

DISCUSSION PAPER SERIES

IZA DP No. 12234

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## ABSTRACT

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# Out-Of-Partnership Births in East and West Germany

Using data from the German Socio-Economic Panel (SOEP), we show that single women in East Germany are significantly more likely to give birth to a child than single women in West Germany. This applies to both planned and unplanned births. Our analysis provides no evidence that the difference between East and West Germany can be explained by economic factors or the higher availability of child care in East Germany. This suggests that the difference in out-of-partnership births is rather driven by behavioral and cultural differences. However, these behavioral and cultural differences do not only reflect different gender role models that evolved under the former communist regime in East Germany and the democratic one in West Germany. Partly, they also reflect a long historical divide that predates the 1945 separation of Germany.

**JEL Classification:** J12, J13, P20

**Keywords:** unpartnered birth, gender role models, culture, East Germany, West Germany, politico-economic systems

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## **1. Introduction**

Two decades after reunification there are still large differences between East and West Germany. This does not only hold for economic circumstances but also for various dimensions of social life including family structure and fertility. Official statistics show that single-parent households are more common among East Germans than among West Germans (Statistisches Bundesamt 2010). In the year 2009, 27 percent of East German families were single-parent families. The share of single-parent families in West Germany amounted to only 17 percent. Closely related to this, nonmarital births are much more common in East Germany (Goldstein et al. 2010). In the year 2009, the share of nonmarital births among all births was 61 percent in East Germany which was more than twice the share of 27 percent in West Germany. The share of nonmarital births in East Germany is one of the highest in the EU (Mühling and Schreyer 2012).

This gives rise to the question as to what factors drive the differences between East and West Germany. We address this question by examining the determinants of out-of-partnership birth. Using data from the SOEP, our multivariate analysis shows that, even when accounting for a broad set of control variables, single women in East Germany are significantly more likely to give birth to a child than single women in West Germany. In particular, our estimates provide no evidence that the differences between East and West Germany can be explained by economic factors or by the higher availability of child care in East Germany. This holds for both planned and unplanned out-of-partnership births.

Our results conform to the notion that behavioral and cultural differences – i.e. different preferences and social customs in matters of love, partnership and family – play a crucial role in the differences in out-of-partnership births. People in East and West

Germany lived under completely different political regimes – a communist and a democratic one – for 45 years. This may have resulted in the emergence of different gender role models in the two parts of Germany. East Germany appears to be characterized by more equal gender roles implying that women are less dependent on a male partner. Thus, their wish to have a child should be less likely to depend on the presence of a stable partner or spouse. Moreover, as stressed by sex researchers and cultural historians, the more equal gender roles imply that women's sexuality is more emancipated in East Germany. To the extent this involves a higher frequency of casual sex, it can lead to a higher likelihood of unwanted pregnancies.

However, while the separation of Germany after World War II is often viewed as a natural experiment, behavioral differences between East and West Germans may have historical origins that predate the 1945 separation. Indeed, historical descriptive statistics show that, already in the early 20th century, the eastern part of Germany had substantially higher nonmarital fertility rates than the western part (Klüsener and Goldstein 2016). When taking this long historical divide into account, we do no longer find a significant East-West difference in unplanned births whereas the difference in planned births still remains. This suggests that the differences in out-of-partnership births are due to both historical factors predating the separation of Germany and different gender role models that have evolved under the two political regimes during the separation. The higher probability of unplanned births in East Germany appears to reflect long historical factors that might have contributed to East-West differences in casual sexual behavior. By contrast, the higher probability of planned births in East Germany appears to reflect a more emancipated gender role model that has evolved under the former communist regime.

The more emancipated gender role model implies that East German women to a lesser degree define themselves through a partner. Thus, their decision to give birth to a child should be less likely to depend on the presence of a stable partner or spouse. In order to examine this explanation in more detail, we also analyze if single women in East and West Germany differ in their life goals. Our estimates show that single women in East Germany place a higher value on having children than single women in West Germany. This result provides further support for the hypothesis that women in East Germany are less dependent on a male partner.

In a final step, we estimate the determinants of birth with an expanded sample that additionally includes cohabiting and married women. While cohabiting women in East Germany are also more likely to give birth to a child than their West German counterparts, we find no significant differences between married women in East and West Germany. Thus, the differences between East and West Germany only hold true for nonmarital, but not for marital births. This finding also supports the view that the East-West differences are due to different gender role models rather than due to a generally higher propensity of having children.

Our study contributes in several ways to the economic literature. Since the emergence of the economics of the family, economists have been increasingly interested in the determinants of nonmarital births (Akerlof et al. 1996, An et al. 1993, Burdett and Ermisch 2002, Ekert-Jaffe and Grossbard 2008, Lundberg and Plotnick 1995, Lundberg et al. 2016, Kearney and Levine 2014, Willis 1999, Wolfe et al. 2001). Economic studies have examined factors such as welfare benefits, income, educational achievement, labor market conditions, religiosity, race, and price and effectiveness of birth control. We

examine the long-lasting effects of historical factors and different political regimes. Moreover, our paper is one of the few papers distinguishing between planned and unplanned births.

Our study also adds to the literature on gender identity (Akerlof and Kranton 2010, Alesina et al. 2013, Bertrand et al. 2015, Booth and Nolen 2012, Cardenas et al. 2012, Gneezy et al. 2009). That literature has examined the influence of gender role models on income distribution, labor force participation, risk taking, and competitive behavior. Our results suggest that gender role models also have an influence on out-of-partnership births.

Furthermore, our study is related to the literature on institutions and cultural attitudes (Bowles 1998, Alesina and Giuliano 2015). Specifically, it contributes to the literature on the behavioral consequences of communism. A series of econometric examinations have shown that the exposure to 45 years of communism in East Germany has had substantial long-term influences on solidarity and cooperation, social distrust, personality traits, and preferences for state intervention (Alesina and Fuchs-Schündeln 2007, Ariely et al. 2014, Brosig-Koch et al. 2011, Friehe et al. 2015, Heywood et al. 2017, Ockenfels and Weimann 1999, Rainer and Siedler 2009). These studies assume that the separation of Germany after World War II is a natural experiment. However, due to the non-availability of suitable data, East-West differences predating the separation are usually not taken into account. Examining the long-lasting influence on fertility, our study demonstrates that such historical differences can play an important role.

Finally, we note that some exploratory studies have examined the determinants of nonmarital births in East and West Germany (Huinink 1998, Kreyenfeld et al. 2011, Vatterrott 2012). However, those studies do not have a specific focus on out-of-partnership

births and do not distinguish between planned and unplanned births. Moreover, they use a rather small set of control variables.

The rest of the paper is organized as follows. In the second section, we provide our background discussion. The third section presents the data and variables while the fourth section provides the estimation results. The fifth section concludes.

## **2. Background Discussion**

### *2.1 Different Gender Role Models in East and West Germany*

Germany was separated in 1945 at the end of World War II. The separation was the result of the positions of the occupying forces and negotiations between the Allies. In 1949, the Federal Republic of Germany (FRG) and the German Democratic Republic (GDR) were officially founded in the West and in the East. The GDR was an authoritarian communist regime while the FRG embraced democracy and capitalism. After the fall of the Berlin Wall, reunification of East and West Germany took place in 1990.

During the years of separation, the two parts of Germany differed substantially in their family policies (Engelhardt et al. 2002, Pfau-Effinger and Geissler 2002, Rosenfeld et al. 2004). In West Germany, family policy was dominated for a long time by the traditional male breadwinner model with continuously employed men and only partially employed women. Women worked full-time until they had children and returned to part-time work after longer career interruptions. Lack of public child care and inconvenient opening times of many day care facilities made it difficult for women to combine work and family. Instead of facilitating women's employment opportunities, the government focused on parental leave policies allowing mothers to stay at home with their young children.

While being on parental leave, women's entitlements were largely derived from their husbands' rights. Moreover, the tax system provided incentives for mothers to stay at home as it heavily weighted in favor of married and single income couples. Support for single-parent households was modest and there were no specific measures to foster single mothers' employment.

