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IZA DP No. 13019

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ABSTRACT

Short- and Long-Run Effects of a Sizable Child Subsidy: Evidence from Russia*

This paper utilizes a large-scale natural experiment aimed at increasing fertility in Russia. Motivated by a decade-long decrease in fertility and population, the Russian government introduced a sequence of sizable child subsidies (called Maternity Capitals) in 2007 and 2012. We find that the Maternity Capital resulted in a significant increase in fertility both in the short run and in the long run, and has already resulted in an increase in completed fertility for a large cohort of Russian women. The subsidy is conditional and can be used mainly to buy housing. We find that fertility grew faster in regions with a shortage of housing and with a higher ratio of subsidy to housing prices. We also find that the subsidy has a substantial general equilibrium effect. It affected the housing market and family stability. Finally, we show that this government intervention comes at a substantial cost: the government's willingness to pay for an additional birth induced by the program equals approximately 50,000 dollars.

JEL Classification: J1, H1, I1

Keywords: fertility, maternity capital, housing

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1 Introduction

In all European and northern American countries fertility rates are below the replacement level (United Nations, 2015, 2017). This concern has prompted most developed countries to implement large-scale and expensive pro-natalist policies.[1] The effectiveness of these measures as well as the design of an optimal pro-natalist policy remains a challenge.

This paper utilizes a natural experiment aimed at increasing fertility in Russia to address several important open questions about the evaluation of these programs. The first is whether such policies can induce fertility in the short-run and/or over a longer horizon. Pro-natalist policies may or may not have an effect depending on whether providing financial or other support to families affects their fertility decisions; fertility may or may not respond to these programs because the opportunity costs of childbearing are too high or because fertility is driven by other factors like cultural attitudes. Even if a policy has an effect, the next question is whether it results only in a short-run change in fertility that is driven by re-scheduling the timing of births or also changes long-run (overall) fertility, i.e., affects the total number of children a woman would like to have. While both short- and long-run effects are of interest (Bloom et al. 2009), only the latter changes the future size of the workforce and a country's ability to finance old-age benefits.

The next set of questions deals with further evaluation of the programs: What are the characteristics of families that are affected by these policies? How costly, i.e. how much is the government paying per birth that they induce? Finally, what are the non-fertility-related effects of these policies? Most existing studies that analyze the effect of pro-natalist policies concentrate on fertility and mothers' labor market outcomes. Due to their scale, however, these policies may have important general equilibrium and multiplier effects that could influence economies both in the short run and long run (Acemoglu, 2010).

Motivated by a decade-long decrease in fertility and depopulation, the Russian government introduced a sizable conditional child subsidy (called Maternity Capital). The program was implemented in two waves. The first, the federal Maternity Capital program, was enacted in 2007. Starting in 2007, a family that already has at least one child, and gives birth to another, becomes eligible for a one-time subsidy. Its size is approximately 10,000 dollars, which exceeds the country's average 18-month wage and the country's minimum wage over a 10-year period. Four years later, at the end of 2011, Russian regional governments introduced their own regional programs that gave additional money - on the top of the federal subsidy - to families with newborn children.

We first document that the Maternity Capital program results in a significant increase in fertility rates both in the short run (by 10%) and in the long run (by more than 20%). To identify the causal effect of Maternity Capital in the short run, we utilize high-frequency (monthly and quarterly) data and use regression discontinuity (RD) analysis within a relatively short time interval near the adoption of the child subsidies. To find the long-run effect, we confirm that the short-run shocks that were identified in our RD analysis are persistent over time by applying difference estimators with various time trends. On top of that, we utilize Difference-in-Differences estimators where we first employ variation in the levels of regional child subsidies (regional Maternity Capital programs); and, second, employ differences in intensity of treatment for second and third children by parity relative to first-parity children. Finally, in a robustness check, we compare the

[1] Eighty-four percent of developed countries have implemented various pro-natalist policies that cost on average 2.6 percent of GDP (Milligan, 2005, Malkova, 2019, United Nations, 2015).

post-reform fertility growth in Russia with that of Eastern European countries that showed similar pre-reform trends in fertility. All regressions show that the Maternity Capital resulted in long-term fertility growth.

The effects of the policy are not limited to fertility. Resulting in a reduction in the share of single mothers and in the share of non-married mothers it also affects family stability. Additionally, the policy affects the housing market.[2] In particular, we find that the supply of new housing and housing prices increased significantly as a result of the program.[3] Confirming a close connection between the housing market and fertility, we find that in regions where the subsidy has a higher value for the housing market, the program has a larger effect: the effect of Maternity Capital was stronger, both in the short and long run, in regions with a shortage of housing and in regions with a higher ratio of subsidy to price of apartments (i.e., those regions where the real price of subsidy as measured in square meters of housing is higher). Both results suggest that a cost-benefit analysis of such policies should go beyond their effects on fertility.[4] Ignoring general equilibrium issues may result in substantial bias in the evaluation of both short and long-run costs and benefits of the program (Acemoglu, 2010).

Finally, we demonstrate that Maternity Capital is costly: our calculations show that the government pays approximately 50,000 dollars per additional birth that is induced by the program.

The paper proceeds as follows. In the next section, we discuss the literature. Section 3 describes the institutional environment of the Russian Maternity Capital program. Sections 4, 5, 6, and 7 present the data, graphical illustration, short-run analysis, and long-run analysis for Russia. Section 8, 9, and 10 study general equilibrium effects, changes in mother characteristics, and willingness to pay for an additional child (WTP). Section 11 provides robustness checks. Section 12 concludes the paper.

2 Related Literature

Following the canonical theoretical model of fertility as an economic decision by Becker (1960), many papers have tested empirically whether fertility responds to financial incentives or not. The evidence is mixed. Gauthier (1996), Gauthier and Hatzius (1997), Acs (1996), Rosenzweig (1999), and Kearny (2004) find no effect of pro-natalist policies. On the other hand, Malkova (2019), Cohen , Dehejia, and Romanov (2013), Gonzales (2013), Milligan (2011), Lalive and Zweimüller (2009), and Slonimczyk and Yurko (2014) find evidence that fertility follows financial incentives.

Most of these studies document only the short-run response to the policies. Adda, Dustmann, and Stevens (2017), Sobotka and Lutz (2011), and Schoen (2004) argue that the documented short-run effect overestimates the impact of pro-natalist policies because it is driven by the rescheduling of birth, but not by the decisions of families to increase the overall number of children.[5] In particular, Adda, Dustmann, and Stevens (2017) utilizes German data to show that the long-run effect of the pro-natalist policy is smaller than the short-run response. In our case, the policy affects both short- and long-run fertility. In this respect, the closest paper

[2] The recipients of the subsidy can use it only on three options: housing, the child's education, and the mother's pension. Eighty eight percent of families use it to buy housing. For more details, see section 3.

[3] This result also identifies those who are penalized by the program: home-buyers who did not plan to have a new baby, suffer from the rising costs of housing.

[4] While most of the studies that analyze the effect of pro-natalist policies concentrate on fertility and labor market outcomes, our study shows that the effect of these large-scale policies may go far beyond this scope.

[5] Another potential driver initial short-term effect of the program comes from additional births in a large pool of families that have parents from older-age cohorts who decided to have one more child.

to ours, Malkova (2019), documents the (long-run) rise in second and higher parity completed fertility rates in response to a maternity program in the Soviet Union. In our study, we provide evidence from the market environment that allows us to get more "external validity" of our results as well as to analyze a broader set of important outcomes that would be impossible in a closed non-market socialistic economy.[6]

Second, while most of the previous studies concentrate on the effect of pro-natalist policies on fertility and mothers' labor market outcomes, ours shows that the effects of these large-scale policies may go far beyond this scope. We provide an example of the importance of the general equilibrium effects for policy evaluation, which contributes to the existing discussion (Acemoglu, 2010). Finally, by demonstrating the sizable effect of the program on the housing market, our paper shows a strong connection between childbearing decisions and housing (Lovenheim and Mumford, 2013, Dettling and Kearney, 2014).

3 Institutional Environment: The Russian Maternity Capital Program

The Russian federal Maternity Capital program became effective on January 1, 2007. Families that adopted or gave birth to a second or higher birth order child became eligible for a one-time subsidy of 250,000 rubles (10,000 dollars), an amount that exceeds the country's average 18-month wage. This amount is updated annually to account for inflation (see Figure 1 for the ruble and dollar amount of Maternity Capital). Families do not receive the money in cash. Instead, they receive a certificate that can be used only to pay for three options: "improvement to current living conditions", (i.e., for housing, including existing mortgages), their child's college education, and the mother's pension.[7] The money from this certificate is transferred directly from the pension fund (the administrator of the program) to the education facility or the home seller or mortgage holder. The subsidy is granted only once per family. According to the initial (2007) version of the Maternity Capital law, a family could utilize the Maternity Capital certificate money only after their child reaches two years of age. Since December 2008, the family can use the Maternity Capital subsidy to pay for a mortgage immediately after the birth of a child.

Of the three options (housing, education, pension), 88% of the families spend their subsidy on housing. One of the reasons for this is that the option of buying a house (or apartment), in contrast to other options, can be realized shortly after the birth of a child. An important restriction that we will explore further, is that using the certificate to buy an apartment requires that the child automatically becomes it's co-owner. This makes the apartments less liquid. In particular, if a family decides to sell the apartment, it will need to comply with the regulations of guardianship and trusteeship bodies. As a result, some families, mainly buyers of expensive apartments, prefer not to use Maternity Capital.[8] The other important feature of the Maternity Capital program is that it was unanticipated by the public until October 2006 (see Slonimczyk

[6]Russia's socialistic economy has several important distinguishing features. Housing is free in the USSR and the costs of raising children is low: every family has access to free childcare, healthcare, a high school, and college education. The opportunity cost (of raising children) is also low: the earning profile was flat and women are guaranteed their jobs back following a maternity leave (Malkova, 2019).

[7]In 2014, the option of using Maternity Capital to pay for pre-school also became available (see the comment to Federal Law 14.07.2014 N 648).

[8]Also, the government applies additional restrictions to ensure that families use their Maternity Capital to improve current living conditions, but not to make investments. Thus, although they can use Maternity Capital to buy housing, recipients can not use it to buy relatively cheap alternatives like, land or a summer house (dacha).

and Yurko, 2014), when the bill creating it was introduced to the State Duma (Parliament).

In the first 12 years after the adoption of Maternity Capital, 8.9 million families received Maternity Capital certificates, and 5.1 million families used the subsidy in its entirety; 3.3 million families used Maternity Capital to pay for a mortgage, while more than 1.9 families used it to pay for housing without using a mortgage.

Since the start of the Maternity Capital program, many Russian regions (states) have also adopted laws that offer families a subsidy additional to the federal program. Two regions adopted Maternity Capital programs in 2008. At the end of 2010, Russian President Dmitry Medvedev requested that regional governments adopt local child support programs. In most of the other regions, laws were passed in the second half of 2011 and came into force in 2012. By 2012, 87% of the regions had adopted an additional subsidy, averaging about 25% of the federal subsidy. The amounts of regional subsidies vary, from 0 to 108% of the federal subsidy. The programs also vary across regions in other dimensions: 1) by which children are eligible: most of the programs (85%) give a subsidy for the third and higher birth order child, yet one region gives it for the first child, three for the fourth and two for the fifth child; 2) by restrictions on the use of a subsidy: many regional programs give unconditional subsidies in cash, some restrict it usage (legitimate expenditures include housing, education, taxes, pension, medical spending, insurance, rental expenses, and cars); and 3) by which families are eligible: in some regions only families with an income below a certain threshold are eligible for a regional subsidy.

Initially, both the federal and regional Maternity Capital programs were set to last for 10 years expiring January 1, 2017. This timing was unchanged until the very end of program. Hovewer, in 2016, government extended federal program until 2018. In 2018 federal program was extended again until 2021. Most of the regional programs were extended initially until 2018, and then until 2021. Also, starting from 2016 the nominal (ruble) value of subsidy was not updated to account for inflation.

