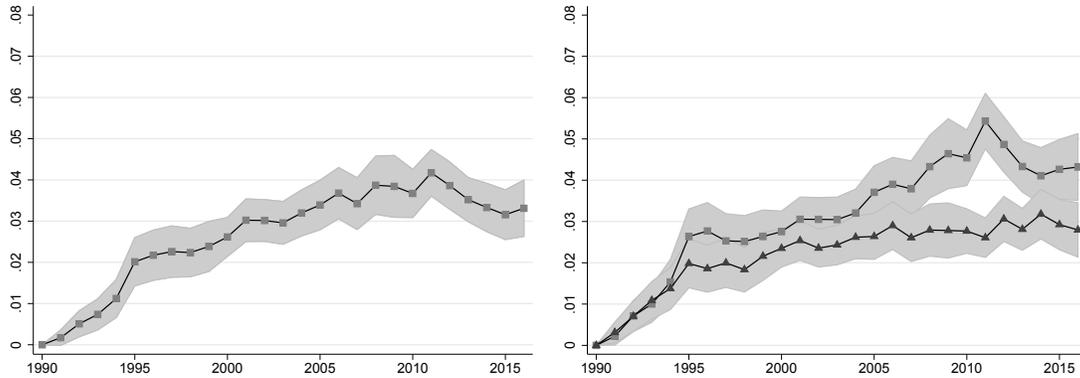
(b) Microcensus data

(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.

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