PUBLIC CHILD CARE AND FERTILITY: EVIDENCE FROM A UNIVERSAL CHILD CARE PROVISION IN WEST GERMANY

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Abstract

Low birth rates in developed countries have been a distinct feature in the 21st century and even before. In an attempt to stimulate birth rates, countries have adopted pronatalist policies. In this paper, we attempt to answer the following questions: Does child care provision raise the fertility rate? Does it have different effects on different groups of people? Based on German administrative panel data, we use the Difference-in-Difference method to evaluate the effect of universal child care provision in West Germany for children under 3 on fertility rate. The results suggest that public child care provision does increase birth rates. 10% increase in childcare coverage rate increases birth rates by 1.3 more births per 1000 women, a 2.8% increase from the mean. Our results also suggest that the policy was effective in increasing the fertility rate of the native population but not for the non-native, as well as married mothers but not for the non-married mothers. The results are robust to county characteristics that might have biased the estimates. This paper sheds light on how to better target different types of pronatalist policies. For instance, a cash transfer policy may provide more incentive to certain groups with less earnings and less opportunity costs in terms of childcare time at home.

1 Introduction

Theoretical studies of fertility assume that those who benefit most from individual fertility choices are parents. However, assuming that children are a public good, fertility may coincide with positive social externalities which benefits all society and the economy. For example, social security schemes in which the active generation pays for pension plans and health care benefit from a growing tax base (Cigno (1993), Folbre (1994)). Thus, low fertility rates below the replacement level is likely to lead to a bigger burden on the young population and a reduction in tax base.

As women's labour market participation, education attainment and bargaining power over birth have increased, concerns about decreasing birth rates has risen as one of the top social and economic issues among developed countries, especially in the European and East Asian countries. Germany, Japan and South Korea have been experiencing low fertility rates below the population replacement rate of 2.1 per child per woman, at a rate between under 1.5. Figure A.1 depicts a trend of fertility rate between the period of 1970 to 2017. Germany has been continuously sustaining a low fertility rate below the OECD average rate whereas France has a relatively high fertility rate among other European countries above the OECD average rate since the mid-1990s. South Korea has experienced a dramatic decline after the 1970s due to the social and economic structure change and is experiencing a fertility rate below 1.1. Developed countries have been implementing main policies to mitigate low fertility rates including tax credit, child care subsidy, and parental leave benefit. While there are some empirical research about pronatalist policy effects on fertility, studies find that the effects vary among countries. Thus, whether implementing policy reforms (e.g. public child care provision) is an effective way to stimulate fertility is a controversial issue.

The focus of our paper lies on the public child care reform effect in West Germany. In particular, we examine whether public child care effectively increases the fertility rate. More specifically, we are interested in how German women and non-German women benefit from the reform in West Germany. The West German federal government had implemented a set of public child care reforms during the period of 2005-2008. The reform focused on creating public child care slots for children under the age of three. Although the government's attempt to expand child care slots in all counties, there had been a large variation in the expansion across counties due to complex administrative processes that differ among local authorities. Our empirical analysis draws upon the birth register data in West Germany, covering roughly 580,000 births annually. The birth register data is combined with a county level administrative data on public child care. The data allows the computation of age-specific birth rates. Thus, we are able to examine possible treatment effects on births within specific cohorts. We use the data from the Federal Employment Agency for our controlling variables such as GDP per capita, male employment rate, population density, and new dwelling units.

We use the difference-in-difference technique and our identification strategy relies on the spatial and temporal variation in child care coverage. Our assumption is that the variation is stemmed from the distinct difference in local child care supply due to administrative processes and rules. In other words, the local supply of new child care slots is independent to expected changes in fertility rates. We use a dichotomous treatment group for the first DID model and then use a more generalized DID model with a continuous treatment variable. The treatment group is West German counties with an above-median increase in child care coverage from 2002 to 2009 and the control group is assigned to West German counties with below-median increase in child care coverage during the same pre and post treatment period.

The first main result from the DID model with dichotomous treatment group shows an overall positive effect of public child care provision on birth rates. The treated counties on average, shows roughly 0.64 more births per 1,000 women aged 15-44 than had they not been treated. The estimates for the deviation from the common trend is smaller when we add regional controls and controlling variables of share of women by age, the share of population by age, municipality revenue, debt, and new dwellings. We also observe a significant positive results of child care provision on birth rate from the generalized DID estimation. After including year and county fixed effects and county characteristics controlling variables, the result shows that increasing child care coverage rate by 1 increases birth rates by 13 per 1,000 women.

Now focusing on the policy effects across different groups, the generalized DID results for German women is similar to that of average women. The child care provision has a positive effect on the birth rate a year after. However,the magnitude of the positive effect on birth rate is smaller than the effect on average German women. While German women experience positive effects on birth rate, we find that non-German women benefit less from the child care reform.

Empirical research by Raute (2017) finds that maternity leave benefit reform in Germany increases financial incentives for women who has child, especially those who has higher education attainment and higher earnings. The results suggest that maternity leave benefits that compensate women with their high opportunity cost of childbearing can mitigate increasing fertility level. Moreover, Bauernschuster et al (2015) finds that child care effects on birth rate mainly materialize at the intensive margin. The study suggests that policies that facilitate both parenthood and employment can be an effective way to increase birth rates in countries with low fertility rates.

The paper is organized as follows: Section 2 provides a review of the findings of several major research in the area of pronatalist policies and fertility rate. Section 3 describes data sets and variables employed in our empirical analysis. Section 4 provides the institutional settings in West Germany followed by Section 5 which describes our empirical methodology. Section 6 presents our main empirical results. Section 7 concludes our research and discusses policy implications. Tables of regression results and summary statistics are provided in the Appendix.