4 Data

In our study, we utilize several datasets.

First, we use regional (state) level data on various regional characteristics from the Russian Statistical Agency, Rosstat and the Russian Fertility and Mortality Database (RFMD).[9] This data includes monthly counts of births at the national and regional level. The Russian Fertility and Mortality Database contains annual data on age-specific birth rates for all Russian regions, and on the birth rates by birth order for a half of the regions. The Rosstat data provides different regional data with an annual and/or quarterly and/or monthly frequency. In particular, the data on regional birth counts is available monthly, whereas the data on regional housing prices is available quarterly, and that on the amount of new housing only on an annual basis.

Second, we use the 2010 Russian census and 2015 Russian micro-census provided by Rosstat.[10] Such data can be obtained in the form of counts of individuals within narrow groups defined by a set of demographic and regional characteristics. For our purposes, we extract several samples. The first sample contains counts of children born in a particular month and year, by a mother of a particular age, and living in a family with k

[9] For details see Rosstat web-site (www.gks.ru) and the Russian Fertility and Mortality Database web-site (http://demogr.nes.ru/en/demogr_indicat/).

[10] Data extracts from the Census were executed several times within a period from September, 2017 until April, 2019.

children (k=1,2,..). The second sample contains counts of children within a particular county (rayon), born in a particular month and year, living in a family with k children (k=1,2,..), and living in a family with one or two parents. The third and fourth samples provide the same counts but aggregated at the state (region) and national levels, respectively.[11] Thus, rayon-(or region-) level datasets contain monthly data on the number of children that were born in a particular month and year in families with one, two, three or more children (including newborns) for families with either a single parent or with two parents for 2,351 of Russian rayons (or 85 regions) for the period of 2000 to 2010 (2010 is a census year). The obtained datasets contain 2,857,200 and 160,200 cells (observations) in rayon- and region-level data, respectively. In addition to the 2010 Census, we utilize data on the 2015 Russian micro-census that surveys 1.7 percent of the population. Due to size limitations, we extract counts not on monthly, but quarterly birth date frequency. Census (micro-census) data on monthly birth rates are richer compared to Rosstat: in particular, using census data we can calculate monthly birth counts by parity, by mother age, as well as by other demographic characteristics. However, the census provides retrospective information on counts of births based on information obtained in 2010 (2015), thus some births are missing due to child mortality. Consequently, for our regressions, we use both Rosstat and census data.[12] In addition to aggregate counts discussed above, the 2010 Russian census is available at the individual level for the sub-sample of 7 million people. Unfortunately this individual-level dataset does not contain many variables important for analysis so we are restricted to using it only for a supportive analysis.

Third, we utilize individual-level data from the Russian Longitudinal Monitoring Survey (RLMS).[13] The RLMS is a nationally-representative annual survey that covers more than 10,000 individual respondents from 1994 to 2015. The RLMS survey contains rich information on demographic and socioeconomic characteristics. The RLMS has data on the date of birth and birth order, as well as various demographic and socio-economic characteristics of children and their families. In our analysis, we restrict the time span of the data to the years 2000-2015. The year of the adoption of Maternity Capital lies in the middle of this period.

Finally, to do a national-level analysis and cross-country comparisons, we use the Human Fertility Database (HFD) provided by the Max Plank Institute for Demographic Research (MPIDR) and the Vienna Institute of Demography.[14] The HFD contains annual country-specific data on age-specific birth rates, on the birth rates by birth order, as well as monthly counts of births.

The summary statistics of variables used in the analysis are shown in Table 1.

Birth Rates Variables and Data Used. For short-run analysis, we use monthly-level data in the main specification. Monthly counts of births are available at national and regional level, thus we utilize national and regional-level data, and use log counts of births in the main specification. In the robustness section, we construct data on the population of females of childbearing age by smoothing out available annual-level data and use constructed log fertility rate (log number of births divided by the number of females of childbearing age) instead of log number of births. For within-country long-run analysis, we use available regional- and national-level annual data on a log of age-specific fertility rates.[15] For a cross-country case-study, we use

[11] There are 2,351 rayons and 85 regions in Russia.
[12] Results of regressions are similar for all datasets.
[13] See https://www.hse.ru/en/rlms/
[14] See http://www.fertilitydata.org/ and http://www.humanfertility.org/cgi-bin/main.php
[15] Data on age-specific births are available monthly only for retrospective 2010 Census data; thus we do not use them in the short-run main specification, and we do use them in robustness analysis.

data on age-specific fertility, total fertility rate, cumulative fertility rate, and tempo-adjusted fertility rates that are available on the country level (for definitions, see note 1 in Appendix).

5 Graphical illustration

Figure 2 illustrates the effect of Maternity Capital on birth rates.

Panel A shows monthly data on the number of births using 2010 Census retrospective data. Panel B shows monthly birth rates using Rosstat data for the 2003 to 2016 period. It shows both rough counts and de-seasoned data to control for seasonality in birth rates. All graphs indicate jumps in the number of births in July 2007, nine months after the announcement of the federal program, and in 2012, when the regional programs were introduced.

Panel C shows annual data on the total fertility rate (TFR) for 2002-2017. It shows an increase in TFR both in 2007 and 2012. Overall, TFR gew Panel C also shows a drop in fertility rates in 2017 (when program initially were expected to end)[16], compared to 2016; yet, the TFR in 2017 exceeds that in pre-reform 2006 by more than 25%.

Panel D shows, perhaps, the most striking illustration of the reform. It shows the effect of Maternity Capital on the growth of births of second and higher parity children relatively to births of first children. Recall that second and higher parity children are eligible for federal child subsidy, whereas first-parity children are not. In addition, third parity children are those who are eligible for the most regional child subsidies. Panel D shows first that the ratio of births of second and higher parity children relatively to births of first children was stable for a decade before 2007, and then it increases by more than 50%.

6 Short-Run Effect on Fertility

6.1 Short-Run Effect of the Federal Maternity Capital Program

The main challenge in the analysis of the effect of a universal natural experiment like the introduction of federal Maternity Capital is to choose a credible counterfactual.[17] One credible solution is to employ an RD design that resembles perfect randomization in the neighborhood of the threshold and does not rely on a control group. The RD approach estimates the local treatment effect that we interpret as the short-run effect.

In our RD strategy, we compare fertility rates within a short time interval before and after the introduction of the Maternity Capital program. For the federal Maternity Capital program, we treat October 2006, the official date of the announcement of the program, as the threshold date for conception decisions (see Slonimczyk and Yurko, 2014). This means that we treat July 2007 as a threshold month for realized birth

[16] Initially, both the federal and regional Maternity Capital programs were set to last until January 1, 2017. This timing of the program was unchanged until the very end of program, and thus formed expectations of families regarding timing of subsidy.

[17] For example, the option to use Dif-in-Dif approach and families that give birth to their first child as a control group would be an imperfect solution because the program may facilitate birth rates of the first child too.

outcomes.[18] For the regional Maternity Capital programs, we treat January 2012, the start of the majority of those programs, as the threshold date for realized birth outcomes.[19]

To estimate the effect of Maternity Capital in the short run we employ several specifications.

Our baseline regression uses the following flexible RD specification

$$Y_{rt} = \theta I(t \geq 0)_{rt} + f(t) + g(t) * I(t \geq 0)_{rt} + D'_{rt}\Gamma + u_{rt} \tag{1}$$

where t is date ($year + (month - 1/12)$) normalized to be 0 at the threshold dates discussed above, $f(t)$ and $g(t)$ are the smooth functions of time, $g(0) = 0$, and Y_{rt} stands for the dependent variable (log births); because birth rates are seasonal we include the set of controls D_{rt} that contains the month fixed effects to control for seasonality. In all regressions, we use the triangular kernel; $f(t)$ and $g(t)$ are parametrized to be first-order polynomial, and the error terms u_{rt} are clustered at the date level. The parameter of interest θ stands for the effect of Maternity Capital. We estimate the model using monthly data on national-, regional-, and rayon-level cells. The baseline specification uses data at the national-month level. In addition, we show results for regional-, and rayon-level cells to be consistent with further elaboration of our results in which we utilize regional and rayon heterogeneity in the effect of the program. The subscript r in regressions refers to the cross-sectional dimension (national, regional, or rayon), and the subscript t refers to time (date). The bandwidth was set to be 3 in the baseline specification.[20]

Table 2 shows the results of the RD estimates of the effect of Maternity Capital on birth rates.[21] Panels A, B, and C display the results of the RD regressions at national×month bins, regional×month bins, and rayon×month bins, respectively. All panels indicate that Maternity Capital results in a 9% increase in birth rates. The subsidy affects the birth rates of second and higher birth order children more. While the fertility rate for the first child increased by 7%, fertility rates for second, third and higher birth order children increased by 12%, and 15% correspondingly.[22] Interestingly, the results suggest that reform increases birth rates not only for second and higher parity children that are eligible for a subsidy, but also for first children. We see two different explanations for this. First, for a family that preferred to be childless before the reform, it became beneficial to give birth for two children and thus become eligible for a Maternity Capital subsidy. As a result, some couples opted to have a first child. A second explanation the Maternity Capital program's massive promotional campaign encouraged some pursued childless couples to start families. Indeed, recent

[18] The threshold time point in decisions in the housing market is similar to conception decisions, i.e., the threshold date is October 2016. In the housing market, one can buy housing using a mortgage before obtaining the Maternity Capital certificate and then, after getting Maternity Capital, use it to pay a mortgage.

[19] Recall that information about regional Maternity Capital programs became publicly available within a year before January of 2012.

[20] Figure A1 in Appendix shows RD estimates for different bandwidth sizes. The estimates are the same for bandwidths greater than 1.5. We treat specification (1) as primary because it is more flexible. In particular, in this specification, we can control for seasonality or can estimate the heterogeneity of the Maternity Capital effects with respect to initial housing prices. In the robustness section, we use the data-driven bandwidth selector and RD estimator by Calonico, Cattaneo, and Titiunik (2014) to confirm our main specification results.

[21] Figure 3 shows the short-run effect of the federal Maternity Capital program for the births of different parity. Figure A2 in Appendix and Figure 1 (Panel D) show the effect of Maternity Capital on total fertility rate (TFR) and on the decomposition of births using annual data for the period until 2017. Both figures show that Maternity Capital affects births of second and higher parity children more.

[22] Columns 1 and 2 of Panels A and B show results for two data sets, Rosstat (RFMD) and the 2010 Census. Rosstat and HFD provide monthly counts of births at the date of birth. Census data provide retrospective information on monthly counts of births based on information obtained in 2010, and thus some births are missing due to child mortality. The results shown in columns 1 and 2 are similar.

literature provides many examples in which fertility decisions are sensitive to persuasion (see Bassi and Rasul, 2017, Chong, Duryea, and Laferrara 2012).

It should be noted that the observation that fertility jumps with the introduction of a child subsidy is not limited to Russia. Section 5.3 provides an example of an increase in fertility after the introduction of a child subsidy in Ukraine that (importantly) happen in different time. Moreover, Gonzales (2013) documents both a jump in conceptions and drop in abortions after the introduction of a child subsidy in Spain.[23] To further confirm that our results are not driven by a choice of regression specification or choice of variables, in Section 10 we provide various robustness checks where we estimate a model using different measures of fertility, utilizing data on age-specific data fertility rates, as well as applying an alternative to our main specification robust RD estimator by Calonico, Cattaneo, and Titiunik (2014). Results are similar to our baseline regressions. Finally, in Section 5.3 we use placebo experiment to show that jumps in fertility in Russia coincides with the introduction of Maternity Capitals.