The family policy in East Germany promoted more equal gender roles. The main goals of the family policy were to integrate women into full-time employment and to encourage childbearing. The communist regime built up a comprehensive child care system that allowed women to stay in the labor force even during childbearing years.<sup>1</sup> Furthermore, measures such as child-illness leave or reductions in working hours for full-time employed mothers enabled women to reconcile work and family. East Germany also provided parental leave. However, parental leave was coupled with far reaching rights to job return. Furthermore, in contrast to West Germany, the East German tax system provided no specific incentive for women to stay at home. The earnings of spouses were taxed individually. Finally, while marriage was seen as the foundation of the family, some family policies privileged unmarried mothers (Hiekel et al. 2015). For unmarried women, the government permitted a 1-year paid maternity leave already for their first child. For married women, this maternity leave was granted for the second child only. Unmarried mothers were also preferentially treated in the allocation of child care slots.

After reunification the West German family and marriage law was adopted by the whole of Germany. However, to the extent people in East and West Germany have internalized the respective gender role model, one should still find behavioral differences even after reunification. The experience of a new politico-economic regime is unlikely to

make East Germans completely abandon the family and moral values they have acquired through socialization.<sup>2</sup> Available evidence suggests that the process of cultural transmission, if any, takes a long period of time.

A series of studies show that East Germans are still much more likely to hold egalitarian sex-role attitudes than West Germans (Bauernschuster and Rainer 2012, Kreyenfeld and Geisler 2006, Lee et al. 2007, Scott 1999, Treas and Widmer 2000). East Germans are less likely to be concerned about adverse effects of maternal employment on the well-being of children. Accordingly, they are more likely to disagree with the view that women have to stay home in order to take care of the household and the children. East Germans also more often tend to refuse the view that a woman has to support the husband's career instead of making her own. Most interestingly in our context, East Germans more often share the opinion that single women's wish to have a child should be respected and that one parent can raise children as effectively as two parents can do (Dorbritz and Ruckdeschel 2009).

Remarkably, the attitudinal studies do not provide evidence of a convergence. Considering the time span between the years 1991 and 2004, Lee et al. (2007) find that the differences in sex-role attitudes between East and West Germans have even increased. Bauernschuster and Rainer (2012) analyze the time span between 1991 and 2008 and obtain a similar result.

Labor supply studies show that the attitudinal differences are matched by behavioral differences. Considering the years 1999 to 2002, Haan (2005) finds that married women in the East have a higher labor market participation rate than those in the West. Relatedly, analyzing data from married and cohabiting couples in the period 2000 to 2007,

Haan and Wrohlich (2011) find higher employment rates among East German than among West German women. Finally, Kreyenfeld and Geisler (2006) show for 2002 that mothers in East Germany are much more likely to work full-time than mothers in West Germany. Moreover, they find that married and unmarried mothers in East Germany have similar employment patterns whereas in West Germany married mothers are less likely to work full-time than unmarried mothers.

All in all, the available evidence suggests that there still exist more equal gender roles in East Germany even though the former political regime is no longer in place. People in East Germany have been usually grown up with mothers employed full-time. This is the model on which they base their own lives. The more equal gender roles imply that women are both emotionally and economically less dependent on a male partner. They are less likely to define themselves through a partner and the stronger labor force attachment enables them to earn their living. Thus, their wish to have a child should be less likely to depend on the presence of a stable partner or spouse. This wish is reinforced by the widespread social acceptance of single motherhood. Against this background, we hypothesize that East German women have a higher probability of out-of-partnership birth than West German women.

One may even take this one step further and argue that the more equal gender roles not only contribute to a higher probability of wanted pregnancies, but also to a higher likelihood of unwanted pregnancies. Sex researchers and cultural historians stress that sexuality in East Germany is more emancipated (Beutel et al. 2007, Herzog 2008, Lautmann et al. 2004, Mühlberg 1995, Starke 1995). Sexuality in East Germany is characterized by higher levels of sexual activity and mobility and is more frequently to be

perceived as gratifying and enjoyable. Long-term material cost-benefit considerations appear to play a less important role in the relationships between East German men and women. Thus, to the extent single women in East Germany have a higher frequency of casual sex, we should also observe a higher probability of unplanned out-of-partnership births.

## *2.2 Alternative Explanations*

We recognize that East and West Germany still differ in a series of further circumstances that may be potentially relevant for out-of-partnership births. After German reunification, East Germany's comprehensive child care system has, to a larger extent, survived so that availability of child care is higher in the East than in the West (Schober and Stahl 2014, Wrohlich 2008). As child care allows women to combine family and work, it lowers their financial dependence on a male partner (Bauernschuster and Borck 2012). This in turn may increase women's incentive to give birth to a child even if they do not have a stable partner. However, it is an open question whether higher availability of child care alone can explain the differences between East and West Germany. The availability of child care facilities must be matched by a corresponding demand. The demand is higher if women have a stronger labor force attachment. Other things equal, such labor force attachment depends on more equal gender roles.

A second alternative explanation may be that East Germany is still characterized by relatively poor labor market outcomes. In the year 2009, the unemployment rate amounted to 13 percent in East Germany compared to 7 percent in West Germany.<sup>3</sup> The average gross monthly wage of a full-time employee was 2486 Euro in East Germany

compared to 3248 Euro in West Germany.<sup>4</sup> Building on the ‘marriageable men’ hypothesis (Willis 1999, Wilson 1987), one could argue that there is a low share of men with a high earnings capacity in East Germany. If women have a smaller chance to find a partner who brings resources to the partnership, they may decide to have a child without a partner. However, from a theoretical point of view the influence of a low share of marriageable men is ambiguous. Single women may rather prefer to have no child if they do not find a suitable partner. Only single women guided by relatively egalitarian gender roles may decide to give birth to a child.

One may argue that women’s own economic situation could play a role, too. However, the influence of this factor is also not clear-cut from a theoretical viewpoint. On the one hand, feelings of economic hopelessness may lead single women to view themselves as having little to lose by having a baby (Kearney and Levine 2014). On the other hand, single women may only give birth to a child when they have sufficient income to support a family on their own (Willis 1999).

We recognize that even if the East-West difference in out-of-partnership births is due to behavioral and cultural factors, this does not necessarily mean that these factors evolved under the two political regimes during Germany’s separation. This brings us to the third alternative explanation. Klüsener and Goldstein (2016) provide descriptive statistics showing that already in the early 20th century the eastern part of Germany on average had substantially higher nonmarital fertility rates than the western part. The authors argue that civil legislation and population policies in the eastern parts of the German Empire facilitated non-marital births. Moreover, a larger share of the East German population worked as seasonal workers. They had itinerant employment and lived far from home in

mass dormitories. In these seasonal communities, the workers were less subject to social control and pressure. This is likely to have supported the spread of deviant behavior. One may hypothesize that specifically the latter factor has contributed to long-lasting East-West differences in casual sexual behavior.

In our empirical analysis, we will test these alternative explanations by running regressions with and without control variables for the economic situation, the availability of child care and the long historical divide. If the economic situation, the availability of child care or the historical divide plays the primary role, the difference in out-of-partnership births between East and West Germany should diminish or even vanish when including the respective control variables. Yet, if the difference is primarily driven by behavioral and cultural factors tracing back to the separation of Germany after World War II, we should still find a significantly higher probability of out-of-partnership birth in East Germany regardless of whether or not we account for the economic situation, the availability of child care and the long historical factors.

### **3. Data and Variables**

#### *3.1 The Data Set*

Our study uses data from the SOEP (Wagner et al. 2007). The SOEP is a large representative longitudinal survey of private households in Germany. It is administered by the German Economic Institute (DIW). Infratest Sozialforschung, a professional survey and opinion institute, conducts the face-to-face interviews. A nucleus of socio-economic and demographic questions is asked annually. Different ‘special’ topics are sampled in

specific waves. In our empirical analysis, we consider single women, i.e. women without a partner or spouse. We focus on single women aged 18–42.<sup>5</sup>

### *3.2 Dependent Variables*

Table 1 shows the definitions of the dependent variables and their descriptive statistics. Our main dependent variable is a dummy for out-of-partnership birth. The respective dummy equals one if a single woman gives birth to a child in the actual year and equals zero otherwise. For the analysis of out-of-partnership birth, we focus on women who are singles in the previous and in the actual year. The variable for out-of-partnership birth is available for the years 1999–2014.