2 Background and Context

Fertility rate in Germany dramatically decreased since the late 1960s and early 1970s and has been among the lowest fertility rates countries worldwide. Fertility rates were between 2.3 and 2.5 during the early 1960s but rapidly decreased to a level of 1.37 in 1979. Ever since the drop in the 1970s, Germany continuously sustained very low fertility rates between 1.2 and 1.5, well below the replacement rate. As a consequence,the German government initiated to implement pronatalist policies in order to encourage higher fertility. The government expanded reforms of maternity benefit since the late 1970s, providing a maximum 36 months of parental leave of job protection and paid parental leave (Raute 2017). Yet, the provision of public child care remained limited. While the public child daycare was strongly supported by the government in the East Germany for children in all ages, early child care was very limited in West Germany. Thus, our analysis focuses on the universal public care in West Germany only.

The German government had enacted legislation in 1996 that provided a slot in a public kindergarten for children aged 3-6. The reform was to grant full provision of half-day child care for children in the age of 3-6 by 2002 (Bauernschuster and Scholotter 2015). However, legislation regarding public child care provision for children in the age group of 0-3 was virtually non-existent until the mid-2000s. Excess demand for child care was severe in the mid-2000s. Prompted by the severe excess demand for child care, the German government implemented public child care reforms in West Germany, with the attempt to increase fertility level. The reforms focused on children under the age of three.

In January 2005, the German government enacted a day care expansion law "Tagesbetreuungsausbau Gesetz". The law aimed to create additional child care slots for children under the age of three and increase child care coverage rate up to 17% by 2010 in West Germany. In 2007, the German government targeted to increase the child care coverage to 35% by 2013. In December 2008, the federal law "Kinderforderungsgesetz" established a legal claim to a child care slot that by 2013, all children aged on and older are guaranteed for a child care slot. Although regional authorities were not penalized for violating the legal claim, parents had the right to sue municipalities if their eligible children were not provided with a child care slot.

Preferences for the child care enrollment were given to families who signed up early on the waiting list. The eligibility to skip the waiting lists was determined by parents' working status, single parenthood or if the child's siblings were already enrolled. Parents who did not get a public child care slot for the their children had other two options. Parents had the option to resort to informal child care from the private market which costed much more than the fees of centre[1]. The other option was to keep their children at home until the age of three when they enter kindergarten, which brings a high opportunity cost of childbearing to parents. The public child care slots were largely covered by the public. The total operating costs of child care amounted approximately 14.1 billion Euros in 2006. Public subsidies amounted on average roughly 79%, parental fees covered 14% and private organization covered 7% of the total operating costs (Bauernschuster et al 2015). Parental fees depended on family size and income.

Figure A.3 provides a graphical information of a heterogeneous child care expansion across 325 counties after the policy reforms in West Germany. The left panel shows the pre-treatment child care coverage in 2002 where we observe the coverage in most of the counties ranged below 5%. However after the child care reforms during the period of 2005 to 2008, we observe that there has been substantial increase in the child care coverage rate across counties in West Germany. At the same time, we also observe that the magnitude of this expansion varies distinctly across counties.

[1]Informal child care such as nannies were not a common alternative as it was extremely expensive compared to public child care. In addition, the lack of a private market for child care was due to strict regulations at the state level. Not only regulations regarding operating hours, staff-child ratios, and group size, but the qualifications of the staff to work in the sector were extremely strict(Felfe and Lalive 2012).

Where do these variation stem from? Felfe and Lalive (2012) and Bauernschuster et al (2015) argues that this variation comes from the complex and lengthy administrative processes. Expanding child care slots involved complex process in several stages - decisions and approval by municipality-level, county-level, and state-level authorities. Municipality and county level authorities project the local demand for child care considering socio-economic conditions such as labour market conditions. Based on the assessment made by the regional authorities, state-level authorities should approve the proposals on setting up new child care centres submitted by the non-profit organization. Local authorities had no influence or control on such administrative processes. Thus, variation may be driven by approval delays, rejections due to non-compliance with various regulations and varying complicated funding systems, and shortages of qualified staffs. As a result, the county-level difference of child care expansion is explained not only by the local demand but mainly by the exogenous shocks to the local child care supply stemming from intricate administrative processes (Felfe and Lalive 2012, Bauernschuster et al 2015).

3 Data

We employ a county-level dataset used in Bauernschuster et al (2015). The administrative data is from Statistical Offices of the German Lander on public child care for children under three years old. The data covers the years of 1998, 2002, 2006, 2007, 2008 and 2009, which are the only available periods. Public child care coverage, our main variable of interest, is defined as the number of public child care slots (measured in March of year t) over the total population of children under three years old measured in December of year t-1). Fertility measure is based on the birth certificates of all 325 West German counties, covering around 580,000 births per year from Populations Reference Bureau. The main dependent variable that we are interested in is the birth rate. Birth rate is defined as births per 1,000 women and is calculated as the sum of births over 1,000 women in reproductive age (ages 15 - 44).

Births are measured in year t and in year t+1 since child care is measured in the first half of March in each year t while births are measured in December each year. Additional data used for our controlling variables - GDP per capita, the male employment, population density, and new dwelling units, are from the Federal Employment Agency. Our county level panel data set is averaged over representative individuals.

Figure A.2 shows the birth rate trends of German and non-German women in West Germany. In our data, German women is defined as native born women and non-German is defined as those who are not born in German (e.g. immigrants). We observe a declining trend in birth rates for both groups. However, there is a slight increase in German women's birth rate after post-treatment period 2006 while non-German women did not experience much increase in birth rate compared to the counterpart. Such different change in trend after the policy reform between the two groups may have driven by several factors. One possible reason may be due to the wage gap between the two groups. It is more likely for native German women to have higher earnings than non-German women, which leads to a higher opportunity costs of childbearing. Thus, from the data of birth rates among German and non-German women, we may expect that there had been differential effects of treatment on fertility among the two groups.

4 Empirical Strategy

We want to estimate the effect of public child care provision on fertility. To do this, we use the Difference in Difference technique to identify the policy impact of Germany's universal public child care provision in West Germany. This policy gives us the spatial and temporal variation in child care coverage rate that we can use. The first DID model uses a dichotomous treatment group where the variable equals 1 if treated and 0 if not. Then we use a more generalized DID model where we use a continuous treatment variable.