Yet, there are several possible concerns regarding the use of an RD strategy in this set-up. First, couples that gave birth before 2007 may try to falsify declared birth date to change it to later time. However, this concern is not relevant in because jump in fertility occurred in July 2007, half a year after the Maternity Capital program was initiated.[24] Second, while we have information on dates of birth, exact conception dates are unknown. Therefore, using the rule that conception occurred nine months before the birth date provides noisy information on the exact conception dates, resulting in attenuation bias. Third, while one can expect to see an immediate effect of the program because it encourages conceptions and discourages contraception use and abortions, many couples are not immediately successful when they try to conceive. In particular, the literature suggests that it usually takes three to six months for a couple to conceive when actively trying (see Gonzales, 2013). There is also a chance that general knowledge of the reform is not immediate, resulting in a transitional period in the implementation of the reform, and then RD regression may underestimate the short run effect. To deal with this issue, we propose a robustness check where we allow for a narrow six-month transitional period between the initial announcing date and full realization of the program. This approach is similar to Clark and Del Bono's (2016) and assumes that there is a sharp increase rather than jump in the probability of treatment across the borderline dates.[25] The exact specification is as follows:

$$Y_{rt} = \theta TR(t)_{rt} + f(t) + g(t) * I(t \geq 0)_{rt} + D'_{rt}\Gamma + u_{rt} \tag{2}$$

The treatment variable $TR(t)_{rt}$ equals one for birth dates after September, 1, 2007, and zero for dates before March, 1, 2007, and increases linearly from 0 to 1 in a half-year period between March, 1, 2007, until September, 1, 2007. The set of controls and size of bandwidth are the same as in (1). Error terms are clustered at the date level.

Panel D shows the results of this regression using national-level data. Compared to RD estimates the estimated effect in (2) is on average 1.5 percentage points higher: the fertility rate increased by 10.6%, 7.7%,

[23]Unfortunately, we do not have access to monthly or quarterly data on abortions, and thus could not provide similar RD estimates. Annual data (that is available) shows that the abortion rate, which is relatively high in Russia, has been falling for the whole time span of our analysis. The ratio of abortions to births is 1.8 in 2000, decreases to 1.1 in 2006, and further decreases to 0.45 in 2015.

[24]Also, today it is almost impossible to falsify birth dates for more than a couple of days. Registration of birth date takes place immediately after birth and directly in hospital where a mother gives birth.

[25]The other option is to apply applications RD design to the situation in which the discontinuity point is unknown (see, for example Card, Mas, and Rothstein, 2008, van der Klaauw, 2002, Porter and Yu, 2015)

13.6%, and 16.5% for all births and for births of first, second, third and higher parity children, respectively.

Next, to confirm a close relationship between the housing market and fertility, we explore the regional (and rayon-level) heterogeneity in the effect of the Maternity Capital program. The vast majority of families use federal Maternity Capital to buy housing.[26] Thus, one can expect that in regions with a housing shortage, the demand for Maternity Capital would be higher. We then compare the effect of the program in regions with high- and low-priced housing. The average price of apartments varies greatly across Russian regions: in 2007, with Maternity Capital funds one could buy a 20-square-meter apartment in the North Ossetia region, whereas in Moscow one could buy only 2.4 square meters. Given that buying apartments using Maternity Capital is accompanied by future legal costs (see Section 3), it is reasonable to expect that the effect of maternity capital will be greater in places with lower housing prices (or, equivalently, the higher real price of Maternity Capital). To check the differential effect, we add pre-reform regional characteristics, the shortage of housing and housing affordability, and their interactions with the program dummy $I(t \geq 0)_{rt}$ in regression (3).

$$\begin{aligned} Y_{rt} = \theta I(t \geq 0)_{rt} + \gamma I(t \geq 0)_{rt}(Z_{rt0} - \overline{Z_{rt0}}) + \mu Z_{rt0} \\ + f(t) + g(t) * I(t \geq 0)_{rt} + D'_{rt}\Gamma + u_{rt} \end{aligned} \tag{3}$$

In this regression, Z_{rt0} stands for pre-reform regional characteristics (in 2006), the availability of housing is defined as the average square meters of owned housing per person in the region, and the affordability of housing is the size of an apartments that can be purchased using Maternity Capital.

Panel A of Table 3 shows the results of the estimation. In regions with a shortage of housing or more affordable housing, the effect of Maternity Capital is greater. The effect is economically high: in regions where the price of an apartments and the size of the living area are one standard deviation lower than the mean, fertility increases by an additional 2.8 and 2 percentage points, respectively (compared to an average increase of 8 pp). We find a similar differential effect caused by the program when we explore heterogeneity at the rayon level. Panel B shows that in rayons where the average number of rooms in apartments per household is one standard deviation lower than the average the growth in fertility is 3 pp higher.

Next, we check whether economic and social factors (average wage, unemployment rate, migration, and crime) as well as age distribution in the female population do not change discontinuously at the time of the introduction or announcement of Maternity Capital. This test serves as a validity check for the RD strategy. If the timing of shocks in income or other factors coincides with the introduction of Maternity Capital, then factors other than Maternity Capital may drive the results. Figure 5 shows the results of the RD estimates for different placebo threshold dates: there are no statistically significant discontinuous changes in economic factors in October 2006 (the announcement date of the Maternity Capital program) or in July 2007 (the date of the increase in birth rates).

6.2 Short-Run Effect of Regional Maternity Capital Programs

We further provide a similar analysis of the short-run effects of the 2012 wave of regional Maternity Capital programs. We treat January 2012, the starting date of the majority of the programs as the threshold date for

[26] Figure 4 plots birth rates over time for various Russian regions. Indeed, it shows that in rich regions such as Moscow there is no visible effect of Maternity Capital, whereas in less wealthy Russian regions, like Bryansk, Nizhniy Novgorod, Tatarstan the effect is sizable.

realized birth outcomes. The specification of the RD regression is similar to (1), where the running variable t is normalized to be 0 in January 2012.

Table 4 shows the results of the RD estimates of the effect of regional Maternity Capital on birth rates. Panels A and B display the results of the RD regressions at the national and regional levels. All panels indicate that regional Maternity Capital results in a further increase in birth rates by 4.7%. The regional programs primarily affect births of first and third order children (by 5.4%, and 5.7%, respectively) because the majority of these programs were designed to induce births of children of this parity. Similar to the analysis of the federal program, we provide a robustness check by allowing for a six-month transitional period of implementation of the reform (see equation (2)). Panel C shows the results of this estimation: that magnitude of the effects is 1 pp higher.

6.3 Validity Check: Ukraine Case Study

In this section, we discuss the case study of Ukraine, which provides an additional validity check for RD results. The RD estimates would show a spurious effect if the introduction of Maternity Capital coincides with some unobservable economic or social shock that also affects fertility. Although we already checked this possibility by showing that no other factors changed discontinuously around the threshold date, the Ukrainian case study provides an additional validity check. Facing similar demographic challenges, Ukraine also introduced a sizable child subsidy, but at a different time (one year later than Russia). This allows us to explore the effect of timing in the introduction of the subsidy to see if fertility responded differently in the two countries after the subsidy was introduced.

Ukraine significantly changed its child support policy twice. The first policy change was in April 2005, when the government introduced a one-time child benefit of 8,500 UAH (1,700 dollars). The second increase in child benefits was introduced in the Ukrainian Rada (Parliament) on October 2007 and became effective in January 2008. According to the new policy, a family that gives birth to a first, second, and third or higher birth order child receives a child benefit of 12,240 UAH, 25,000 UAH, and 50,000 UAH (2,500, 5,000, and 10,000 dollars), correspondingly. In contrast to Russia, the subsidy in Ukraine can be used for any purpose.

Figure 6 displays monthly data on the number of births in Ukraine. It shows a jump in fertility rates in July 2008, nine months after the announcement of the child subsidy. Table A1 shows the results of the RD estimates of the effect of the subsidy on birth rates. It shows, that the subsidy had a sizable immediate effect on the birth rate in Ukraine: it resulted in an immediate increase in the birth rate of 8%.

To demonstrate that Ukraine and Russia experienced shocks at fertility at different points in time, we run placebo experiments. We estimate placebo RD coefficients for a jump in fertility within different placebo threshold dates that vary from January 2006 till 2010. Figure 7 shows the results of placebo experiments for both Ukraine and Russia. The placebo RD coefficients plot for Russia shows an inverse U-shape with peaks in July 2007. The placebo RD coefficients plot for Ukraine shows two peaks that happen in January 2006 and July 2008.

Thus, we show that the jumps in birth rates in Ukraine and Russia coincided with the changing child policy in these countries.Since the dates of the initiation of their Maternity Capital programs are different, we provide additional evidence that these increases are driven by the change in child support policies and not by random economic or social shocks (that would have been likely to hit both neighbor countries at the same time).

7 Long-Run Effect on Fertility

We establish evidence of the long-run effect of the program in several steps.

First, using series of difference-in-difference regressions we show that 1) reform resulted in highe long-run growth in birth rates of second and third children by parity relative to births of first-parity children; 2) total fertility grew faster in regions with a higher regional subsidy. Second, in within-country analysis we show that an initial short run change in fertility does not vanish, but rather increases over time. Third, we provide indirect evidence to show that the re-scheduling motive is not a driving force in the observed change in fertility. We demonstrate that the time between children as well as the age of the mother did not decreased as a result of the reform, and at that the desired number of children significantly increased. Forth, for a robustness check, we compare the long-term growth in fertility in Russia with Eastern and Central European countries that have similar initial trends in fertility and face similar economic conditions. Finally, using our regression estimates, we simulate the effect of Maternity Capital on completed (long-run) cohort fertility rates and show that the reform already increased completed cohort fertility for a sizable of Russian women.

7.1 Difference-in-Difference Analysis

7.1.1 Births of second and third children by parity relative to first-parity children

Next, we check how the reform affects birth rates for second and third children by parity *relative* to births of first-parity children. Second and higher parity children are eligible for federal child subsidy, whereas first-parity children are not. In addition, third parity children are those who are eligible for the most regional child subsidies. Therefore, one would expect these program to affect births of higher parity children more, and indeed, Panel D of figure 1 already demonstrated an significant increase in ratio of births of second and third children by parity relative to first children.

Yet, comparing the relative growth of birth rates by parity would not allow us to quantify the net effect of Maternity Capital because, as we already argued, Maternity Capital could have an indirect effect on births of first children too. Our previous analysis confirms this argument by showing an increase in births of first parity children as well. However, we still can infer the causal effect of the intensity of the treatment effect under the assumption that births of second and third parity children benefited more from the program than those of first children. To estimate the effect of the intensity of treatment we use national-level data on age-specific birth rates for births of first, second or third children and use the following Dif-in-Dif regression:

$$\begin{aligned} Y_{apt} = \gamma_{21} I(year \geq 2007) I(parity \geq 2) + \gamma_{22} I(year \geq 2012) I(parity \geq 2) \\ \delta_t + \delta_{ap} + t * \delta_{ap} + u_{apt} \end{aligned} \tag{4}$$

where Y_{art} stands for the log of the fertility rate of mothers of age a, for children of parity p, at year t. Parameters of interest γ_{21} and γ_{22} remain for a relative (in comparison to births of first children) increase in births of second and third children after the 2007 and 2012 reforms, respectively. δ_t, δ_{ap}, and $t * \delta_{ap}$ remain for time fixed effects, age$\times$parity fixed effects, and age$\times$parity-specific time trends. Errors are clustered at the age$*$parity level.

Panel B of Table 5 reports the results of regression (5). Column 1 shows a sizable relative increase in second and higher parity children after 2007 and after 2012. Births of second and third children by parity increase by 12% after 2007 and then further increase by 6% after 2012, resulting in a total increase in fertility rate by 18%. Column 2 shows no statistically significant different in per-reform trends in fertility. In addition, column 3 reports results of the regression where we estimate relative growth in fertility separately for second and third-parity children. [27] It shows a relative (to births of first children) increase in third parity children by parity after 2007 and after 2012, and an increase in birth rates of second parity children after 2007. These estimates are consistent with observation that Federal Maternity Capital program gives a subsidy for the second and higher parity child whereas most of the regional programs give a subsidy for the third child by parity.