In a further step, we distinguish between unplanned and planned out-of-partnership births. This helps examine possible transmission channels in more detail. As stressed by our background discussion, the higher degree of gender equality should imply that East German women's wish to have a child is less dependent on the presence of a stable partner or spouse. This should result in a higher probability of planned out-of-partnership birth. Single women in East and West Germany may even differ in their sexuality. If single women in East Germany have a higher frequency of casual sex, we should also observe a higher probability of unplanned out-of-partnership birth. The variables for planned and unplanned out-of-partnership birth are available for the years 2004–2014.

Moreover, we examine if single women in East and West Germany differ in the value they place on having children. The dependent variable is a dummy equal to 1 if a single woman states that having children is an important or very important goal in her life. To the extent East Germany is characterized by more equal gender roles, a woman's wish to

have a child should be less likely to depend on the presence of a stable partner or spouse. Thus, East German single women should place a higher value on having children than their West German counterparts. The variable for the personal importance of having children is available for the years 2004, 2008 and 2012.

### *3.3 Explanatory Variables*

Table 2 provides the definitions and descriptive statistics of the explanatory variables. The explanatory variables are measured one year prior to the actual year. Our explanatory variable of primary interest is a dummy equal to 1 if the woman resides in East Germany. The dummy is equal to 0 if the woman resides in West Germany. We exclude women who have migrated from East to West Germany or from West to East Germany. For our analysis, we focus on East German women who have lived in East Germany before the fall of the Berlin Wall. Accordingly, we focus on West German women who have lived in West Germany before the fall of the Wall. This helps capture the potential influence of long-term cultural factors.

The economic situation is captured by a series of variables. We include a variable for the unemployment rate at the county level. Furthermore, we account for the woman's labor force status, working hours and income. Subjective expectations are captured by a variable for economic worries.

Information on the availability of child care is not provided by the SOEP, but can be obtained from official German statistics (Bundesinstitut für Bau-, Stadt- und Raumforschung 2016). Our measure of child care availability is the number of day care facilities divided by the number children under age 3 in the county the woman lives in.

Data on historical nonmarital birth rates are also obtained from official German statistics (Statistisches Reichsamt 1900–1929). For our analysis, we average nonmarital birth rates at the federal state level over the years 1900–1929. By including the historical nonmarital birth rate, we can examine if possible East-West differences in out-of-partnership births are due to Germany’s separation or due to factors predating the separation (see Lichter et al. 2015 for a related approach with respect to the influence of mass surveillance on social capital in the former GDR).

Socio-demographic characteristics are taken into account by variables for education, age, health and the number of children under age 16 in the single woman’s household. We also control for risk tolerance. Risk tolerance has been shown to be positively associated with out-of-partnership birth (Jirjahn and Struewing 2016). The SOEP provides a measure of risk tolerance on an eleven-point Likert scale. This measure has been experimentally validated by Dohmen et al. (2011).

Furthermore, we include variables for religious affiliation to capture differences in religiosity between East and West Germany. East Germans are, on average, less religious than West Germans (Meulemann 2016). One may argue that this reflects cultural differences between the eastern and the western part of Germany. However, even though gender role models may be related to religion, they play a more general and fundamental societal role beyond religion. Moreover, the influence of religion on out-of-partnership births is ambiguous from a theoretical point of view. Lower religiosity could explain the higher rate of out-of-partnership births in East Germany only if religiosity had a negative influence on the likelihood that single women give birth to a child. This would be the case if religiosity were associated with reduced sexual activity of single women. Yet, there are

at least two other potential effects of religiosity working in the opposite direction. First, religious women may have a lower probability to abort a child. Second, religious women may have a higher degree of altruism implying a stronger wish to have a child even when there is no stable partner or spouse. Thus, the inclusion of the religion variables may weaken or strengthen the estimated East-West difference in out-of-partnership births.

Note that the variables for child care and risk tolerance are not available for all waves of our sample. Thus, we provide two sets of regressions. The first set of regressions use the full sample of observations, but do not account for child care and risk tolerance. The second set of regressions include these variables and use only those waves of the survey that contain information on child care and risk tolerance.

## **4. Empirical Analysis**

### *4.1 Determinants of Out-of-Partnership Births*

Table 3 provides the initial estimations on the determinants of out-of-partnership birth. The estimations are based on an unbalanced panel of single women for the years 1999–2014. In random effects probit regression (1), we include only a constant and the dummy variable for residing in East Germany. The variable takes a significantly positive coefficient. The corresponding marginal effect implies that a single woman in East Germany has a 1 percentage point higher probability of giving birth to a child. Taking into account that this probability is 0.5 percent for West Germany, the difference between the two parts of Germany is substantial. Single women in East Germany have twice the probability of giving birth to a child than single women in West Germany.

In regression (2), we add basic control variables for age, education, health, number of children and year of observation. Age takes a significantly positive and its square a significantly negative coefficient. This suggests an inverse U-shaped relationship between age and out-of-partnership birth with a maximum at roughly 30 years. The variable for a completed apprenticeship training emerges with a significantly negative coefficient while the variable for a university degree is not significant. Taking into account that the reference group consists of the unskilled, the results suggest a U-shaped influence of education with medium educated women having the lowest probability of out-of-partnership birth. Most importantly, including the basic control variables does not change the result on our key explanatory variable. Single women in East Germany are more likely to give birth to a child than single women in West Germany.

In regression (3), we expand the specification by additionally including the variables for the economic situation. With one exception these variables do not emerge with significant coefficients. Only the variable for own unemployment takes a significant coefficient. The coefficient is positive suggesting that single women are more likely to give birth to a child if they are unemployed. Residing in East Germany remains a significantly positive determinant of out-of-partnership birth. Thus, the estimation provides no evidence that the East-West differences in out-of-partnership birth can be explained by economic factors. In regression (4), we also include variables for the woman's religious affiliation and for the historical nonmarital birth rate. The coefficients on these variables are insignificant while the coefficient on the dummy for East Germany still remains significant.

Finally in regression (5), we apply Firth's (1993) penalized likelihood approach to take into account that the share of observations with an out-of-partnership birth is rather

small in our sample.<sup>6</sup> The results of the penalized likelihood approach are very similar to those obtained by using the probit procedure. Importantly, this approach also confirms a significant East-West difference in out-of-partnership births.

The estimations in Table 3 do not control for child care availability and risk tolerance. In order to take child care availability and risk tolerance into account, we now limit our estimation sample to the years for which information on these variables is available. Table 4 presents the estimations based on an unbalanced panel for the years 2008–2014. For the purpose of comparison, regression (1) uses the same specification as regression (4) in Table 3. The regression confirms the inverted U-shaped relationship between age and out-of-partnership birth. For the first time, the variable for the historical nonmarital birth rate takes a significant coefficient. Single women in federal states with a higher 1920s nonmarital birth rate have an increased probability of giving birth to a child. This suggests that historical factors can indeed have a very long-lasting influence on fertility behavior. However most importantly, the East-West difference in out-of-partnership births is also confirmed when using the smaller estimation sample.

In regression (2), we add the variable for child care availability to the specification. This variable takes a significantly positive coefficient. Single women in counties with a greater availability of child care are more likely to give birth to a child. While this role of child care availability conforms to expectations, it cannot explain the East-West differences in the fertility of single women. Single women in East Germany remain significantly more likely to give birth to a child.

In regression (3), we also control for risk attitude. The regression shows a significantly positive association between risk tolerance and out-of-partnership birth. The

result on the East-West difference remains also in this regression unchanged. Finally, regression (4) applies Firth's penalized likelihood approach. That regression confirms our pattern of results, too.

Altogether, the result of a significant East-West difference in out-of-partnership births persists even when taking a broad set of control variables into account. Specifically, our estimates do not provide evidence that the higher likelihood of out-of-partnership births in East Germany can be explained by the higher availability of child care or the poor economic situation. This suggests that other factors should play a role. As discussed, different norms of love, partnership and family have developed in East and West Germany. People in East Germany are more likely to have non-traditional sex role attitudes. As a consequence, single women in East Germany appear to be more willing to give birth to a child.

So far we also have not found evidence that the different norms of love, partnership and family can be explained by historical factors predating the 1945 separation of Germany. The estimated East-West difference in the likelihood of out-of-partnership birth remains statistically significant and quantitatively largely unchanged in regressions that account for the 1920s nonmarital birth rate. This could suggest that the different gender role models evolved under the two political regimes during the separation. However, the role of historical factors may differ between planned and unplanned births. Hence, we now turn to an examination of the determinants of planned and unplanned out-of-partnership births.