For the DID model, we assign West German counties with an above-median increase in child care rate from 2002 to 2009 as a treatment group. We assign West German counties with a below-median increase in child care rate from the same period as a control group. Our identification strategy depends on the assumption that the growth of child care slots is not correlated with the expected changes in fertility rate. This is a strong assumption and we argue by suggesting that the supply of child care provision differed in counties due to different administrative rules and processes and not by differing demands in child care.

We estimate the DID model for the period of 1998 to 2010 and use 2005 and the reform year. The model follows the following form:

$$Y_{it+1} = \alpha_i + \beta_t + \sum_{t=1998}^{2003} \delta_t \left(D_i * \beta_t\right) + \sum_{t=2005}^{2009} \delta_t \left(D_i * \beta_t\right) + \epsilon_{ct+1} \tag{1}$$

Where Y_{it+1} is the birth rate, measure as a number of births by 1,000 women aged 15 to 44, in the county in year t+1. Women will make fertility decisions based on child care availability and it takes 10 months for them to give births. α_i is the county Fixed Effect. β_t is the Year Fixed Effect. D_i is the treatment indicator which equals 1 if a county is in the treatment group, and 0 if it is in the control group. δ_t is the parameter of interest in this equation and it identifies deviations from a common trend. If the child care provision had a positive effect on birth rates, we would see δ_t equal to 0 for the years before 2005 and positive for post-treatment years. The standard error is clustered at the county level. Again, the validity of our identification strategy depends on two assumptions: strong exogeneity, and common trend assumption. Strong exogeneity assumes that the local supply of public child care was independent of birth rates. The common trend assumption suggests that the trend of treated counties would have followed the trend of control counties had they not been treated. This model identifies intention-to-treat effects. (ITT)

An alternative model is a more generalized model where we use child care coverage rate as a continuous treatment variable. We can exploit the variation in child care coverage rate in each county and year. This model identifies average treatment effects on the treated.

(ATT)

$$Y_{it+1} = \alpha_i + \beta_t + \rho D_{it} + X_{it}\delta + \epsilon_{it} \tag{2}$$

Where Y_{it+1} is the outcome variable, birth rate in county i and year t+1. α_i is the County Fixed Effect. β_t is the Year Fixed Effect. X_{it} is a vector of Covariates such as GDP per Capita, Population density, Male Employment rate, and New dwelling Units. ρ is the parameter of interest in this model and would show the treatment effect. Assumption is same in this model in that Cov $(D_{it}, \epsilon_{it}) = 0$.

Next, we see if the public child care provision policy was more effective towards a certain group of people. So far, the estimation would yield the policy's effectiveness for average women in West Germany. However, child care might play different roles for different parties. Two comparisons of interest are native/non-native women, and within/outside marriage mothers. These groups are interesting to look at as it can serve as guidance for the government to implement policies. We'd expect that the German government seeks to increase birth rates of native women and within marriage mothers. Native women tend to have lower birth rates, and the government would tend to want outside married mothers to work and support their families instead of having more children, especially if they are teenage mothers or single mothers. It is of government, and researchers' interest if child care provision actually affects the fertility of different groups as expected.

The strong exogeneity assumption is plausible but not proved in this study. There should be an upward bias of the estimate if counties differ in the supply of child care due to household demands. There is a concern about overestimation in this model. The other key assumption in our DID model is the common trend assumption. To see the plausibility of this assumption, we see whether the treatment and control groups followed the same fertility trend in the pre-treatment period. If the treatment group does follow the same trend as the control group had it not been treated, we can see the child care policy expansion's effect on fertility rate. To further investigate the robustness of our results, we include time-varying county characteristics covariates.

5 Results

Figure 4 shows child care coverage under the age of 3 and birth rate trends in treatment and control groups. It shows that public child care coverage was very low and close to 0 for both the control and treatment groups for 1998 and 2002. We can see the increasing trend of child care coverage in west Germany for the years 2006 to 2010. The treatment group has counties with higher child care coverage rates than counties in the control group. The federal child care policy took effect in 2005. By 2006, coverage rates had increased to 5.3% in the control group and to 9.2% in the treatment group from close to 2% before. In 2010, coverage rate has already increased to 20.8% in the treatment counties and 13.3% in control counties. This shows evidence that the control and treatment groups had a similar low level of child care pre-2005 and their child care rates have diverged post-2005.

Figure 4 (b) shows birth rate trends for treatment, and control groups for the years 1998 to 2010. The treatment counties had lower birth rates than the control counties. The trends seem parallel and decreasing for the two groups until 2006 where the trends become increasing. The birth rate trend for the treatment group shows more positively sloped trends after 2006 than the control group's. The dashed line shows the parallel trend assumption where it is assumed to be the trend of the treatment group had it not been treated. The treatment group's trend converges to that of the control group's. This is consistent with the hypothesis that fertility increases with the provision of child care.

We first estimate the Difference in Difference model. The results are shown in Table 2. The first column shows that child care expansion had positive effects on birth rates. The treated counties on average, post-2005, had about 0.638 more births per 1,000 women aged 15 to 44 than the common trend. This estimate is higher and more robust when the dependent variable is the birth rate in year $t+1$. It shows the deviation from a common trend. The column (3) adds regional controls and we control for share of women by age and share of population by age as well. The last column includes Municipality revenue, debt and new dwellings as well for controls. The estimates for the deviation from the common trend become smaller in value as we control for more county characteristics. This is most likely due to having more regressors. Among the county characteristics, population density is one with high significance where it negatively affects the birth rate.

Next, we show our results for the generalized DID model in table 3. This uses a continuous treatment variable, child care coverage rate. We see that the child care coverage rate has a positive and significant effect on the birth rate. As before, the child care coverage rate has a higher and more robust estimate when the dependent variable is the birth rate in year $t+1$. We include year and county fixed effects, as well as control for county characteristics such as female high education share, population density, GDP per capita, and male employment rate. We can see that in column (4), with all controls, increasing child care coverage rate from 0 to 1 will increase birth rates by 13 meaning 13 more births per 1,000 women. If we assume this effect is constant over all child care coverage rates, we can infer that a 10% increase in child care coverage rate increases birth rates by 1.3 more births per 1,000 women or 2.8% increase from the sample mean of 44.1 births per 1,000 women.