7.1.2 Cross-regional evidence

To elaborate further on the effect of Maternity Capital programs, we utilize the differences in regional subsidies in a Difference-in-Difference analysis. As was discussed in Section 3, regional programs vary by size. Besides, while most of the Russian regions introduced their own Maternity Capital programs in 2012, some were initiated in 2008, and in some regions, there were no programs at all. Thus, we explore both differences in the size of subsidies and timing of the regional programs.

Now, we analyze the effect of the programs over the long-run period rather than immediate effects documented in Sections 5.1 and 5.2: we estimate the effect of the programs until the last year of available data, 2017. The demographic literature that analyzes fertility over long-run time horizons suggests accounting for changes in age distribution among the female population (see, for example, Schoen, 2004).[28] To deal with this issue, we utilize data on age-specific fertility rates and use the mother's age-specific time trends to control for possible demographic changes in the female adult population. We utilize data on birth rates from 2000 to 2017 and use the following Dif-in-Dif regression:

$$\begin{gathered} Y_{art} = \gamma S_{rt} + \\ + \delta_t + \delta_a + t * \delta_a + \delta_r + t * \delta_r + D'_{rt}\Gamma + u_{art} \end{gathered} \tag{5}$$

where Y_{art} stands for the log of the fertility rate of mothers of age a, in a region r, at year t. To make the results comparable with Section 5.1, we normalize the regional subsidy by the size of the federal one: S_{rt} stands for the ratio of the regional child subsidy to the subsidy that is given by the federal Maternity Capital program. In our data, S_{rt} varies from 0 (region does not give a subsidy) to 1.09 (region gives a subsidy that exceeds the federal one by 9%). The parameter of interest, γ, shows an additional effect of a regional program in a region that introduces a subsidy that exceeds the average regional subsidy by an amount equal to the federal Maternity Capital. Further, δ_r, δ_t, δ_a, $t * \delta_a$, and $t * \delta_r$ stand for regional, year, mother age fixed

[27] The regression specification in this case is following: $Y_{apt} = I(year \geq 2007) * (\gamma_{21} I(parity = 2) + \gamma_{31} * I(parity = 3)) + I(year \geq 2012) * (\gamma_{22} I(parity = 2) + \gamma_{32} I(parity = 3)) + \delta_t + \delta_{ap} + t * \delta_{ap} + u_{apt}$. Control variables and error structure are the same as in regression (4).

[28] For example, Figure A3 in the Appendix shows that the size of a young cohort of the female population starts decreasing in the late 2010s whereas the size of the older cohort increases. If younger women have different fertility rates compared to older women then the change in age distribution may bias aggregate estimates of the effect of reforms. Recall that this concern would not contaminate the RD analysis because the size of the female population did not change discontinuously at the time of the introduction of subsidies (see Figure 5). To confirm this, in the robustness section we show that RD estimates for age-specific birth rates are similar to the main RD specification.

effects, mother-age-specific, and regional time trends respectively. The set of control variables D_{rt} includes log average income and housing availability in a region. Errors are clustered at the regional×year level.

Next, similar to the short-run estimates, we check that Maternity Capital has a stronger effect on the fertility rates in regions with a shortage of housing options and the higher relative price of federal Maternity Capital (relative to the local price of housing). To test this prediction, we use a similar Dif-in-Dif specification and include the interaction of these variables with $I(year \geq 2007)_{rt}$.[29] Note that one can interpret variation in the relative price of Maternity Capital as variation in the real price of federal Maternity Capital (in terms of housing), and thus treat these estimates as additional Dif-in-Dif estimates of the effect of the real price of federal Maternity Capital.

Panel A of Table 5 reports the results of the regressions. Column 1 shows the results of the baseline specification. It shows that in a region that gives Maternity Capital of the same size as the federal one, the average fertility rates grew by 7.3%. Columns 3 to 5 show the results of the regression after excluding time trends. All columns show an effect that is similar in magnitude.[30] Column 2 shows that, in regions with lower availability of housing and regions with higher relative prices of Maternity Capital, the effect of the programs on birth rates is greater: in regions where the housing price and the size of the living area are one standard deviation lower than the mean, fertility increases by an additional 4.2 and 5 percentage points, respectively.

Columns 6 to 9 show the results of regressions in which we check the parallel trend assumption. To do so, we take pre-reform years and regress pre-reform birth rates on the time trend multiplied by the level of a (future) regional subsidy (controlling for time trends and the same covariates as in (4)). This interaction term, $\overline{S_r} * t$, shows the differential time trends in birth rates in regions that give different subsidies. Column 6 shows the result of a regression where we use a sample of all regions in the 2001 to 2007, before all Maternity Capital programs started. Column 7 shows the result of a regression where we look at all years, but look only on those regions and those years where there was no subsidy. Columns 8 and 9 check the robustness of results where additional time trends included in the regressions. Columns 6 to 9 show no difference in pre-reform trends in fertility.

7.2 Cumulative Effect

While previous sections documents separately several effects of the Maternity Capital programs, the cumulative long-run effect of these policies may differ from the simple summation of these effects for several reasons.

On one hand, the cumulative effect may be smaller than the sum of short-run effects because of a re-scheduling effect and because of the selection (to compliers) at the initial stage of the program. Parents respond to the introduction of Maternity Capital by re-scheduling a birth to coincide with the time when the policy is effective rather than by increasing their total number of children they want to have. Also, the program in

[29] The set of additional control variables D_{rt} includes the same variables as in (4) plus housing affordability and interaction of log average income with the federal program dummy.

[30] In the robustness section, we will also look at births by birth order. Unfortunately, the regional-level data on parity-specific birth rates has an important limitation: while the data on all birth rates (without parity) is available for all regions and for the whole time horizon 2000 to 2017, the regional-level data on parity-specific birth rates is available only for half of the regions, and the selection process for this pool of regions is unknown (see Section 4 for discussion). Thus, we leave the discussion of results to the robustness section and treat them as only suggestive.

its initial stage may affect the large pool of parents from the older cohort, which later stages of the program would not affect. For example, a couple that gives birth to a second child right before the program became effective may decide to have a third child after its introduction in order take advantage of the subsidy, whereas a couple that gives birth to a second child right after the program's initiation may choose not to have more children because they already got the subsidy for the second child. On the other hand, the cumulative effect may also be greater for several reasons. First, as discussed earlier, some families do not immediately react to the campaign by giving a birth to a child. It may take time to conceive and for knowledge of the reform, and trust in the program, to become widespread. Finally, the policy may have a cumulative (multiplicative over time) effect, the result of changing in social habits and a preference (see, for example, Maurin and Moschion, 2009, Yakovlev, 2018).

7.2.1 Within-Country Estimates of Long-Run Effect

In this section, we provide a cross-regional analysis of the long-run effect. To do so, we utilize regional data on age-specific fertility rates from 2000 to 2017 and use the following regression:

$$\begin{aligned} Y_{art} = \theta_1 I(year \geq 2007)_{rt} + \theta_2 I(year \geq 2012) + \gamma S_{rt} \\ + \delta_a + t * \delta_a + \delta_r + t * \delta_r + D_{rt}' \Gamma + u_{art} \end{aligned} \tag{6}$$

where Y_{art} stands for the log of the birth rate of mothers of age a, in a region r, at year t. θ_1 and θ_2 show the change in fertility rates across the 2007 to 2017, and 2012 to 2017 periods and γ shows an additional effect of a relative size of regional subsidy. δ_a, $t * \delta_a$,δ_r, and $t * \delta_r$ stand for age fixed effects, age-specific time trends, regional fixed effects, and region-specific time trends, respectively. The set of control variables D_{rt} includes log average income and housing availability in a region.

In the main specification, we include both variables that stay for the effect of regional maternity programs, $I(year \geq 2012)$ and S_{rt}. While these two variables are collinear, we decide to include both of them for several reasons. First, while S_{rt} captures the effect of the variation in size of the subsidy, $I(year \geq 2012)$ may capture the additional effects of the county-wide expansion of regional programs, like making regional programs salient, as well as the effect of some other benefits and features of regional programs rather than the size of the subsidy. Yet, for robustness, we estimate the regression (5), where we include only one of the variables for regional programs, $I(year \geq 2012)$ or S_{rt}.

Table 6 documents the results of the regressions. Column 1 shows, that after accounting for various time trends, the federal program results in an increase in birth rates of 12 percentage points, and the regional programs result in a further increase of 5.9 percentage points.[31] Note that, θ_1 and θ_2 show an average increase in birth rates (over the existing trend) for the 2007 to 2017 and 2012 to 2017 periods, while the RD estimates obtained in the previous section show an immediate (short-run) change. In the absence of post-reform trends, one should not see any differences between RD and long-run estimates, however, in case of rescheduling (see Adda, Dustmann, and Stevens, 2017), the RD estimates should be higher than the average long-run changes. Indeed, results show that an average long-run increase is slightly higher than the sum of the short-run changes. Table 6 also shows, that on the top of a countrywide increase in fertility rate, in a

[31] Recall that the federal program targeted births of second children, while majority of the regional programs targeted births of third children.

region that introduced a subsidy that exceeded the country average by a level equal to federal Maternity Capital, the subsidy results in an additional increase in birth rates of 6% ($\gamma = 0.062$).

The cumulative effect of these three components, θ_1 , θ_2 and γ, is as follows. After 2012, when both waves of Maternity Capital programs were in force, in a region from an upper quartile of the regional subsidy the fertility rate was 20% higher than that in a hypothetical region without a federal and regional subsidy.[32]

Columns 2 to 6 provide robustness checks. Columns 2 and 3 show results of a regression where only one variable that remains for the for regional programs is included ($I(year \geq 2012)$ or S_{rt}). It shows that variable that remains becomes higher in magnitude, implying that it captures the effect of the other variable that was omitted. Columns 4 to 6 show that the results of main specification are robust by including different sets of time trends.

To analyze the long-run effect of the programs on birth rates by parity, we utilize national-level data because the regional-level data is available only for a subset of Russian regions (see Section 3). At the national level, we do not observe regional heterogeneity in size of the subsidies, and the regression specification is

$$Y_{atb} = \theta_1 I(year \geq 2007)_t + \theta_2 I(year \geq 2012)_t + \delta_a + t * \delta_a + D_t'\Gamma + u_{at} \tag{7}$$

where Y_{atb} stands for the log of the birth rate of mothers at age a, at year t and for parity b; θ_1 and θ_2 show the change in fertility rates across the 2007 to 2017, and 2012 to 2017 periods, δ_a, $t * \delta_a$ stand for age fixed effects, and age-specific time trends. Columns 7 to 10 show the results of national-age-level regressions, and similar (or slightly higher) estimates of θ_1 and θ_2. Columns 8 to 10 also show that the federal program affects more births of second children, while the regional programs affect more births of third children.

7.3 Additional Evidence: Birth Spacing, Mother's Age, and Desired Number of Children

This section tests the predictions of the re-scheduling argument, which posits that families might react to the subsidy not by increasing their total number of children, but rather by re-scheduling the timing of a planned birth to occur at an earlier date, thereby becoming eligible for Maternal Capital (see Adda et al., 2017, Schoen, 2004).

This re-scheduling behavior should result in a decrease in time spacing between children and in a decrease in the age at which mothers give birth. At the same time, it should not affect the total number of children a couple desires. We test these predictions using household-level data that comes from the RLMS survey as well as from 2010 Census data.[33] Figure 8 demonstrates how the average interval between births, age of mother, and the desired number of children changes over 2000-2015. Panel A shows data on the time between children using 2010 Census and RLMS data; it shows no change (or a slightly positive change for 2010 Census) in the average spacing between births. Panel B which plots changes in the average age of mothers shows an increase in age and positive changes in the slopes of the trends after 2007; in addition, census data shows a small

[32] The mean value of S_{rt} in the upper quartile of regions by regional subsidy equals 0.35. Thus, the cumulative effect equals 0.35*0.062+ 0.059+0.12 = 0.2.