#### *4.2 Planned and Unplanned Out-of-Partnership Births*

The determinants of planned and unplanned out-of-partnership births are estimated by using the multinomial probit model. Planned and unplanned births are measured relative to the base of no birth. Table 5 presents the results. Regressions (1) and (2) are based on an unbalanced sample for the years 2004–2014.

In regression (1), we do not control for the historical nonmarital birth rate. The regression shows that age has an inverted U-shaped relationship with both planned and unplanned births. The single woman's own unemployment increases both the probability of a planned and the probability of an unplanned birth. Education plays only a role in unplanned births. Single women with a medium education level are less likely to have an unplanned birth. Religion emerges as a significantly positive determinant of planned births whereas it plays no significant role in unplanned births. Compared to single women without religious affiliation, those with a Catholic, Protestant or other religious affiliation are more likely to have a planned birth. This conforms to the notion that religiosity is associated with an increased wish to have a child. Turning to our variable of primary interest, single women in East Germany have both a significantly higher probability of a planned birth and a significantly higher probability of an unplanned birth. Thus, the East-West difference in the fertility of single women holds true for both planned and unplanned births.

Regression (2) shows that this difference is partly due to historical factors that predate the 1945 separation of Germany. Adding the variable for the historical nonmarital birth rate to the specification renders the coefficient on East Germany insignificant in the equation for unplanned out-of-partnership births. Moreover, the size of that coefficient drops substantially by more than 40 percent. The variable for 1920s nonmarital birth rate

emerges as a significant determinant of unplanned out-of-partnership births. Single women in federal states with a higher historical nonmarital birth rate are more likely to have an unplanned birth.

However, the East-West difference in planned out-of-partnership births cannot be explained by the historical nonmarital birth rate. In the equation for planned births, the coefficient on East Germany remains statistically significant and its size even slightly increases when including the variable for the 1920s nonmarital birth rate. Moreover, the variable for the 1920s nonmarital birth rate does not emerge as a significant determinant of planned out-of-partnership births.

Regressions (3) and (4) use a smaller sample for the years 2008–2014. These regressions additionally include variables for risk tolerance and child care availability. The two variables take significant coefficients in the equation for unplanned out-of-partnership births. Risk tolerance and child care availability are positively associated with a higher probability of unplanned out-of-partnership birth. Most importantly, the two regressions confirm our key pattern of results. When not controlling for the 1920s nonmarital birth rate, the coefficient on East Germany is statistically significant in both the equation for planned and the equation for unplanned out-of-partnership births. Adding the 1920s nonmarital birth rate to the specification renders the coefficient on East Germany insignificant in the equation for unplanned out-of-partnership births whereas the coefficient remains statistically significant and quantitatively large unchanged in the equation for planned out-of-partnership births.

Altogether, the estimations shown in Table 5 provide two important insights. First, the pattern of influences underlying the East-West difference in out-of-partnership births

can be revealed only when distinguishing between planned and unplanned births. Second, while behavioral and cultural differences between East and West Germans are usually attributed to the different political systems during Germany's separation, our estimations show that historical factors predating the separation cannot be ignored. The estimations provide evidence that the higher likelihood of unplanned births among East German single women is due to factors dating back longer than Germany's separation. As suggested by Klüsener and Goldstein (2016), a greater extent of seasonal work in the eastern part of Germany may have historically contributed to what they call deviant behavior. Our finding indicates that East-West differences in casual sexual behavior persist to the present time.

By contrast, we do not find evidence that the higher likelihood of planned births among single women in East Germany can be explained by factors that predate the separation. This conforms to the hypothesis that the higher likelihood of planned out-of-partnership births reflects more equal gender roles that have evolved in East Germany during the separation. These more equal gender roles imply that women are less dependent on men such that they are more willing to raise a child even when there is no stable partner or spouse.

Furthermore, our estimations provide no evidence that the cultural and behavioral differences between East and West Germans can be reduced to differences in religiosity. East Germans are on average less religious than West Germans (Meulemann 2016). However, the East-West difference in planned out-of-partnership births holds even when controlling for religious affiliation. Moreover, religious affiliation is not associated with a lower, but with a higher probability of planned out-of-partnership births. Thus, the

estimations suggest that the different gender role models in East and West Germany play a more general societal role beyond religion.

#### *4.3 The Importance of Having Children*

In a further step, we examine if single women in East and West Germany differ in the value they place on having children. If women are less dependent on men, their wish to have a child should depend to a lesser degree on the presence of a stable partner or spouse. Thus, single women in East Germany should place more value on having children than their West German counterparts.

Table 6 provides the estimations on the determinants of the personal importance of having children. Regressions (1) and (2) are based on an unbalanced panel for the years 2004, 2008 and 2012. In regression (1), we include a set of basic control variables. Several of the control variables take significant coefficients. Single women with a Catholic, Protestant or other religious affiliation are more likely to place a high or very high value on having children. This finding fits the result that religious women have a higher probability of planned out-of-partnership birth. It may indicate that religious people are characterized by a higher degree of altruism. The number of children is also a positive covariate of the personal importance of having children whereas a university degree is a negative covariate. Age has an inverted U-shaped influence. Interestingly, the historical nonmarital birth rate does not emerge as a significant determinant of the personal importance of having children. This fits the results that this rate has only an influence on unplanned, but not on planned out-of-partnership births. Most importantly, single women

in East Germany are more likely to place a high or very high value on having children than their West German counterparts.

In regression (2), we additionally include the variables for the economic situation. Those who are out of the labor force and those who work but have a higher number of working hours tend to place less value on having children. The health variable now also emerges as a significant determinant. Good or very good health is positively associated with the personal importance of having children. Turning to our variable of primary interest, the coefficient on the variable for East Germany remains statistically significant and quantitatively largely unchanged.

In regressions (3) and (4), we limit our estimation sample to the years 2008 and 2012. For the purpose of comparison, regression (3) is based on the same specification as estimation (2). The regression confirms the pattern of results. In regression (4), we add variables for child care availability and risk tolerance to the specification. While these variables do not take significant coefficients, the variable for East Germany remains a significant determinant of the importance of having children.

In summary, the positive association between the variable for East Germany and the variable for the personal importance of having children confirms our hypothesis. The more emancipated gender role model in East Germany implies that women's wish to have a child depends to a lesser degree on the presence of a stable partner or spouse. This fits the result that women in East Germany are more likely to have a planned out-of-partnership birth.

#### *4.4 Marital, Cohabiting and Out-of-Partnership Births*

Finally, we recognize the possibility that East German women might have in general a higher fertility rate than their West German counterparts. Thus, general differences in the propensity of having children rather than differences in gender roles might drive the East-West differences in out-of-partnership births. To examine this alternative explanation in more detail, we additionally include married women in our estimation sample. If East German women are in general characterized by a higher propensity of having children, we should find that married women in East Germany are also more likely to give birth to a child than their West German counterparts. Yet, if more emancipated gender roles in East Germany play the primary role, we should observe a higher likelihood of birth only for single women, but not for married women.

We also add cohabiting women to our estimation sample. Cohabitation is more prevalent among East Germans (Jirjahn and Struewing 2018). While cohabitation is largely viewed as an inferior substitute for marriage in West Germany, it is socially more accepted and often viewed as an alternative to marriage in East Germany (Hiekel et al. 2015). This reflects different norms of partnership and love suggesting that there may be also an East-West difference in cohabiting births. As stressed by sociologists, cohabitation involves a greater lack of normative prescriptions for role performance (Baxter 2001). This leaves space for cohabiting couples to negotiate more egalitarian relationships.

Table 7 provides the estimations on the determinants of birth. Regression (1) is based on an unbalanced panel for the years 1999–2014. The key explanatory variables are a dummy for married women in East Germany and dummies for cohabiting women and single women in East and West Germany. The reference group consists of married women

in West Germany. Compared to this reference group, both single women in West and single women in East Germany have a lower probability of giving birth to a child. However, the negative relationship is stronger for single women in West Germany than for single women in East Germany. The null hypothesis of equality of the corresponding coefficients is rejected by a chi-square test at the 1 percent level ( $\chi^2 = 44.25$ ). This confirms our result that single women in East Germany are more likely to give birth to a child than single women in West Germany.