Now we turn to policy effectiveness towards different groups of people. For this, we look at German/non-German mothers and within marriage/outside marriage mothers. German mothers are women who were born in Germany while non-German mothers are women born outside of Germany aged 15 to 44. Figure 5 shows the birth rate trends for German and non-German mothers. Intuitively, we expected the child care policy to be more effective towards German mothers since the native population might have more ease in securing a higher paid career. Evidence of native, immigrant wage gap in Germany also supports our argument that German mothers, with a higher opportunity cost of having a child, benefit more from public child care and thus child care is more effective towards German mothers. An opposing argument would be that child care is more effective towards non-German mothers since they have more children than German mothers on average. In 1998, non-German mothers' birth rate per 1,000 is 73 while it is 47 for German mothers. Figure 5 shows the birth rate trends of treatment and control groups for German/non-German mothers. We can see that birth rate trends for German mothers follow the average women trend, except we see a sharper increase in birth rate trends post 2006 for both treatment and control groups. The birth rate trend for non-German mothers has a decreasing trend for all the years. Post-2006, it seems that the gap between treatment and control groups narrows. However, it is not clear if it is the treatment group converging to the control group or vice versa. It might be that the treatment group has a linear trend and the control group's trend decreases. This indicates that providing child care had no effect in fertility decisions for non-German women but not having child care decreased fertility. Plausibly, fertility choice for non-German mothers is negatively affected by the non-availability of child care while fertility choice for German mothers is positively affected by the availability of child care. It makes sense in a way that non-German mothers, having to work to feed the family, have fewer children when there is no child care. Table 4 shows the generalized DID results for German mothers. The results are similar to the ones for average women. The child care coverage rate has a positive effect on the birth rate a year after. One interesting fact is that child care has a less positive effect on birth rate than average women. Table 5 shows the results for non-German mothers. Without controls, it can be mistaken that the child care coverage rate has a huge positive effect in non-German mothers' fertility decisions. However, with controls, the positive effect is no longer significant. There is mixed evidence that child care coverage helps to increase the birth rate of non-German mothers. In conclusion, child care coverage increases birth rates for German mothers while there is less evidence that it does for non-German mothers.

Next, we turn to child care provision's effect on outside marriage and within marriage mothers. Not included as a figure, birth rate trends for outside marriage mothers are low but increasing over the years. There seems to be no break in the trend after 2006. This indicates that outside marriage mothers might not plan pregnancy and does not take the availability of child care into their fertility decision when making a baby. The birth rate trend of married mothers looks similar to average birth rate trends except that the treatment group tends to converge more to the control group post-2006. This is shown in figure 6 and is a piece of evidence that the policy is more effective towards within-marriage mothers and not so much towards outside marriage mothers. Table 6, and 7 shows the generalized DID results for within marriage mothers and outside marriage mothers. As expected, child care provision policy seems to be much more effective towards within-marriage mothers than outside marriage mothers. The coefficient for child care coverage is high and positive for married mothers. The coefficient becomes less positive when county characteristics controls are included, but is still significantly positive. The child care coverage rate has a negative coefficient for outside marriage mothers when no control was added. This is counter-intuitive but once county controls were included, the estimate is very close to 0. We can interpret this as the irrelevance of child care provision in outside marriage mothers' decision to have a child. Intuitively, out of wedlock births are less planned.

6 Conclusion

With the western world struggling to keep up its population, many worry about a demographic crisis. To provide taxpayers that can support the old through pension, and health care, European countries have initiated baby policies such as public child care, parental leave, and per child subsidy. Of these, we try to identify if the provision of public child care in west Germany positively affected the fertility rate. We focus on Germany's child care policy reform in 2005 to provide public child care slots for children under the age of 3. West Germany had close to none public child care for children under 3 as pronatalist policies it was hesitant to enact pronatalist policies as they were seen as Nazi policies. Private child care was very limited to pre-treatment as it required strict regulations. This policy reform in West Germany provides a variation of child care in time and counties.

We use Difference in Difference and estimates that post-treatment, the treated counties see about 0.641 more births per 1,000 women aged 15 to 44 than had they not been treated.

Using a generalized DID model with a continuous treatment indicator, a 10% increase in child care coverage rate increases birth rates by 1.3 more births per 1000 women. This is a 2.8% increase from the sample mean of 44.1 births per 1,000 women. Using the same approach, we have estimated that the child care provision positively affected German mothers' fertility while it had negligibly affected non-German mother's fertility. Also, the child care provision policy is effective towards within-marriage mothers but not towards outside marriage mothers.

In conclusion, we contribute to providing more empirical evidence of public child care's effect on birth rates. We also estimate the differential effects of policy reform among different groups. Our study, however, has limitations. Strong exogeneity, local supply of public child being independent of birth rates, is a strong assumption and is likely to be violated. This would result in an upward bias in our estimates. It would have been interesting to see how child care policy impacts the labour supply of average mothers and mothers in certain groups.

In the literature, many studies have studied pronatalist policies and their effect on fertility as well as mothers' labour supply. However, not many empirical studies contributed to discovering mechanisms in which each policy might work towards households' fertility decisions. Doepke, Matthias and Fabian Kindermann (2019) suggest an economic theory in which man and woman in a household reach decisions through Nash bargaining. Other more traditional models suggest the household as a whole making fertility decisions based on incentive, benefits, and costs. Nash bargaining story is interesting in that woman and the man takes votes and has children when they both agree. However, many parents agree and want to have children but do not actually have. One possible empirical study could be on intentions of fertility and realization, with a focus on factors that deter realization. Future studies should also empirically test and apply the theories talked above.

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Appendix A

Table A.1 Public child care reforms during 2005-2008 in West Germany

Year	Public child care reforms
2005	Federal law commitment to create 230,000 additional child care slots (targeted child care coverate rate of 17%) for children aged 0-3 by 2010
2007	Federal state and local authorities made agreement to increase the child care coverage rate for children aged 0-3 target to 35% by 2013
2008	Federal law on support for all children age one and above to possess of a legal claim for a child care slot by 2013

Note: Our analysis focues on West Germany only.