[33] The data on birth spacing available from RLMS and the 2010 Census microdata. Both these datasets contain information only on the year of birth, thus we are restricted to using only annual-level birth data. The data on the desired number of children is available from RLMS until 2009. For later years it comes from Rosstat.

bump after the introduction of Maternity Capital.[34] Panel C shows that the average number of children that a family would like to have jumped after 2007 from 1.4 to 2. To sum up, all of these figures show patterns that are not consistent to predictions of re-scheduling behavior. Table 7 quantifies the results plotted in Figure 8. It shows, that after controlling for time trend, the average mother's age at birth increases by 0.23 after the introduction of the Maternity Capital program, and that the average desired number of children increases by 0.18. It also shows no effect of Maternity Capital on the time between children. Finally, Figure 9 displays the distribution of the RD effect by the age of the mother and by birth order. It shows that this short-run effect is driven by the increase in the proportions of mothers from age 33 to 40 who gave birth to a second or higher birth order child.

7.4 Robustness Check: Russia vs. Eastern Europe Case Study

As a robustness check, we compare the long-term growth of fertility rates in Russia with Eastern and Central European countries that face similar economic conditions and had similar pre-reform fertility trends.[35] Like Russia, Eastern European countries experienced a drop in fertility rates right after the collapse of the Soviet Union and had similar trends in fertility until 2007. Some of these countries, including Ukraine and Belarus, adopted pro-natalist policies recently (see Frejka and Gietel-Basten, 2016). Thus, we are likely to underestimate the effect of Maternity Capital in this Dif-in-Dif approach. Figure 10 plots the fertility rates for these countries, Russia, and the United States over the 1995 to 2015 period. It shows that, while experiencing similar trends in fertility before 2007, Russia significantly surpassed all the countries from this comparison group after that time.

For the long-run analysis, we employ several measures of fertility that are available in demographic datasets. First, we use the total fertility rate, TFR. Following the demographic literature, we also use Bongaarts-Feeney tempo-adjusted TR measures (Bongaarts and Feeney, 1998) to account for the possible rescheduling of birth rates (the so-called tempo effects; see Sobotka, 2004, Yi and Land, 2001, Schoen, 2004, Sobotka and Lutz, 2001).

To estimate the effect of fertility, we employ two Dif-in-Dif regressions in which we compare the growth of fertility rates in Russia with the control group.

In the first regression, we look at the average growth in fertility in the post-reform years by estimating the following specification:

$$\begin{aligned} Y_{ct} = \theta I(Russia)_c I(year \geq 2007)_{ct} + \alpha I(Russia)_c \\ +\beta I(year \geq 2007)_{ct} + D'_{ct}\Gamma + u_{ct} \end{aligned} \tag{8}$$

In the second regression we look at the year-specific effect on fertility in the post-reform years by estimating the following specification:

$$\begin{aligned} Y_{ct} = \textstyle\sum_{y=2007}^{2015} \theta_y I(year = y)_{ct} I(Russia)_{ct} + \alpha I(Russia)_c \\ + \textstyle\sum_{y=2007}^{2015} \beta_y I(year = y)_{ct} + D'_{ct}\Gamma + u_{ct} \end{aligned} \tag{9}$$

[34] Recall that Figure 5 shows changes in average age among all women of reproductive age (not only mothers). It shows no change in average age among the population of females of reproductive age.

[35] We exclude former Yugoslavian countries because recent war conflicts might have created different demographic patterns. We also exclude Caucasian and Central Asian countries due to their dignificantly higher fertility rates. In our first Dif-in-Dif estimates we use the remaining 14 Eastern and Central European countries as a control group.

In both regressions, the set of controls includes time trend and country-level fixed effects.

Columns 1 to 5 of Table 8 show the results of the regressions with the first control group of countries. For both measures Russia demonstrates significantly higher growth in fertility rates relative to the control group. The effect is economically large: the lowest estimates show that Maternity Capital results in an average increase in fertility across years of 11%, and that the effect becomes stronger over time: in the 2014, the last year of observation, the tempo-adjusted total fertility rates exceed the pre-reform level by 20%. The effect of the reform is higher for the higher birth order birth rate. The total fertility rate increases by 6.2%, 11.2%, and by 25,9% for first, second, third and higher birth order respectively. Again, the effect becomes stronger over time: in 2014, the total fertility rates exceed pre-reform levels by 17%, 21%, 34% for the first, second, third, and higher birth order, respectively.

Columns 6 to 10 show the results of regressions with the second control group. As expected, in this case, the magnitude of the effect is significantly higher (by approximately one half). According to this specification, in 2014, the total fertility rate exceeds the pre-reform level by 33% for all children, and 24%, 35%, and 57% for the first, second, third and higher birth order, respectively.

7.5 Effect on Completed Cohort Fertility Rates

Ideally, to infer a long-run effect on fertility, one would check the effect of the program on the completed fertility rate, i.e., the average number of children that have been born to women who have completed their childbearing years. In our case, this comparison is infeasible because women who have been affected by the program have not yet reached the end of their childbearing years. Thus, to see whether the program already affected completed fertility rates, we simulate its effect in the unrealistically pessimistic scenario in which women from the treatment group stop giving birth completely after 2018, and at the same time, women from a hypothetical control group experience the highest (over the pre-program period, 1992 to 2006, or over whole post-USSR period, 1992 to 2017) growth in fertility.

We perform this simulation in several steps.

First, we take age-specific per-period fertility rates and calculate comparison group by subtracting the effects of the federal and regional Maternity Capital Programs, calculated in Table 6. Then we calculate cumulative fertility rates by summing up per-period fertility for every birth-year cohort. Finally, for the control group, we project a complete cumulative fertility rate under the assumption that women from the control group would experience the highest historical (over both pre- and postprogram years (1992 to 2017) or over only preprogram years (1992 to 2006)) growth in fertility.[36]

Panel A of Figure 11 shows cumulative fertility rates for women aged 30 to 45 in 2017. Panels B and C compare projected completed fertility rates. Panel B uses preprogram years (1992 to 2006) to project maximal change in fertility for control group, and Panel C uses all years (1992 to 2017) to make a projection. Panel B shows that, for Russian women age, 35 to 45 in 2017, the completed cumulative fertility already exceeds that in the control group. Panel C shows the same result for women aged 37 to 45.

Again, we provide a robustness check using a cross-country case study (see Section 6.2). To calculate the

[36]To do so, we use data on age-specific per period cumulative fertility rates for years 1992 to 2017. For every age, we pick the maximum (over years) observed percentage increase in cumulative fertility from this age until age 55. Then, to get a projection for completed fertility rates, we multiply the cumulative fertility rate this age to this maximum historical growth.

cumulative effect of the program, we further compare the cohort cumulative fertility rates in 2006 and 2014.[37] Also, we construct a projected 2016 cohort fertility rate using available data up to 2016 on TFR, and data on age-specific fertility rates until 2014.[38] Figure 12, Panels A and B, show the results of a regression that compares changes in age-specific cumulative fertility rates in Russia and Eastern European countries from 2006 to 2014, and from 2006 to 2016, respectively. To do so, we repeat the Dif-in-Dif regressions described in equation (4) for the years 2006 and 2014 (2016). Figure 12 then shows the Dif-in-Dif coefficients and confidence intervals for regressions for CFR at every particular age. Figure 12 shows that, for any particular age from 20 to 40, the cumulative fertility rate increases by 20% relative to the control group. The growth in fertility is facilitated by births of higher birth order children: while the cumulative fertility for the first child increases by 10%, for higher birth order children, it increases by more than 50%. Thus, one can conclude that the reform results in a significant increase in final cohort fertility for older ages. According to the fertility database, in any year of observation the 99th and 90th percentiles of age at which a mother gives birth to a child does not exceed 40 and 35 years, respectively (see Figure 12). This means that, even in the unrealistically pessimistic scenario where Russian women who are of age 35 to 40 in 2016 stop giving birth completely, the average number of children they will have at the end of childbearing years will exceed that of the control group by at least 15%. Again, the total effect on the births of higher birth order children is higher: in the pessimistic scenario, the share of families that have two or more children will exceed that for the control group by 40%.

8 General Equilibrium Effects

In this section, we discuss the effect of Maternity Capital program on other markets. For the purpose of exposition, we discuss mainly explore the short-run effect of the 2007 federal Maternity Capital program and leave other analyses for future research.

8.1 Maternity Capital and Family Stability

We start with an analysis of the effect of the program on family stability, the pressing public policy concern in Russia. The share of children who live with a single parent constitutes 30% in Russia. This number is higher than that in the United States, where 25% of children live with a single parent, and in any European country.[39] Figure 13 plots short-run changes in the share of children that live with a single parent for families that give birth before and after the Maternity Capital program using 2010 Census data. It shows a significant drop in the share of children who live with a single parent right after the introduction of the federal Maternity Capital program.[40] Table 9 quantifies this short-run effect: columns 1 and 2 show that the

[37]We restrict this analysis to 2014 because there is no data for fertility rates after that year for most of the countries in the control group.

[38]The human fertility database contains data on TFR, age-specific fertility until the year 2014. The data on later years (2015 to 2017) is collected by the authors using different sources (World Bank, CIA World Factbook, and Rosstat).

[39]For a review of family statistics in Rosstat demographic data, see http://www.gks.ru/free_doc/new_site/perepis2010/croc/Documents/portret-russia.pdf for Russia, https://www.pewresearch.org/fact-tank/2018/04/27/about-one-third-of-u-s-children-are-living-with-an-unmarried-parent/ for the United States, and Iacovou and Skew (2011) for the Eurpean Union.

[40]The other evidence of the effect of Maternity Capital on family stability is shown in Figure A4 in the Appendix. That figure demonstrates that the number of children who have been abandoned by parents decreased since 2007 by more than 50%. We have only country-level statistics for this data, therefore do not include it in the main analysis.

share of single parents decreases by 0.008, or by 3.7% compared to the pre-reform level; column 3 shows that the share of unmarried mothers also decreases by 3%. Note that RD estimates show the cumulative effect of the program through two factors: selection to compliers (married couples are likely to participate in the program) and program-induced changes in families (parents are less likely to divorce if they get a Maternity Capital subsidy).

8.2 Maternity Capital and Housing Market

In Sections 5.1 and 6.1 we already showed the connection between the housing market and the Maternity Capital program by documenting a larger effect of the program in regions where the subsidy has a higher value for the housing market. Figure 14 provides further evidence of the effect of the program on the that market. Panel A shows the quarterly and annual indicators of the Russian housing market for a period from 2005 to 2015. It shows an increase in housing prices and the supply of new housing after the announcement of the program at the end of 2006.[41] Panel B uses cross-sectional 2010 Census data to demonstrate the change in housing conditions with the date of childbirth. It shows an increase in the average number of rooms per household member after January 2007. The causal interpretation of the magnitude of the effects that are shown in Figure 14 is suggestive. The effect on the housing market shown in Panel A may be at least partly explained by the development of the mortgage market in Russia. Panel B may, in turn, underestimate the overall change in housing options because of the delay between a birth date and acquisition of Maternity Capital certificate, then buying and moving into a new home. In addition, many mothers in Russia prefer to stay with grandparents, who can offer help with the care of a newborn child, and delay moving into a new home after childbearing (recall that in 2010 Census data those born in 2007 are three years old).

To quantify the effect of Maternity Capital on the housing market in the short-run, we use specification (1) discussed in Section 5.3. In addition, we look at the long-run impact on regional housing prices and the supply of housing. To do so, we use a regional-level analog of regression (5) with an extended set of controls. The set of control variables D_{rt} includes log average real income, log population, and housing availability; the total amount of mortgage credits given by regional banks; average mortgage interest rate, the average term of mortgages; and number of banks, that are certified to give mortgages.