The variable for married women in East Germany does not take a significant coefficient. Thus, the estimation does not provide evidence that married women in East have a higher likelihood to give birth to a child than married women in West Germany. Quite the contrary, the estimated coefficient on the variable for East Germany is even negative. This supports the view that East German women do not have a general higher propensity of having children than West German women.

Compared to the reference group, both cohabiting women in East and cohabiting women in West Germany have a lower probability of giving birth to a child. Similar to single women, the negative relationship is more pronounced for West than for East Germany. The chi-square test rejects the null hypothesis of equal coefficients at the 1 percent level ( $\chi^2 = 45.75$ ). Thus, cohabiting women in East Germany have a higher probability of giving birth to a child than cohabiting women in West Germany. This suggests that different norms of love and partnership also apply to cohabitation in East and West Germany.

In regression (2), we limit our estimation sample to the years 2008–2014 and add variables for child care availability and risk tolerance to the specification. Including these

variables does not change our key pattern of results. Altogether, our estimations do not provide evidence that East German women have in general a higher propensity of giving birth to a child. A higher fertility in East than in West Germany can only be found for single women and cohabiting women, but not for married women. The higher nonmarital fertility in East Germany conforms to the view that nontraditional gender roles are more prevalent in East than in West Germany.

#### *4.5 Further Robustness Checks*

We performed a series of further robustness checks that increased the confidence in the pattern of our results. First, we used alternative measures of the availability of child care. Instead of child care facilities divided by the number of children under age 3, we considered child care facilities divided by the number of children under age 6 and the proportion of children under age 3 in child care facilities among children of the corresponding age group. The inclusion of these variables did not change the basic pattern of results. Second, we replaced the general unemployment rate by the male unemployment rate. This exercise also confirmed our basic pattern of results. Third, we added women who have migrated between East and West Germany to the estimation sample. Again, the pattern of results remained unchanged. Fourth, we also experimented with a specification that included an explanatory variable for residing in an urbanized area. The variable did not emerge as a significant determinant. Fifth, we limited the estimation sample to single women who initially had no child in the household. This exercise also confirmed our key pattern of results.

## 5. Conclusions

Researchers have been increasingly interested in the behavioral differences between people in East and West Germany. Our study shows that such behavioral differences also hold for childbearing patterns. Single women in East Germany have a higher probability of giving birth to a child than single women in West Germany. Our findings conform to the hypothesis that East and West Germany are characterized by different preferences and social customs in matters of love, partnership and family. However, insights into the origins of these differences can only be obtained by taking a long historical divide between the eastern and the western part of Germany into account and distinguishing between planned and unplanned out-of-partnership births.

When accounting for nonmarital birth rates predating the 1945 separation of Germany, we do no longer find that East German women have a significantly higher probability of unplanned out-of-partnership births than West German women. This suggests that the East-West difference in unplanned out-of-partnership births cannot be explained by the 1945 separation, but rather by a long historical divide. Our finding complements a study by Klüsener and Goldstein (2016) who argue that a higher share of seasonal workers in the eastern part of Germany has historically contributed to what they call deviant behaviour. Our result suggests that the resulting East-West differences in casual sexual behavior persist to the present time. On a broader scale, our study demonstrates that the separation of Germany after World War II cannot always be viewed as a natural experiment. Behavioral differences between East and West Germans can be due to historical factors predating the separation.

However, our findings also suggest that these historical factors only explain the East-West difference in unplanned, but not in planned births. Single women in East Germany have a significantly higher probability of giving birth to a child even when accounting for nonmarital fertility rates predating the 1945 separation. This suggests that the East-West difference in planned out-of-partnership births is due to a more emancipated gender role model that has evolved under the former communist regime in East Germany. The family policy in the former GDR promoted more equal gender roles while the family policy in West Germany was for a long time characterized by the traditional male breadwinner model. The more equal gender roles imply that women are both emotionally and economically less dependent on a male partner. Thus, their wish to have a child is less likely to depend on the presence of a stable partner or spouse. This view is supported by our finding that single women in East Germany are more likely to place a high value on having children than single women in West Germany.

In modern times, gender equality is the key topic in the family policy debate in many countries (European Commission 2016, United Nations Human Rights Council 2011, United Nations Office at Geneva 2016 and World Bank 2012). Our findings imply that gender equality can involve changes in childbearing patterns. More equal gender roles are associated with an increase in non-traditional childbearing. This suggests that promoting gender equality and providing sufficient support for single mothers are complementary policies. Single motherhood is often viewed as having a series of negative consequences for both mothers and children.<sup>7</sup> It is associated with lower earnings and a higher risk of poverty. For the children, it negatively affects academic achievement, health and psychological well-being. For the mothers, it reduces the likelihood to marry. Family

policies such as child care provision, family allowance, paid parental leave, and equalizing the resources between single- and two-parent families may mitigate some of these negative consequences.<sup>8</sup>

However, we also recognize the possibility that more equal gender roles themselves may attenuate some of the negative consequences of single motherhood. Single motherhood is less a stigma in a society that accepts the independence of women. Thus, single mothers may have a higher probability of finding a partner. Moreover, their children may face less social exclusion. Examining this aspect in more detail stands as important future research.

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**Table 1: Variable Definitions and Descriptive Statistics of the Dependent Variables**

Variable	Description	Years	Mean	N
Out-of-partnership birth	Dummy equals 1 if a single woman gives birth in the actual year.	1999-2014	0.011	17,289
Planned out-of-partnership birth	Dummy equals 1 if a single woman gives birth in the actual year and states that the pregnancy was planned.	2004-2014	0.002	12,121
Unplanned out-of-partnership birth	Dummy equals 1 if a single woman gives birth in the actual year and states that the pregnancy was unplanned.	2004-2014	0.006	12,121
Importance of children	Dummy equals 1 if a single woman states that having children is an important or very important goal in her life.	2004, 2008, 2012	0.687	3,861

**Table 2:** Variable Definitions and Descriptive Statistics of the Explanatory Variables

Variable	Description	Mean
East Germany	Dummy equals 1 if the single woman resides in East Germany.	0.263
Risk tolerance	Score of risk tolerance on an eleven-point Likert scale. The scale ranges from 0 “not at all willing to take risks” to 10 “very willing to take risks”.	4.789
Ln(child care availability)	Log of number of daycare facilities per children under age 3 at the county level.	-3.690
Age	The single woman’s age in years.	26.870
Skilled	Dummy equals 1 if the single woman’s highest educational attainment is a completed apprenticeship training.	0.535
University degree	Dummy equals 1 if the single woman has a university degree.	0.160
Migration background	Dummy equals 1 if the single woman is a first-generation or second-generation immigrant.	0.194
Health	Dummy equals 1 if the woman reports good or very good health.	0.697
Number of children	Number of children under age 16 in the household.	0.595
Actual working hours	Actual working hours per week including overtime. The variable is set equal to 0 if the woman does not work.	21.635
Labor income	Monthly gross labor income of the single woman. The variable is set equal to 0 if the woman does not work.	911.88
Unemployed	Dummy equals 1 if the single woman is unemployed.	0.104
Out of labor force	Dummy equals 1 if the single woman is out of labor force.	0.235
Economic worries	Score of own economic concerns on a three-point Likert scale coded as 1 “no concerns”, 2 “somewhat concerned”, and 3 “very concerned”.	2.071
Ln(unemployment rate)	Log of unemployment rate (in %) at the county level.	2.181
Catholic	Dummy equals 1 if the woman is catholic.	0.285
Protestant	Dummy equals 1 if the woman is protestant.	0.374
Other religious affiliation	Dummy equals 1 if the woman has another religious affiliation.	0.034
Ln(historical nonmarital birth rate)	Log of historical nonmarital birth rate (in %) at the federal state level. The rate is averaged over the years 1900-1929.	2.238
Year dummies	Sixteen year dummies.	---

N = 17,289. The reference group of the education dummies (labor force status dummies, religion dummies) consists of unskilled single women (employed single women, single women with no religious affiliation). For risk tolerance and childcare availability the number of observations is equal to 6,540.