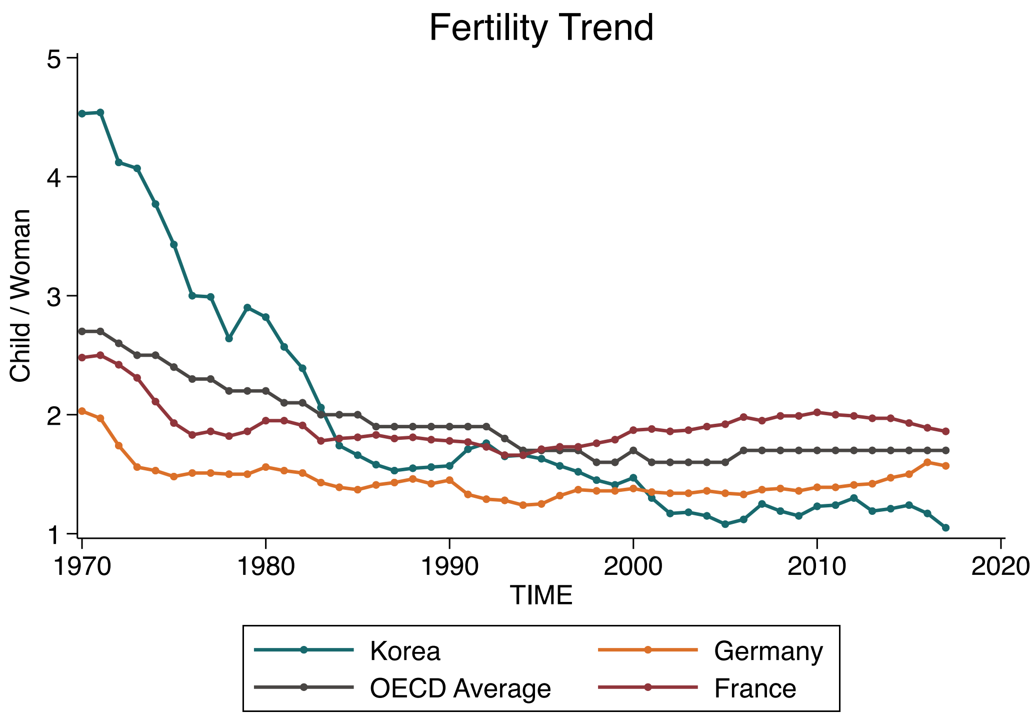


Figure A.1 Fertility Trends in Developed countries.

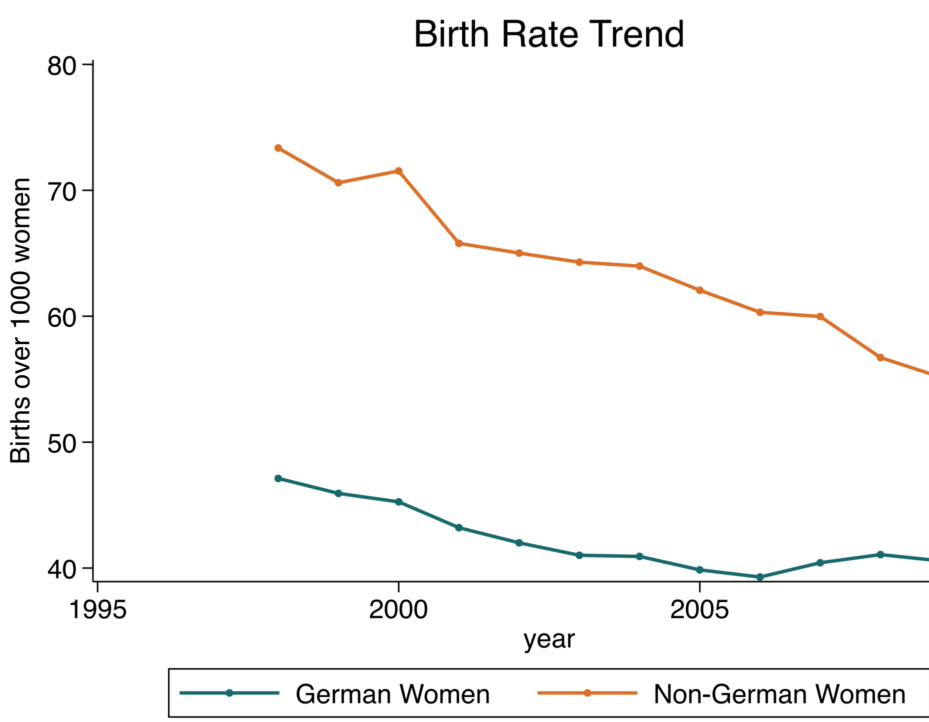


Figure A.2 Birth rate trends of german and non-german women in west Germany.