Table 10 shows the estimation results. Panel A1 shows the results of short-run regressions, that children who born after 2007 live in bigger houses (apartments) and their families share housing with other households less often . Panel A2 shows that the federal Maternity Capital program significantly affects local housing markets: it results in an increase in housing prices and construction of new housing by 16% and 14%, respectively. Panel B of shows the results of long-run regressions: a sizable statistically significant effect of the federal Maternity Capital program and smaller and statistically insignificant effect of regional Maternity Capital;

[41]The mortgage market has existed in Russia since the middle of the 1990s, and grew from 0.2% of GDP in 2004 to 2.5% in 2011. Yet, the Russian mortgage market was and is underdeveloped compared to that in Eastern European countries, the European Union and the United States. In 2007 a share of mortgage loans to GDP was 1.5% in Russia compare to 11% in Poland, 40% in the European Union, and more than 60% in the United States. In 2011, the share of mortgage loans to GDP was 2.5%, 19%, 75%, and 40% for Russia, Poland, the United States, and the European Union correspondingly (see http://www.cesifo-group.de/de/ifoHome/facts/DICE/Banking-and-Financial-Markets/Banking/Comparative-Statistics.html). One of the reasons for the small size of a mortgage market is the high price of mortgage in Russia: in 2007 the annual interest rate was 11.4% and 13.7% for mortgages in U.S. dollars and Russian rubles, correspondingly (see Central Bank of Russia, www.cbr.ru).

In the first 12 years after the adoption of Maternity Capital, 5.2 million families uses Maternity Capital for housing. The share of transactions that involved the Maternity Capital subsidy constitutes about one sixth of the total transactions in the housing market.

that Federal Maternity Capital increases housing prices and construction of new housing by 18% and 15%, respectively.[42]

8.3 Cross-Border Effects: Ukraine Case Study

In this section, we document a discontinuous increase in conception rates in Ukrainian regions with a Russian majority relative to regions with a Ukrainian majority right after the introduction of Russian Maternity Capital.

Figure 15 shows monthly data on the differences in birth rates between regions with Russian and Ukrainian majorities. It shows a discontinuous jump in July 2008, at exactly the time of introduction of Maternity Capital in Russia. Figure 16 plots the placebo simulation of the RD estimate for these differences. It confirms the results shown in Figure 15: the difference peaked in July 2008, and disappeared in one year within the introduction of the child subsidy in Ukraine. Finally, Table 11 provides quantitative estimates of the effect. The RD estimates show that Ukrainian regions with a Russian majority experienced a sizable jump in fertility rates. The magnitude of the effect is as follows: in a hypothetical Ukrainian region populated only by people of Russian ethnicity, the fertility rate jumped by 5% compared to a hypothetical region populated by other ethnic groups. This effect is approximately one-half of that in Russia.

We see several possible explanations for the effect: persuasion, peer (relatives) effects, and the intention to buy property in Russia. Recent literature shows that fertility decisions, as well as other family-related decisions, are subject to persuasion (Bassi and Rasul, 2017, Card and Dahl, 2011, Chong, Duryea, and Laferrara, 2012, Della Vigna and Gentzkow, 2010). People of Russian ethnicity in Ukraine watch Russian TV and are exposed to Russian media. Therefore, they are likely to have been affected by a large-scale promotional campaign that accompanied the introduction of Maternity Capital. The second explanation is peer effects. Many Ukrainian families have close relatives on the Russian side of the border and the fertility decisions of those relatives could affect their own (for empirical examples of peer effects see Moretti and Mas, 2009, Maurin and Moschion, 2009, Yakovlev, 2018). Finally, this result may also be driven by the intention to buy property in Russia. To be eligible for Maternity Capital subsidy, one needs Russian citizenship; , but Russian residency is not required. Although dual citizenship is illegal in Ukraine, some families may manage to obtain a second, Russian, citizenship illegally, and then use it to acquire Maternity Capital.[43]

9 Change in Mothers' Characteristics

In this section, we analyze changes in the characteristics of mothers who gave birth before and after the introduction of the program.

For this purpose, we utilize an individual level panel survey, RLMS, that provides a rich set of mothers characteristics at the moment of the birth of a child.[44] We look at women aged 18 to 50 over 2000 to

[42] This result also identifies those who are at a disadvantage because of the program: buyers of homes who did not plan to have a new baby suffer from the rising cost of housing.

[43] The question of which effect prevails is out of scope of this paper.

[44] For this particular analysis, we chose the RLMS survey over census data for two reasons. First, as discussed in Section 7, census data shows the cumulative effect of selection and program effects. In this section, we are primarily interested in quantifying the selection effect. In addition, census data does not contain information on several important personal characteristics that

2015 period, and see how the characteristics of those who give birth changed after 2007 using the following Difference-in-Difference regression:

$$\begin{aligned} Y_{it} = \gamma I(year \geq 2007)_{it} \times I(give\,birth)_{it} + \theta I(year \geq 2007)_{it} + \beta I(give\,birth)_{it} \\ + \delta_t + \delta_r + \delta_a + t * \delta_a + u_{it} \end{aligned} \tag{10}$$

The dependent variable Y_{it} stands for the mother's and her family characteristics; $I(givebirth)$ is an indicator whether a woman gave birth to a child within the last year; δ_t, δ_r δ_a, $\delta_a t$, represent year, regional, age fixed effects and age-specific time trends, respectively. Errors are clustered at the individual level.

The Dif-in-Dif parameter of interest in this model is γ. It shows how the characteristics of women who gave birth in a particular year changed after 2007 compared to those of other women of the same age and region. Table 12 shows the results of regression (8). While most of the effects are statistically insignificant, it supports the notion that the program primarily affects older mothers, married mothers, and families that belong to the top 25% by income of family head.

10 Willingness To Pay for Additional Child

In this section, we roughly calculate how much the Russian government is paying for each additional child born as a result of the program.[45]

While a family receives 10,000 dollars for a child, that does not imply that the government's willingness to pay for the birth of any additional child is equal to the subsidy level.

Willingness To Pay (WTP) is different because of two reasons. On one hand, the government supports not only to those families who decided to give birth to a child because of Maternity Capital (compliers), but also those who would have given birth independent of the subsidy (always-takers). On the other hand, the subsidy increases birth rates not only of second children, but also of first children, for which the government does not offer Maternity Capital.

The rough calculation of WTP is as follows. The Maternity Capital subsidy results in an increase in fertility rates by 7% and 13% for first and higher birth order children respectively (see Table 2). For this increase in fertility, the government pays *all* (100%) families that give birth to second and higher birth order children (10,000 dollars per child). There are approximately equal numbers of births of first and second or higher birth order children. Thus, the government's willingness to pay for the birth of an additional child that is implied by the Maternity Capital program equals 10,000*(100%/(7%+13%)), or approximately 50,000 dollars.

11 Robustness Checks

Table 13 shows the results of various robustness checks of the estimation of the effects on fertility. Columns 1 to 6 of Panel A show the results of an RD estimation using log fertility rates instead of log number of births

are of primary interest for this analysis, such as personal or family income. The disadvantage of the RLMS survey relative to Census data is that birth events are rare in the RLMS. The RLMS surveys on average 10,000 respondents in every round and contains data on average on 150 births per every round of the survey. Thus, we do not have enough power for the hypothesis tests in our regression analysis.

[45]For other examples of empirical studies of WTP see Chay and Greenstone, 2005, Greenstone and Jack, 2015.

as a dependent variable. Columns 7 and 8 of Panel A show the results of an RD estimation for only the resident (non immigrants) population. Panel B shows the results of an RD estimation using the Calonico, Cattaneo, and Titiunik (2014) robust RD estimator. Panel C shows results of regressions where we allow for a transition period of treatment variable from 0 to 1 within a half year before the programs start instead of a discontinuous jump of treatment variable from 0 to 1 at the threshold date (see Clark and Del Bono, 2016, for a similar approach). In all panels, results correspond with our main specification results. Panel D shows the RD estimates using mother age cells, and controlling for age-specific time trends (using 2010 Census data). Estimates are similar to our main specification results. Panel E shows the long-run effect of the program on birth rates for births by parity for a subset of regions using available data on birth rates by parity. It shows estimates of the effect of the program that are similar to the main specification. Table A2 in Appendix documents results of robustness checks for cross-country case study analysis (see Section 6.4). It shows changes in various alternative measures of fertility in Russia compared to Eastern European countries. Table A2 shows results similar to the main specification.

12 Conclusion

This paper documents the strong effect of sizable child subsidies on fertility.

We find that the introduction of the subsidies in 2007 and 2012 resulted in a significant increase in fertility both in the short run and long run. To identify the causal effect of the subsidy in the short run, we apply the regression discontinuity strategy soon after the subsidy's adoption. The short-run effects do not vanish over time. We find that the program created a decade-long increase in fertility of 20% and has already resulted in an increase in completed fertility for a certain cohort of Russian women.

We also find that the subsidy had a substantial general equilibrium effect. It affected the housing market: the price of housing and the supply of new homes increased as a result of the program. And, it affected family stability, resulting in a decrease in the share of single mothers and a higher marriage rates.

Finally, we show that this government intervention comes at a substantial cost: each additional birth induced by the program equals approximately 50,000 dollars.

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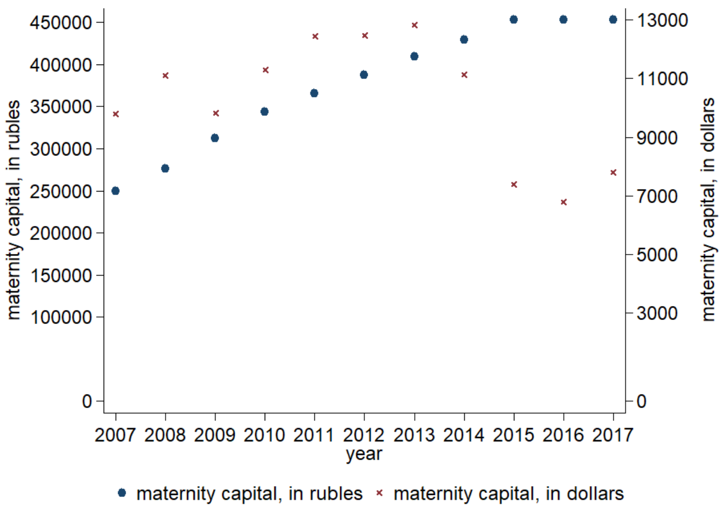
Tables and Figures

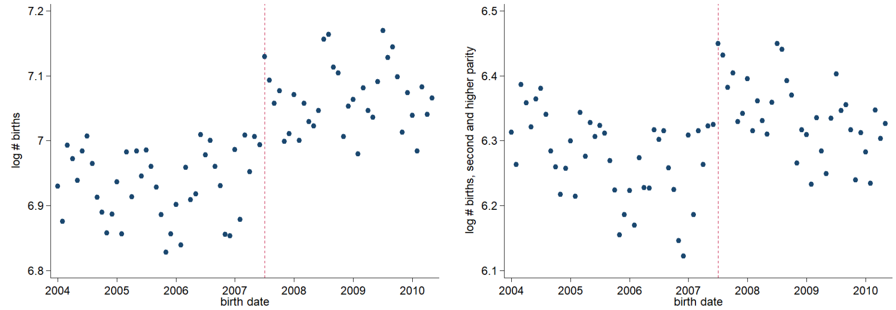
Figure 1: Values of Maternity Capital



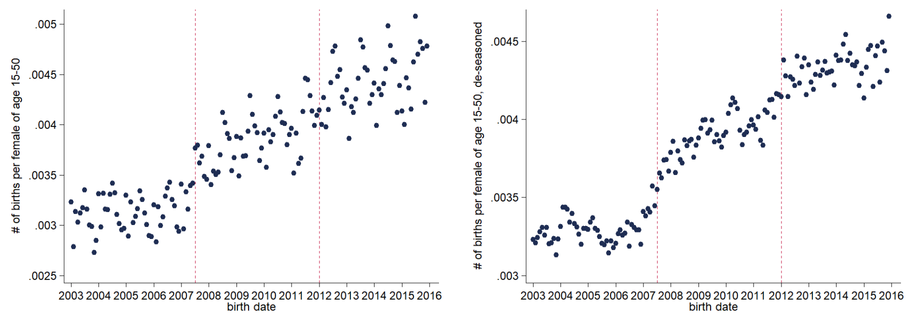
Notes: Graph shows the nominal value of federal Maternity Capital in rubles and dollars. Source: Russian Federation Pension Fund.