**Table 3:** Determinants of out-of-partnership birth; years 1999-2014

	Random Effects Probit				Firth Logit
	(1)	(2)	(3)	(4)	(5)
East Germany	0.437 [0.010] (6.86)***	0.472 [0.019] (6.87)***	0.391 [0.014] (4.09)***	0.400 [0.015] (3.39)***	0.961 (3.39)***
Age	---	0.291 [0.005] (5.94)***	0.257 [0.004] (5.13)***	0.256 [0.004] (5.11)***	0.634 (5.15)***
Age squared	---	-0.005 [-0.0001] (5.87)***	-0.004 [-0.0001] (5.15)***	-0.004 [-0.0001] (5.12)***	-0.011 (5.14)***
Skilled	---	-0.254 [-0.008] (3.09)***	-0.201 [-0.006] (2.43)**	-0.202 [-0.006] (2.44)**	-0.487 (2.54)**
University degree	---	-0.143 [-0.005] (1.31)	0.006 [0.0002] (0.05)	0.006 [0.0002] (0.05)	0.010 (0.04)
Migration background	---	0.118 [0.004] (1.39)	0.127 [0.004] (1.49)	0.097 [0.003] (1.06)	0.227 (1.02)
Health	---	-0.101 [-0.003] (1.55)	-0.065 [-0.002] (0.97)	-0.067 [-0.002] (1.01)	-0.156 (0.97)
Number of children	---	-0.004 [-0.0001] (0.11)	-0.040 [-0.001] (0.92)	-0.041 [-0.001] (0.95)	-0.038 (0.42)
Actual working hours	---	---	0.003 [0.0001] (0.87)	0.003 [0.0001] (0.83)	0.010 (1.27)
Labor income	---	---	-4.1e-06 [-6.4e-07] (0.31)	-3.4e-05 [-5.5e-07] (0.26)	-3.0e-04 (1.26)
Labor income squared	---	---	-9.8e-09 [-1.5e-05] (0.32)	-1.1e-08 [-1.8e-10] (0.37)	3.5e-08 (0.94)
Unemployed	---	---	0.464 [0.020] (3.90)***	0.468 [0.021] (3.93)***	1.076 (3.77)***
Out of labor force	---	---	0.117 [0.004] (0.94)	0.112 [0.003] (0.91)	0.301 (0.97)
Economic worries	---	---	0.025 [0.001] (0.51)	0.026 [0.001] (0.52)	0.063 (0.52)
Ln(unemployment rate)	---	---	0.015 [4.4e-04] (0.16)	0.031 [0.001] (0.31)	0.068 (0.27)
Catholic	---	---	---	0.099 [0.003] (1.01)	0.228 (0.96)
Protestant	---	---	---	0.079 [0.002] (0.97)	0.209 (1.09)
Other religious affiliation	---	---	---	0.241 [0.008] (1.38)	0.592 (1.49)
Ln(historical nonmarital birth rate)	---	---	---	0.049 [0.001] (0.53)	0.125 (0.54)
Constant	-2.614 (31.68)***	-6.429 (9.38)***	-6.143 (8.42)***	-6.325 (8.15)***	-14.216 (7.56)***
Year dummies	---	Included	Included	Included	Included
Pseudo R <sup>2</sup>	0.023	0.050	0.066	0.067	0.076
N	17,289	17,289	17,289	17,289	17,289

The table shows the estimated coefficients. Z-statistics are in parentheses. Marginal effects are in square brackets. Marginal effects of dummy variables are evaluated for a discrete change from 0 to 1. Marginal effects of the education dummies, labor force status dummies and religion dummies are changes in probability compared to the respective reference group. \*\*\* Statistically significant at the 1% level; \*\* at the 5% level; \* at the 10% level.

**Table 4:** Determinants of out-of-partnership birth; years 2008-2014

	Random Effects Probit			Firth Logit
	(1)	(2)	(3)	(4)
East Germany	0.495 [0.014] (2.64)***	0.431 [0.012] (2.26)**	0.429 [0.011] (2.22)**	1.123 (2.43)**
Ln(historical nonmarital birth rate)	0.313 [0.006] (1.82)*	0.313 [0.006] (1.78)*	0.319 [0.006] (1.78)*	0.811 (1.81)*
Risk tolerance	---	---	0.053 [0.001] (2.02)**	0.127 (2.10)**
Ln(child care availability)	---	0.451 [0.009] (1.88)*	0.465 [0.009] (1.91)*	1.041 (1.90)*
Age	0.283 [0.003] (3.00)***	0.289 [0.003] (3.05)***	0.295 [0.003] (3.07)***	0.728 (3.17)***
Age squared	-0.005 [-0.0001] (3.09)***	-0.005 [-0.0001] (3.15)***	-0.005 [-0.0001] (3.15)***	-0.013 (3.22)***
Skilled	-0.186 [-0.004] (1.29)	-0.186 [-0.004] (1.29)	-0.170 [-0.003] (1.16)	-0.503 (1.52)
University degree	0.057 [0.002] (0.28)	0.068 [0.002] (0.34)	0.086 [0.002] (0.43)	0.099 (0.22)
Migration background	0.262 [0.007] (1.66)*	0.282 [0.007] (1.78)*	0.283 [0.007] (1.76)*	0.749 (2.04)**
Health	-0.042 [-0.001] (0.36)	-0.036 [-0.001] (0.31)	-0.044 [-0.001] (0.38)	-0.087 (0.32)
Number of children	0.003 [0.0001] (0.05)	-0.002 [-3.6e-05] (0.03)	-0.006 [-0.0001] (0.09)	0.026 (0.19)
Actual working hours	-0.002 [-3.8e-05] (0.29)	-0.002 [-4.1e-05] (0.31)	-0.002 [-4.2e-05] (0.33)	-0.003 (0.18)
Labor income	-0.0001 [-1.3e-06] (0.69)	-0.0001 [-1.6e-06] (0.67)	-0.0001 [-1.2e-06] (0.69)	-0.0004 (1.22)
Labor income squared	1.6e-08 [1.8e-10] (0.61)	1.6e-08 [1.8e-10] (0.63)	1.8e-08 [1.8e-10] (0.68)	7.7e-08 (1.95)*
Unemployed	0.340 [0.010] (1.48)	0.361 [0.010] (1.56)	0.359 [0.010] (1.53)	0.705 (1.28)
Out of labor force	-0.026 [-0.001] (0.11)	-0.019 [-0.0003] (0.08)	-0.018 [-0.0003] (0.08)	-0.095 (0.17)
Economic worries	-0.092 [-0.002] (1.08)	-0.097 [-0.002] (1.14)	-0.091 [-0.002] (1.06)	-0.219 (1.07)
Ln(unemployment rate)	0.057 [0.001] (0.36)	0.117 [0.002] (0.71)	0.107 [0.002] (0.64)	0.192 (0.47)
Catholic	0.089 [0.002] (0.49)	0.113 [0.002] (0.62)	0.103 [0.002] (0.56)	0.268 (0.62)
Protestant	0.154 [0.003] (1.13)	0.170 [0.003] (1.23)	0.173 [0.003] (1.24)	0.431 (1.36)
Other religious affiliation	0.587 [0.020] (2.14)**	0.597 [0.020] (2.18)**	0.615 [0.020] (2.21)**	1.465 (2.53)**
Constant	-7.045 (4.81)***	-5.569 (3.44)***	-6.049 (3.63)***	-13.408 (3.43)***
Year dummies	Included	Included	Included	included
Pseudo R <sup>2</sup>	0.170	0.175	0.180	0.074
N	6,540	6,540	6,540	6,540

The table shows the estimated coefficients. Z-statistics are in parentheses. Marginal effects are in square brackets. Marginal effects of dummy variables are evaluated for a discrete change from 0 to 1. Marginal effects of the education dummies, labor force status dummies and religion dummies are changes in probability compared to the respective reference group. \*\*\* Statistically significant at the 1% level; \*\* at the 5% level; \* at the 10% level.