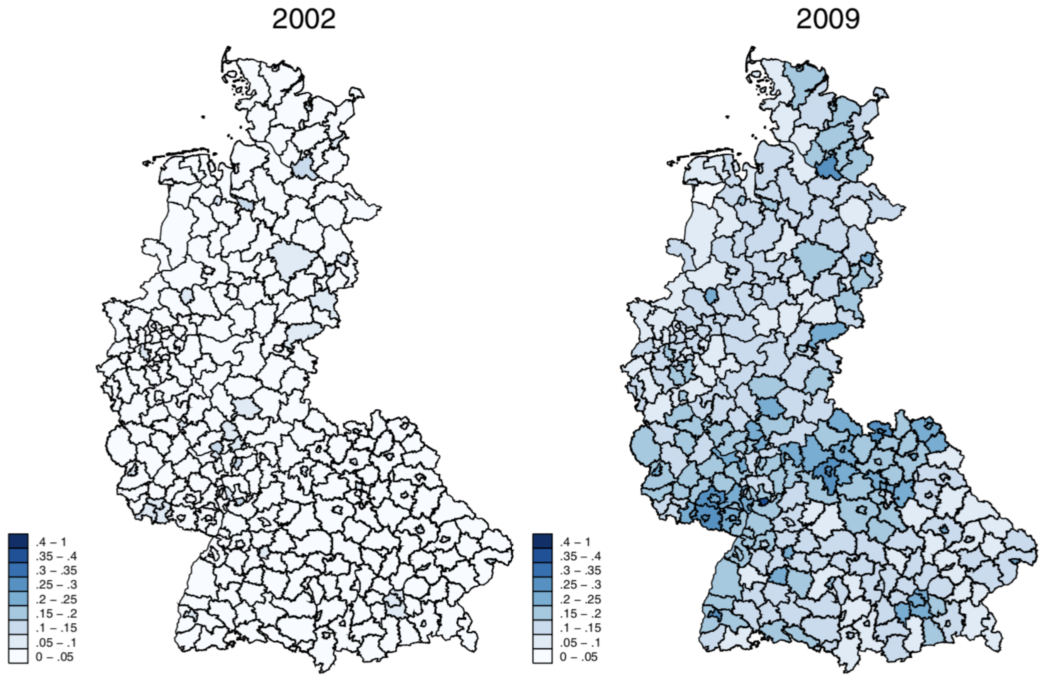
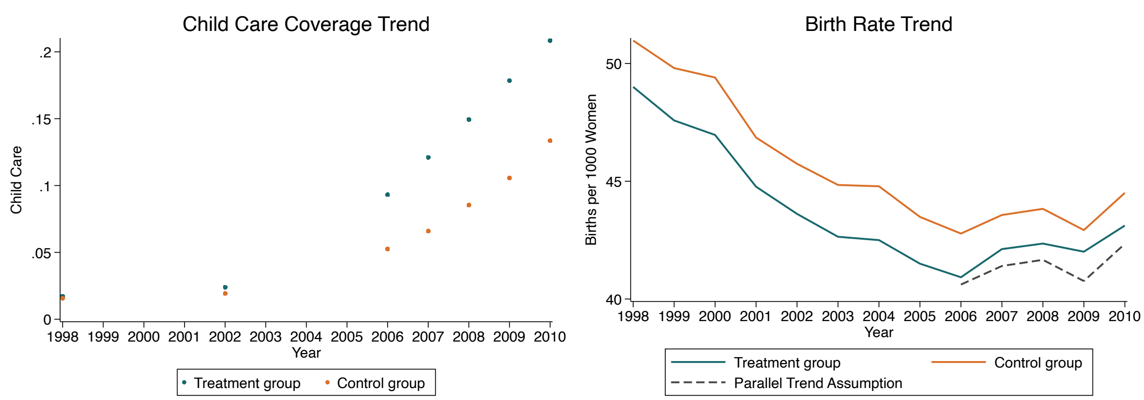
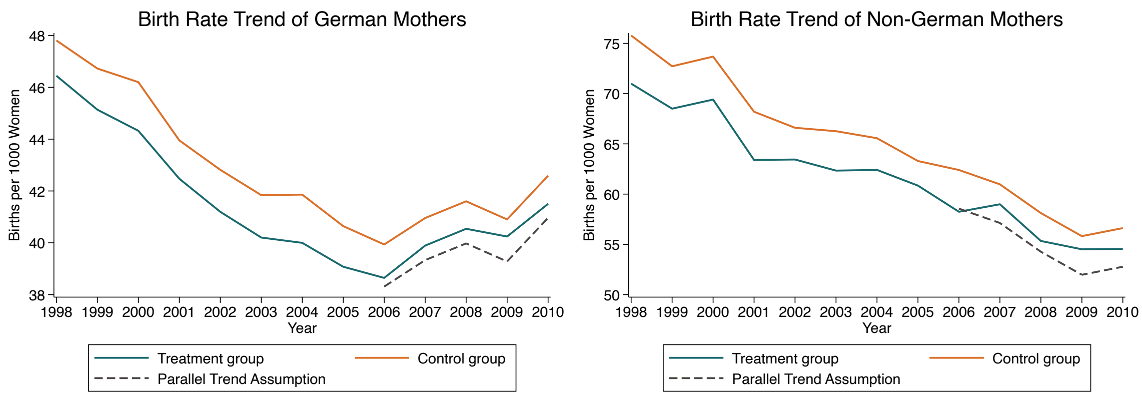


Figure A.3 Public child care coverage in 325 West German counties in 2002 and 2009. The map shows that counties differ distinctly in the magnitude of child care expansion especially after the reforms. In 2009, the child care coverage vary from roughly 4% to 36%. (Source: Bauernschuster, Hener, and Rainer 2015)



(a) **(b)**

Figure A.4 Child care coverage and birth rate trends in treatment and control groups. The treatment group includes West German counties with an above-median increase in child care coverage rates from 2002 to 2009 where the control group consists of West German counties with a below-median increase in child care coverage for the same period.



(a) (b)

Figure A.5 The figure shows the birth rate trends in treatment and control groups for german mothers and non-german mothers. The parallel trend line shows the trend of treatment groups if they had not been treated.