Figure 2: Birth Rates

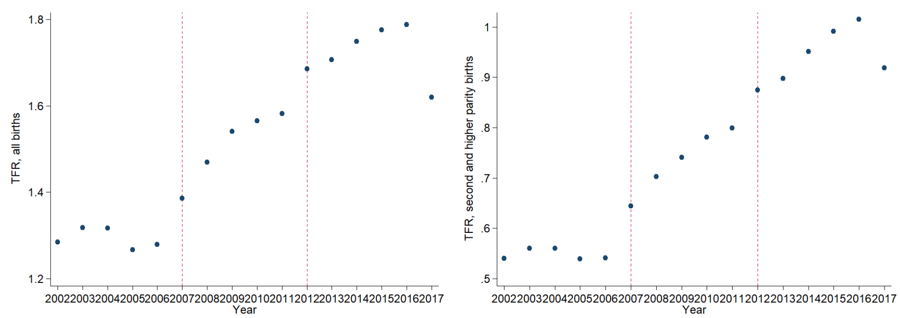
Panel A. Log number of births by birth date, 2003-2010, Census 2010 retrospective data



Panel B. Monthly Fertility Rates, 2003-2016, Rosstat database



Panel C. Total Fertility Rates (TFR) by parity, annual data, 2002-2017, RFMD database



Panel D: Ratio of births of second and higher parity children to births of first-parity children, RFMD database

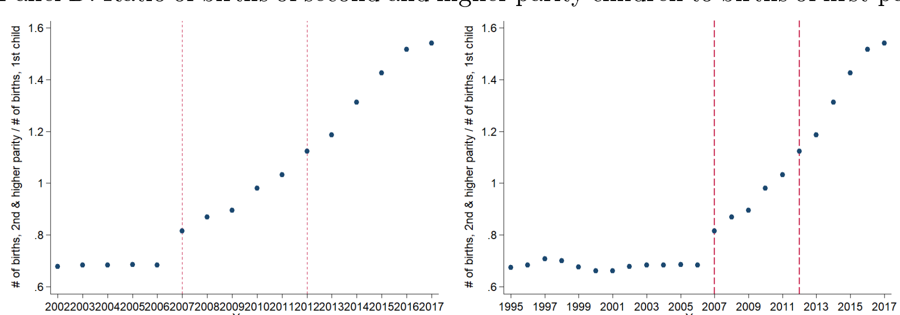
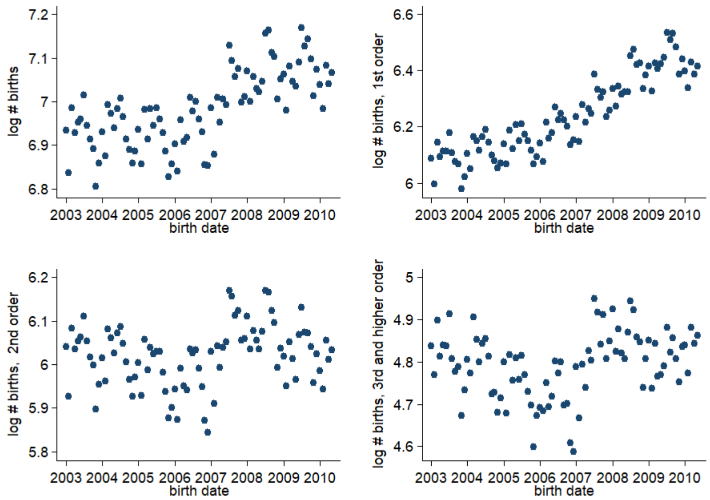
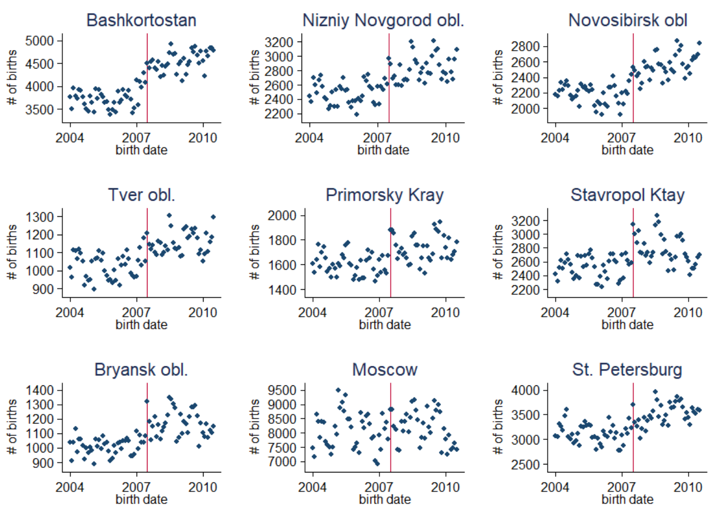


Figure 3: Birth rates in Short Run (by parity)



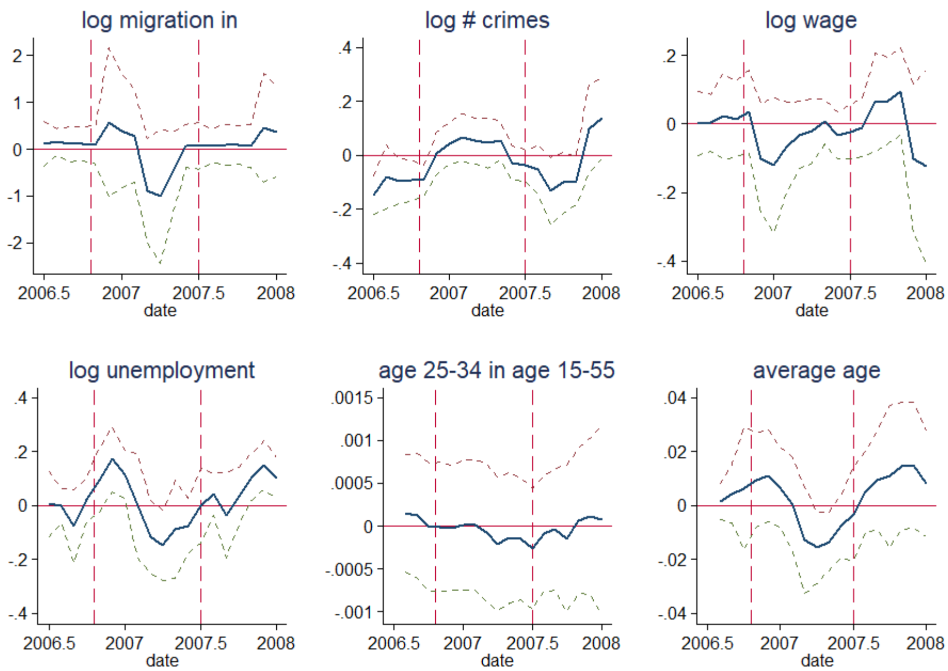
Note: Graph shows the log of monthly counts of births by birth order. Source: Russian Census 2010.

Figure 4: Effect of Maternity Capital, by regions



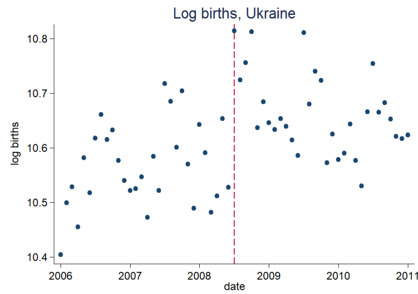
Note: The graph shows the monthly counts of births in different Russian regions. The dashed line stands for the threshold date for Federal Maternity Capital Program. Source: Russian Census 2010. Monthly bins.

Figure 5: RD estimates for regional-level pre-determinate covariates with different placebo dates for threshold



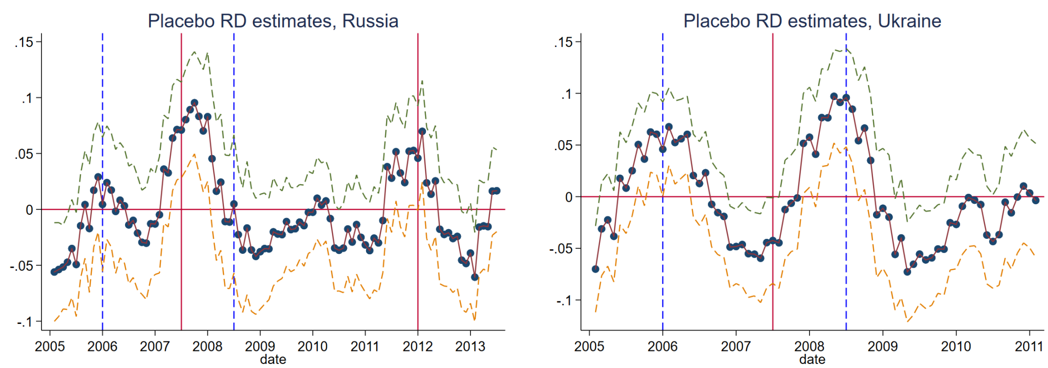
Note: Graphs test for jumps (using placebo RD estimates for different placebo dates) in different covariates. Solid lines represent the announcing date of federal Maternity Capital Program and 9 months after the announcing date. Variables average age and age 25-34 in age 20-55 show characteristics of the distribution of the female population. Variable average age stands for the average age of the female population of reproductive age (age 15-55), variable age 25-34 in age 15-55 stands for share of females aged 25-34 in total female population of age 15-55. Source: Rosstat, www.gks.ru.

Figure 6: Number of births, by birth date. Ukraine



Note: Graph shows the log of monthly counts of births in Ukraine. The dashed vertical line stands for the starting date of the child support program in Ukraine. Source: Ukrstat, http://ukrstat.gov.ua/

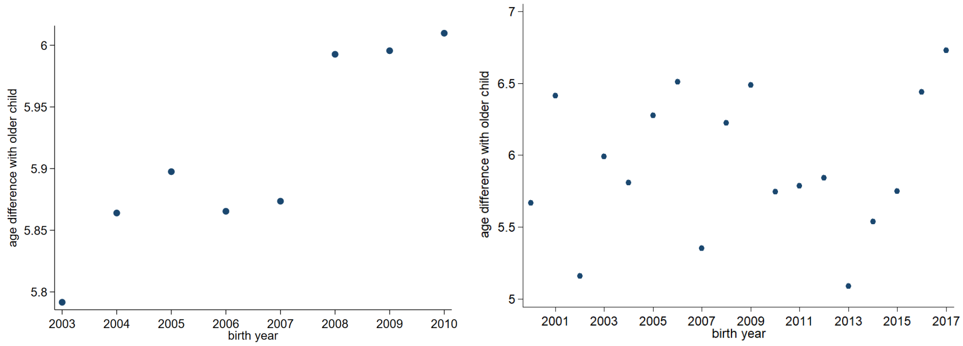
Figure 7: Placebo Experiments for RD estimates in Russia and Ukraine



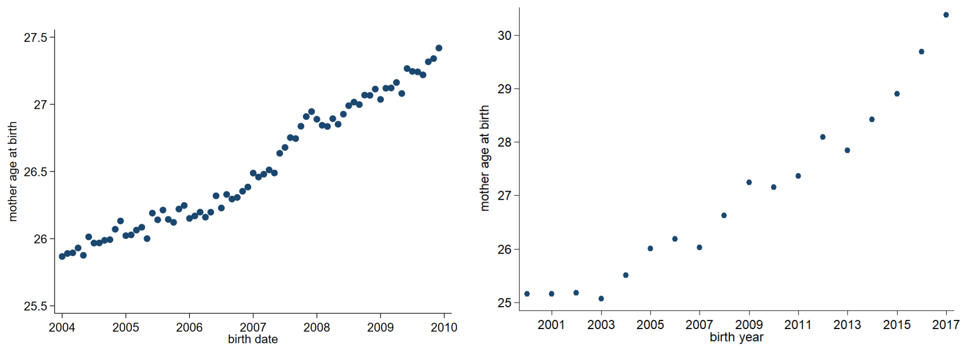
Note: Left and right graphs show RD estimates for different placebo dates of the reform in Russia and in Ukraine correspondingly. Solid vertical lines stand for starting dates of Maternity Capital programs in Russia, dashed vertical lines stand for starting dates of child support programs in Ukraine.