**Table 5:** Determinants of planned and unplanned out-of-partnership births

	(1) Years 2004-2014		(2) Years 2004-2014		(3) Years 2008-2014		(4) Years 2008-2014	
	Planned	Unplanned	Planned	Unplanned	Planned	Unplanned	Planned	Unplanned
East Germany	1.092 [0.006] (5.20)***	0.447 [0.005] (2.28)**	1.102 [0.006] (4.40)***	0.258 [0.002] (1.17)	2.035 [0.016] (5.97)***	0.537 [0.005] (1.99)**	2.011 [0.016] (5.03)***	0.138 [0.001] (0.46)
Ln(historical nonmarital birth rate)	---	---	-0.007 [-0.0001] (0.02)	0.345 [0.004] (2.08)**	---	---	0.042 [1.5e-05] (0.08)	0.834 [0.008] (2.65)***
Risk tolerance	---	---	---	---	-0.042 [-0.0002] (0.59)	0.085 [0.001] (2.13)**	-0.043 [-0.0002] (0.63)	0.085 [0.001] (2.09)**
Ln(child care availability)	---	---	---	---	-0.868 [-0.003] (1.52)	0.579 [0.006] (1.72)*	-0.865 [-0.003] (1.52)	0.621 [0.006] (1.77)*
Age	0.580 [0.002] (3.89)***	0.452 [0.004] (4.61)***	0.580 [0.002] (3.91)***	0.452 [0.005] (4.60)***	0.815 [0.003] (2.69)***	0.360 [0.003] (2.30)**	0.812 [0.003] (2.68)***	0.358 [0.003] (2.16)**
Age squared	-0.009 [-4.0e-05] (3.90)***	-0.008 [-0.0001] (4.62)***	-0.009 [-4.0e-05] (3.92)***	-0.008 [-0.0001] (4.60)***	-0.014 [-4.7e-05] (2.86)***	-0.006 [-0.0001] (2.32)**	-0.014 [-4.7e-05] (2.86)***	-0.006 [-0.0001] (2.19)**
Skilled	-0.050 [-0.0001] (0.20)	-0.300 [-0.003] (1.65)*	0.052 [-0.0001] (0.21)	-0.306 [-0.003] (1.71)*	0.443 [0.001] (0.89)	-0.356 [-0.004] (1.59)	0.437 [0.001] (0.86)	-0.386 [-0.004] (1.73)*
University degree	0.368 [0.002] (1.22)	0.005 [-0.0001] (0.03)	0.365 [0.002] (1.20)	-0.015 [-3.7e-04] (0.07)	0.943 [0.003] (1.60)	-0.006 [-2.6e-04] (0.02)	0.933 [0.003] (1.50)	-0.065 [-0.001] (0.22)
Migration background	0.269 [0.002] (1.05)	-0.206 [-0.002] (1.12)	0.269 [0.002] (1.05)	-0.203 [-0.002] (1.11)	0.842 [0.004] (2.14)**	-0.043 [-0.001] (0.17)	0.845 [0.004] (2.14)**	-0.011 [-0.0002] (0.04)
Health	0.169 [0.001] (0.83)	-0.134 [-0.002] (1.00)	0.169 [0.001] (0.82)	-0.140 [-0.002] (1.04)	0.213 [0.001] (0.71)	-0.117 [-0.001] (0.61)	0.214 [0.001] (0.72)	-0.134 [-0.001] (0.68)
Number of children	0.191 [0.001] (3.42)***	0.124 [0.001] (1.89)*	0.191 [0.001] (3.40)***	0.128 [0.001] (1.94)*	0.223 [0.001] (2.65)***	0.092 [0.001] (1.06)	0.223 [0.001] (2.65)***	0.093 [0.001] (1.06)
Actual working hours	0.002 [8.2e-06] (0.16)	0.002 [1.9e-05] (0.23)	0.002 [8.2e-06] (0.16)	0.002 [1.5e-06] (0.18)	-0.010 [-3.3e-05] (0.42)	-0.001 [-1.3e-05] (0.13)	-0.010 [-3.3e-05] (0.43)	-0.002 [-2.1e-05] (0.20)
Labor income	2.7e-05 [1.6e-07] (0.10)	-0.0001 [-1.3e-06] (0.55)	2.8e-05 [1.7e-07] (0.11)	-0.0001 [-1.3e-06] (0.52)	1.2e-05 [4.1e-07] (0.27)	-0.0001 [-1.4e-06] (0.51)	1.1e-05 [4.2e-07] (0.27)	-1.7e-04 [-1.6e-06] (0.58)
Labor income squared	-6.9e-09 [-3.4e-11] (0.21)	7.8e-09 [8.3e-11] (0.28)	-7.0e-09 [-3.4e-11] (0.22)	8.1e-09 [8.7e-11] (0.27)	3.0e-09 [7.8e-12] (0.07)	1.5e-08 [1.5e-10] (0.52)	2.9e-09 [6.6e-12] (0.07)	2.2e-08 [2.1e-10] (0.70)
Unemployed	0.666 [0.004] (1.72)*	0.596 [0.008] (2.18)**	0.663 [0.004] (1.72)*	0.582 [0.008] (2.12)**	0.598 [0.002] (0.94)	0.411 [0.005] (1.14)	0.591 [0.002] (0.94)	0.368 [0.004] (0.99)
Out of labor force	0.277 [0.001] (0.62)	0.005 [0.0001] (0.02)	0.276 [0.001] (0.62)	-0.014 [-0.0002] (0.05)	0.004 [3.6e-05] (0.01)	-0.146 [-0.001] (0.36)	-0.001 [-2.6e-05] (0.01)	-0.201 [-0.002] (0.48)
Economic worries	0.223 [0.001]	-0.068 [-0.001]	0.221 [0.001]	-0.067 [-0.001]	0.314 [0.001]	-0.174 [-0.002]	0.313 [0.001]	-0.169 [-0.002]

	(1.39)	(0.80)	(1.38)	(0.77)	(1.35)	(1.52)	(1.35)	(1.42)
Ln(unemployment rate)	0.185 [0.001] (0.70)	0.249 [0.003] (1.44)	0.182 [0.001] (0.69)	0.294 [0.003] (1.71)*	-0.670 [-0.002] (1.49)	0.465 [0.005] (1.49)	-0.662 [-0.002] (1.37)	0.554 [0.006] (2.00)**
Catholic	0.633 [0.003] (2.50)**	0.113 [0.001] (0.56)	0.636 [0.003] (2.50)**	0.146 [0.001] (0.71)	0.935 [0.002] (2.09)**	0.284 [0.003] (1.06)	0.940 [0.002] (2.14)**	0.321 [0.004] (1.20)
Protestant	0.495 [0.002] (2.61)***	-0.023 [-0.0004] (0.13)	0.496 [0.002] (2.64)***	0.014 [-2.5e-05] (0.08)	1.103 [0.003] (3.05)***	-0.063 [-0.001] (0.29)	1.105 [0.003] (3.09)***	-0.003 [-0.0002] (0.01)
Other religious affiliation	0.811 [0.004] (1.91)*	0.398 [0.005] (1.08)	0.816 [0.004] (1.91)*	0.466 [0.006] (1.28)	1.233 [0.004] (1.79)*	0.143 [0.001] (0.26)	1.237 [0.004] (1.80)*	0.298 [0.003] (0.56)
Constant	-15.010 (6.75)***	-10.416 (6.97)***	-14.992 (6.17)***	-11.262 (7.52)***	-21.423 (4.11)***	-7.530 (2.86)***	-21.473 (3.85)***	-9.315 (3.31)***
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
Log pseudolikelihood	-576.549		-532.095		-254.349		-250.495	
N	12,121		12,121		6,525		6,525	

Method: Multinomial probit. Base category: No birth. The table shows the estimated coefficients. Z-statistics are in parentheses. Standard errors are clustered by the county level. Marginal effects are in square brackets. Marginal effects of dummy variables are evaluated for a discrete change from 0 to 1. Marginal effects of the education dummies, labor force status dummies and religion dummies are changes in probability compared to the respective reference group. \*\*\* Statistically significant at the 1% level; \*\* at the 5% level; \* at the 10% level.