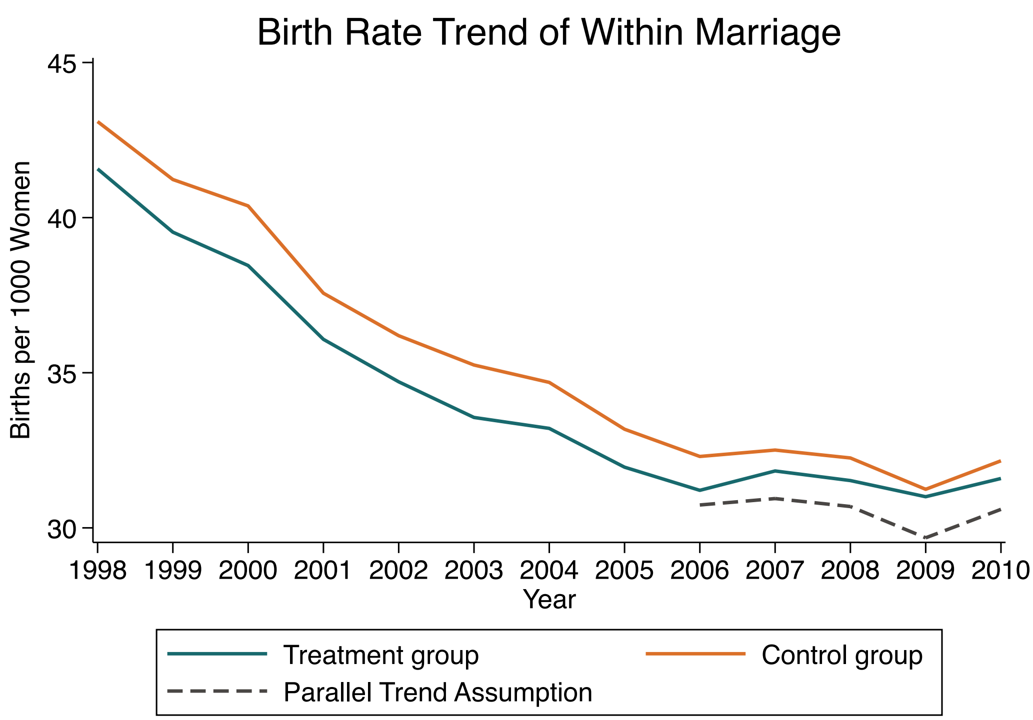


Figure A.6 The figure shows the birth rate trend in the treatment and control groups of within-marriage mothers. The figure for the birth rate trends of outside marriage mothers is not included since it shows no convergent trends for control and treatment groups. The trend is increasing for both groups for outside marriage mothers and is deemed parallel.

Table A.2 Estimates for the DID model.

	(1)	(2)	(3)	(4)
VARIABLES	Birth rate (t)	Birth rate (t+1)	Birth rate (t+1)	Birth rate (t+1)
Treatment * Year FE	0.638**	0.811***	0.717***	0.641***
	(0.263)	(0.249)	(0.217)	(0.221)
Municipality revenues (in 1 million €)				0.000914
				(0.000562)
New dwellings (in 1000)				0.115
				(0.103)
Municipality debt (in 1 million €)				-1.230*
				(0.691)
Female high education share			0.559	0.722
			(1.621)	(1.904)
Population density			-0.0165***	-0.0198***
			(0.00289)	(0.00362)
Male employment rate			1.295	-1.751
			(5.952)	(6.523)
GDP per capita (in 1000 €)			0.0471	0.0461
			(0.0347)	(0.0363)
Conservative vote share			-3.827	-4.792*
			(2.530)	(2.789)
Constant	49.99***	48.69***	153.6	196.8
	(0.135)	(0.133)	(171.7)	(136.9)
Observations	3,575	3,575	1,950	1,610
R-squared	0.694	0.602	0.738	0.778
Number of counties	325	325	325	322
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Share of women by age	NO	NO	YES	YES
Share of population by age	NO	NO	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The table shows the results of the DID model. The dependent variable is births per 1,000 women aged 15 to 44 in year t for column (1) and year t+1 for other columns. County-level controls include female high education share, population density, male employment rate, GDP per capita, conservative vote share, share of women by age, and share of population by age. Column (4) shows estimates with both county-level controls as well as public finance, and dwelling supply controls. Robust standard errors are clustered at the county level and given in parentheses.

Table A.3 Estimates for the generalized DID model.

	(1)	(2)	(3)	(4)
VARIABLES	Birth rate (t)	Birth rate (t+1)	Birth rate (t+1)	Birth rate (t+1)
Child care coverage	14.97***	15.42***	12.28***	13.01***
	(3.550)	(3.156)	(2.462)	(2.895)
Municipality revenues (in 1 million €)				0.000925*
				(0.000543)
New dwellings (in 1000)				0.106
				(0.0970)
Municipality debt (in 1 million €)				-1.367**
				(0.680)
Female high education share			0.440	0.592
			(1.651)	(1.932)
Population density			-0.0175***	-0.0205***
			(0.00277)	(0.00340)
Male employment rate			2.183	-0.0106
			(5.905)	(6.469)
GDP per capita (in 1000 €)			0.0428	0.0382
			(0.0337)	(0.0348)
Conservative vote share			-3.726	-4.845*
			(2.490)	(2.729)
Constant	49.74***	48.44***	184.1	232.2*
	(0.162)	(0.154)	(157.8)	(124.4)
Observations	1,950	1,950	1,950	1,610
R-squared	0.709	0.597	0.741	0.780
Number of counties	325	325	325	322
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Share of women by age	NO	NO	YES	YES
Share of population by age	NO	NO	YES	YES

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The table shows the results of the generalized DID model. The dependent variable is births per 1,000 women aged 15 to 44 in year t for column (1) and year t+1 for other columns. County-level controls include female high education share, population density, male employment rate, GDP per capita, conservative vote share, share of women by age, and share of population by age. Column (4) shows estimates with both county-level controls as well as public finance, and dwelling supply controls. Robust standard errors are clustered at the county level and given in parentheses.

Table A.4 Generalized DID model estimates for german mothers.

	(1)	(2)	(3)	(4)
VARIABLES	Birth rate (t)	Birth rate (t+1)	Birth rate (t+1)	Birth rate (t+1)
Child care coverage	12.10***	12.20***	10.77***	11.45***
	(3.485)	(3.195)	(2.513)	(2.965)
Municipality revenues (in 1 million €)				0.00114*
				(0.000581)
New dwellings (in 1000)				0.0453
				(0.102)
Municipality debt (in 1 million €)				-1.304*
				(0.723)
Female high education share			-0.285	-0.162
			(1.781)	(2.141)
Population density			-0.0225***	-0.0259***
			(0.00291)	(0.00368)
Male employment rate			3.321	3.945
			(6.001)	(6.626)
GDP per capita (in 1000 €)			0.0295	0.0281
			(0.0383)	(0.0401)
Conservative vote share			-3.147	-4.190
			(2.637)	(2.960)
Constant	46.93***	45.73***	181.0	216.8**
	(0.164)	(0.159)	(120.8)	(91.70)
Observations	1,948	1,950	1,950	1,610
R-squared	0.658	0.517	0.698	0.743
Number of counties	325	325	325	322
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Share of women by age	NO	NO	YES	YES
Share of population by age	NO	NO	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The table shows the results of the generalized DID model for german mothers. The dependent variable is births per 1,000 german women aged 15 to 44 in year t for column (1) and year t+1 for other columns. County-level controls include female high education share, population density, male employment rate, GDP per capita, conservative vote share, share of women by age, and share of population by age. Column (4) shows estimates with both county-level controls as well as public finance, and dwelling supply controls. Robust standard errors are clustered at the county level and given in parentheses.