**Table 6: Determinants of the importance of having children**

	(1) Years 2004, 2008, 2012	(2) Years 2004, 2008, 2012	(3) Years 2008, 2012	(4) Years 2008, 2012
East Germany	0.373 [0.065] (3.16)***	0.381 [0.063] (2.51)**	0.453 [0.047] (2.16)**	0.454 [0.046] (2.12)**
Risk tolerance	---	---	---	-0.028 [-0.003] (1.44)
Ln(child care availability)	---	---	---	0.069 [0.008] (0.25)
Age	0.325 [0.084] (5.40)***	0.285 [0.073] (4.57)***	0.304 [0.060] (3.22)***	0.305 [0.060] (3.20)***
Age squared	-0.005 [-0.001] (5.05)***	-0.004 [-0.001] (4.26)***	-0.005 [-0.001] (3.09)***	-0.005 [-0.001] (3.10)***
Skilled	-0.059 [-0.011] (0.57)	-0.057 [-0.010] (0.54)	-0.178 [-0.019] (1.18)	-0.184 [-0.020] (1.21)
University degree	-0.434 [-0.097] (2.87)***	-0.283 [-0.057] (1.77)*	-0.420 [-0.055] (1.87)*	-0.421 [-0.054] (1.86)*
Migration background	0.157 [0.029] (1.39)	0.151 [0.026] (1.32)	0.094 [0.011] (0.60)	0.098 [0.011] (0.61)
Health	0.098 [0.019] (1.21)	0.140 [0.027] (1.69)*	0.280 [0.037] (2.33)**	0.292 [0.038] (2.40)**
Number of children	0.668 [0.130] (11.54)***	0.640 [0.118] (10.96)***	0.764 [0.094] (8.07)***	0.742 [0.089] (7.78)***
Catholic	0.308 [0.062] (2.69)***	0.344 [0.066] (2.91)***	0.467 [0.059] (2.77)***	0.479 [0.059] (2.81)***
Protestant	0.219 [0.046] (2.07)**	0.237 [0.048] (2.21)**	0.228 [0.034] (1.53)	0.240 [0.035] (1.58)
Other religious affiliation	0.653 [0.108] (2.39)**	0.705 [0.109] (2.55)**	0.799 [0.080] (1.98)**	0.828 [0.080] (2.02)**
Ln(historical nonmarital birth rate)	0.019 [0.004] (0.19)	0.007 [0.001] (0.06)	0.152 [0.018] (1.00)	0.153 [0.018] (0.99)
Actual working hours	---	-0.009 [-0.002] (2.11)**	-0.016 [-0.002] (2.49)**	-0.016 [-0.002] (2.50)**
Labor income	---	0.0001 [3.2e-05] (1.00)	0.0003 [0.0001] (1.45)	0.0003 [0.0001] (1.48)
Labor income squared	---	-5.4e-08 [-1.4e-08] (2.25)**	-7.7e-08 [-1.5e-08] (2.16)**	-7.8e-08 [-1.5e-08] (2.19)**
Unemployed	---	0.151 [0.026] (0.81)	0.159 [0.018] (0.61)	0.159 [0.018] (0.60)
Out of labor force	---	-0.366 [-0.073] (2.41)**	-0.519 [-0.076] (2.31)**	-0.526 [-0.076] (2.32)**
Economic worries	---	0.035 [0.006] (0.62)	0.066 [0.008] (0.80)	0.064 [0.008] (0.77)
Ln(unemployment rate)	---	-0.042 [-0.008] (0.36)	0.018 [0.002] (0.12)	0.026 [0.003] (0.17)
Constant	-4.546 (5.43)***	-3.704 (4.07)***	-4.328 (-3.15)***	-3.947 (2.34)**
Year dummies	Included	Included	Included	Included
Pseudo R <sup>2</sup>	0.064	0.072	0.090	0.091
N	3,861	3,861	2,254	2,254

Method: Random effects probit. The table shows the estimated coefficients. Z-statistics are in parentheses. Marginal effects are in square brackets. Marginal effects of dummy variables are evaluated for a discrete change from 0 to 1. Marginal effects of the education dummies, labor force status dummies and religion dummies are changes in probability compared to the respective reference group. \*\*\* Statistically significant at the 1% level; \*\* at the 5% level; \* at the 10% level.

**Table 7: Determinants of birth**

	(1) Years 1999-2014	(2) Years 2008-2014
Cohabiting woman in West Germany	-0.706 [-0.086] (16.79)***	-0.632 [-0.084] (9.48)***
Single woman in West Germany	-1.339 [-0.109] (27.21)***	-1.345 [-0.114] (15.91)***
Married woman in East Germany	-0.075 [-0.014] (1.40)	-0.111 [-0.021] (1.28)
Cohabiting woman in East Germany	-0.283 [-0.046] (4.77)***	-0.323 [-0.053] (3.50)***
Single woman in East Germany	-0.878 [-0.096] (13.58)***	-0.792 [-0.095] (8.06)***
Risk tolerance	---	0.002 [0.001] (0.21)
Ln(child care availability)	---	0.065 [0.006] (0.72)
Age	0.332 [0.016] (15.48)***	0.400 [0.018] (10.13)***
Age squared	-0.006 [-0.0003] (17.95)***	-0.007 [-0.0003] (11.33)***
Skilled	-0.047 [-0.004] (1.35)	-0.026 [-0.002] (0.41)
University degree	0.112 [0.011] (2.76)***	0.153 [0.015] (2.13)**
Migration background	0.021 [0.002] (0.67)	-0.046 [-0.004] (0.86)
Health	0.044 [0.004] (1.77)*	0.068 [0.006] (1.66)*
Number of children	-0.221 [-0.020] (13.01)***	-0.199 [-0.018] (7.56)***
Actual working hours	-0.008 [-0.001] (5.63)***	-0.009 [-0.001] (3.74)***
Labor income	1.2e-05 [5.8e-06] (3.63)***	1.2e-05 [5.4e-06] (2.56)***
Labor income squared	-6.3e-09 [-3.1e-10] (1.38)	-5.5e-09 [-2.5e-10] (0.95)
Unemployed	0.256 [0.028] (5.42)***	0.202 [0.021] (2.25)**
Out of labor force	0.036 [0.003] (0.90)	0.022 [0.002] (0.29)
Economic worries	-0.005 [-0.0004] (0.27)	-0.024 [-0.002] (0.80)
Ln(unemployment rate)	-0.012 [-0.001] (0.34)	0.002 [0.0002] (0.04)
Catholic	0.061 [0.005] (1.83)*	0.001 [0.0001] (0.01)
Protestant	0.063 [0.006] (2.03)**	-0.041 [-0.004] (0.82)
Other religious affiliation	0.107 [0.010] (1.87)*	0.143 [0.014] (1.39)

Ln(historical nonmarital birth rate)	0.044 [0.004] (1.41)	0.088 [0.008] (1.62)
Constant	-5.494 (15.89)***	-6.497 (9.27)***
Year dummies	Included	Included
Pseudo R <sup>2</sup>	0.146	0.150
N	51,944	18,918

Method: Random effects probit. The table shows the estimated coefficients. Z-statistics are in parentheses. Marginal effects are in square brackets. Marginal effects of dummy variables are evaluated for a discrete change from 0 to 1. Marginal effects of the marital status dummies, education dummies, labor force status dummies and religion dummies are changes in probability compared to the respective reference group. \*\*\* Statistically significant at the 1% level; \*\* at the 5% level; \* at the 10% level.

## Endnotes

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<sup>1</sup> A further reason for building up the comprehensive child care system was that the communist regime tried to control the socialization and education of its citizens from the very start of their lives.

<sup>2</sup> Giavazzi et al. (20014) show that a process of cultural transmission can indeed take a long time. They examine the speed of evolution of a series of cultural attitudes for different generations of European immigrants to the US. Specifically, they identify family and moral values, general political views, and religious values as being relatively persistent.

<sup>3</sup> See [www.destatis.de/DE/ZahlenFakten/Indikatoren/LangeReihen/Arbeitsmarkt/lrarb001.html](http://www.destatis.de/DE/ZahlenFakten/Indikatoren/LangeReihen/Arbeitsmarkt/lrarb001.html).

<sup>4</sup> See [www.destatis.de/DE/ZahlenFakten/GesamtwirtschaftUmwelt/VerdiensteArbeitskosten/VerdiensteVerdienstunterschiede/Tabellen/Bruttomonatsverdienste.html](http://www.destatis.de/DE/ZahlenFakten/GesamtwirtschaftUmwelt/VerdiensteArbeitskosten/VerdiensteVerdienstunterschiede/Tabellen/Bruttomonatsverdienste.html).

<sup>5</sup> Note that the data provide no information whether women younger than 18 years gave birth to a child.

<sup>6</sup> Note that STATA provides only coefficients, but no marginal effects for Firth's model.

<sup>7</sup> E.g., see Brady and Burroway (2012), Corak et al. (2008), Krein and Beller (1988), Lerman (1996), Lichter and Graefe (1999), McLanahan and Sandefur (1994), and Scharte et al. (2012).

<sup>8</sup> E.g., see Maldonado and Nieuwenhuis (2015) and Pong et al. (2003).