Table A.5 Generalized DID model estimates for non-german mothers.

	(1)	(2)	(3)	(4)
VARIABLES	Birth rate (t)	Birth rate (t+1)	Birth rate (t+1)	Birth rate (t+1)
Child care coverage	29.76***	25.31**	15.06	13.61
	(11.24)	(10.59)	(9.364)	(10.69)
Municipality revenues (in 1 million €)				0.00273*
				(0.00160)
New dwellings (in 1000)				0.263
				(0.330)
Municipality debt (in 1 million €)				-3.553*
				(1.811)
Female high education share			1.577	1.149
			(6.635)	(7.827)
Population density			-0.00205	-0.00820
			(0.00891)	(0.00956)
Male employment rate			-27.27	-41.83*
			(22.39)	(25.21)
GDP per capita (in 1000 €)			0.167*	0.141
			(0.0975)	(0.109)
Conservative vote share			-5.426	-9.708
			(9.485)	(11.33)
Constant	72.89***	70.19***	586.6***	750.4***
	(0.503)	(0.471)	(110.4)	(130.7)
Observations	1,948	1,950	1,950	1,610
R-squared	0.501	0.493	0.569	0.577
Number of lkrid	325	325	325	322
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Share of women by age	NO	NO	YES	YES
Share of population by age	NO	NO	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The table shows the results of the generalized DID model for non-german mothers. The dependent variable is births per 1,000 non-german women aged 15 to 44 in year t for column (1) and year t+1 for other columns. County-level controls include female high education share, population density, male employment rate, GDP per capita, conservative vote share, share of women by age, and share of population by age. Column (4) shows estimates with both county-level controls as well as public finance, and dwelling supply controls. Robust standard errors are clustered at the county level and given in parentheses

Table A.6 Generalized DID model estimates for within marriage mothers.

	(1)	(2)	(3)	(4)
VARIABLES	Birth rate (t)	Birth rate (t+1)	Birth rate (t+1)	Birth rate (t+1)
Child care coverage	16.73***	18.59***	12.28***	12.73***
	(3.623)	(3.019)	(2.188)	(2.638)
Municipality revenues (in 1 million â)				0.000716
				(0.000529)
New dwellings (in 1000)				0.0413
				(0.0850)
Municipality debt (in 1 million â)				-1.133**
				(0.574)
Female high education share			0.568	1.075
			(1.452)	(1.695)
Population density			-0.0104***	-0.0138***
			(0.00232)	(0.00273)
Male employment rate			7.069	9.961*
			(5.526)	(5.951)
GDP per capita (in 1000 â)			0.0305	0.0195
			(0.0267)	(0.0272)
Conservative vote share			-3.995*	-4.429*
			(2.293)	(2.604)
Constant	42.06***	40.07***	167.6**	218.1***
	(0.162)	(0.152)	(84.76)	(77.35)
Observations	1,950	1,950	1,950	1,610
R-squared	0.848	0.800	0.878	0.893
Number of lkrid	325	325	325	322
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Share of women by age	NO	NO	YES	YES
Share of population by age	NO	NO	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The table shows the results of the generalized DID model for within marriage mothers. The dependent variable is births per 1,000 within marriage women aged 15 to 44 in year t for column (1) and year t+1 for other columns. County-level controls include female high education share, population density, male employment rate, GDP per capita, conservative vote share, share of women by age, and share of population by age. Column (4) shows estimates with both county-level controls as well as public finance, and dwelling supply controls. Robust standard errors are clustered at the county level and given in parentheses

Table A.7 Generalized DID model estimates for outside marriage mothers.

	(1)	(2)	(3)	(4)
VARIABLES	Birth rate (t)	Birth rate (t+1)	Birth rate (t+1)	Birth rate (t+1)
Child care coverage	-1.761	-3.171***	-0.00919	0.273
	(1.173)	(1.188)	(1.249)	(1.403)
Municipality revenues (in 1 million â)				0.000209
				(0.000279)
New dwellings (in 1000)				0.0647
				(0.0416)
Municipality debt (in 1 million â)				-0.234
				(0.216)
Female high education share			-0.129	-0.483
			(0.758)	(0.825)
Population density			-0.00708***	-0.00672***
			(0.00176)	(0.00175)
Male employment rate			-4.886*	-9.972***
			(2.642)	(2.681)
GDP per capita (in 1000 â)			0.0123	0.0186
			(0.0176)	(0.0189)
Conservative vote share			0.268	-0.416
			(1.142)	(1.226)
Constant	7.686***	8.366***	16.47	14.09
	(0.0518)	(0.0535)	(75.94)	(50.95)
Observations	1,950	1,950	1,950	1,610
R-squared	0.770	0.748	0.788	0.784
Number of lkrid	325	325	325	322
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Share of women by age	NO	NO	YES	YES
Share of population by age	NO	NO	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The table shows the results of the generalized DID model for outside marriage mothers. The dependent variable is births per 1,000 outside marriage women aged 15 to 44 in year t for column (1) and year t+1 for other columns. County-level controls include female high education share, population density, male employment rate, GDP per capita, conservative vote share, share of women by age, and share of population by age. Column (4) shows estimates with both county-level controls as well as public finance, and dwelling supply controls. Robust standard errors are clustered at the county level and given in parentheses