Figure 8: Time spacing between children, mother age, and desired number of children

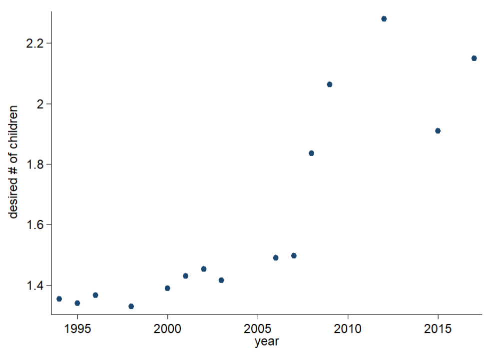
Panel A: Time spacing between births



Panel B: Age of mother

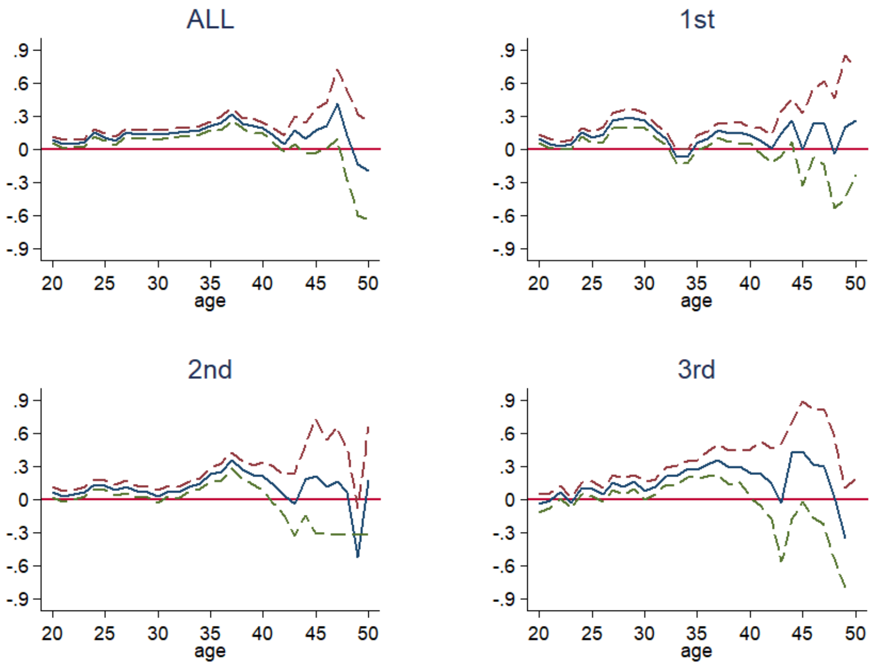


Panel C: Desired size of family



Note: Panel A shows data on time spacing using 2010 Census data (left) and RLMS data (right). Panel B shows changes in the average age of mothers using 2010 Census data (left) and RLMS data (right). Panel C shows that the average number of children that family would like to have according to RLMS (data available for years 1994 to 2009) and Rosstat (data available for years 2010 to 2016).

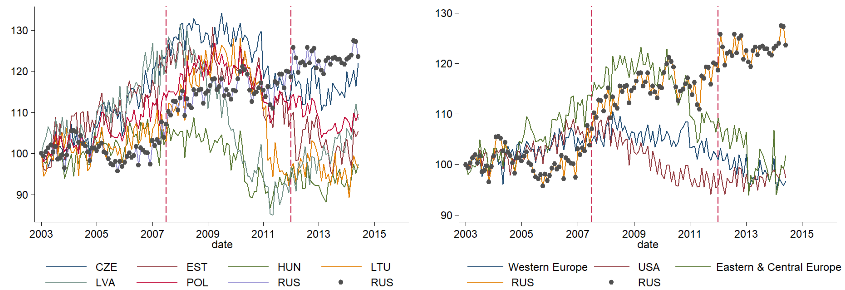
Figure 9: Short-Run effect on births by age of mother and order of child



Notes: Solid lines represent age-specific RD estimates of the effect of the federal Maternity Capital program. Dashed lines represent 95% CI.

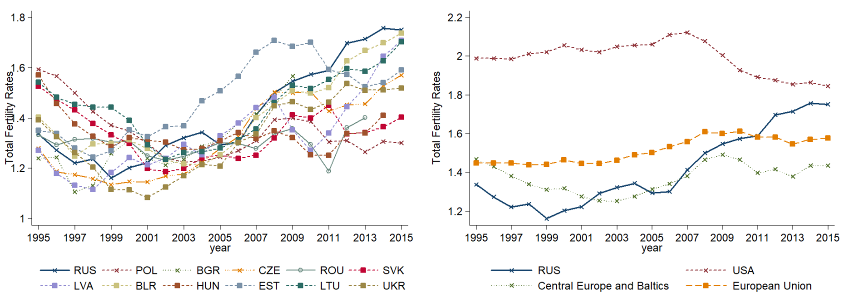
Figure 10: Birth rates in Russia, Eastern European countries, US, and Western Europe

Panel A: Monthly births



Note: Graphs represent normalized monthly births in Russia, Eastern European countries, the United States, and Western Europe. Births are normalized for every country: 2003=100%. A list of Western European countries includes Spain, Austria, Denmark, Finland, Ireland, Italy, France, Portugal, Sweden, Luxembourg, and the Netherlands. List of countries restricted to those for which monthly data is available. Source: http://www.fertilitydata.org/.

Panel B: Total Fertility Rate by country



Note: Graphs show annual TFR (total fertility rate) in Russia, Eastern European countries, the United States, and Western Europe Source: http://www.fertilitydata.org/.

Figure 11: Changes in Age-Specific Cumulative Fertility Rates

Figure A: Cumulative Fertility Rates of Treatment and Control Group

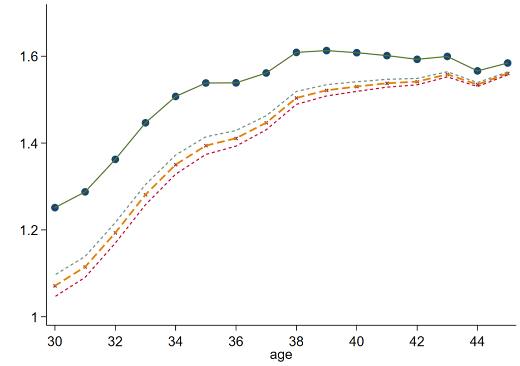
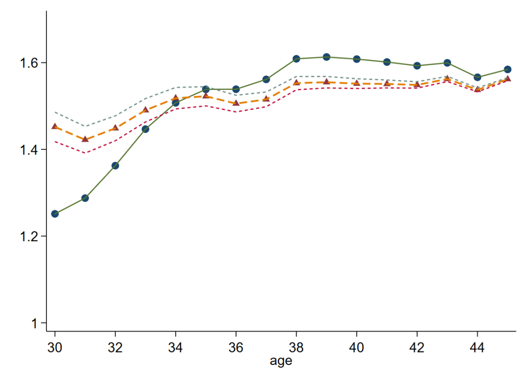
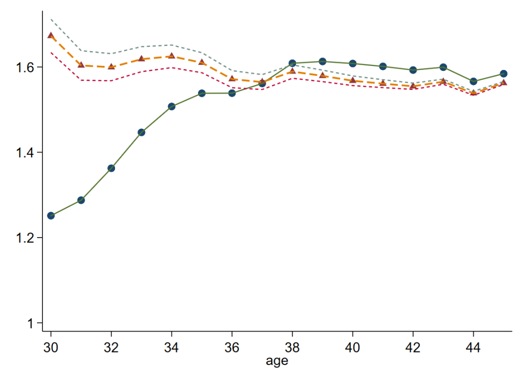


Figure B and C: Cumulative Fertility Rates of Treatment Group and Projected Maximum of Completed Fertility Rate of Control Group





Notes: In all panels: Solid line: treatment group; dashed lines: control group. Panel A shows cumulative fertility rates for females age 30 to 45 in 2017. Panel B and Panel C compare projected completed fertility rates. Panel B uses pre-program years (years 1992-2006) to project maximal change in fertility for control group, and Panel C uses all years 1992-2017 to make a projection.

Figure 12: Changes in Age-Specific Cumulative Fertility Rates

Figure A: Change in CFR, all births: 2006 vs 2014 (Left Panel) and 2006 vs 2016 (Right Panel)

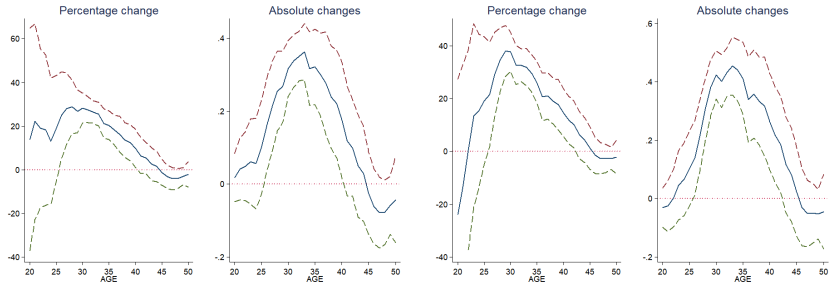
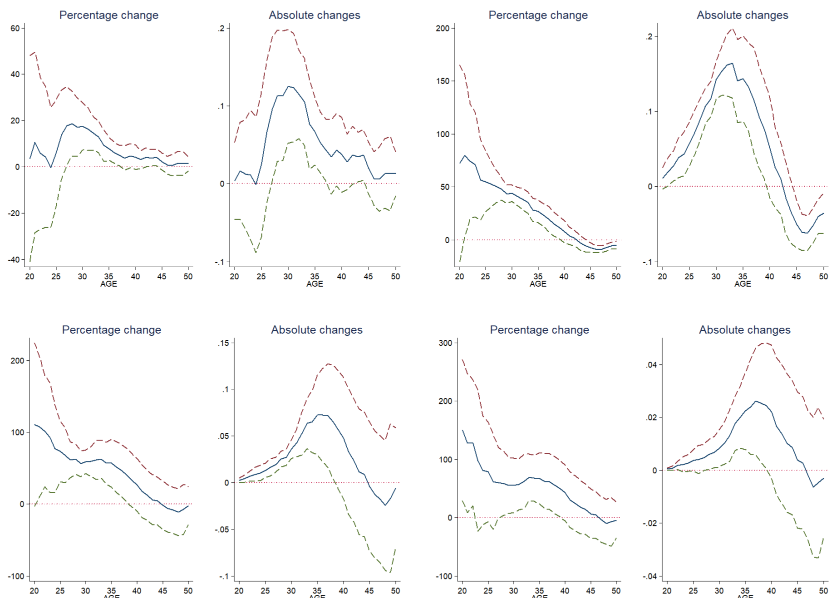
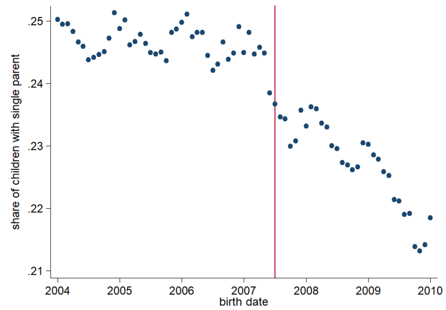


Figure B: Changes in CFR, by birth order: 2006 vs 2014



Notes: The figure shows long-run effect (using Dif-in-Dif estimates) of the effect of the Maternity Capitals on age-specific Cumulative Fertility Rates for all births (top panel) and by birth order (bottom panels).

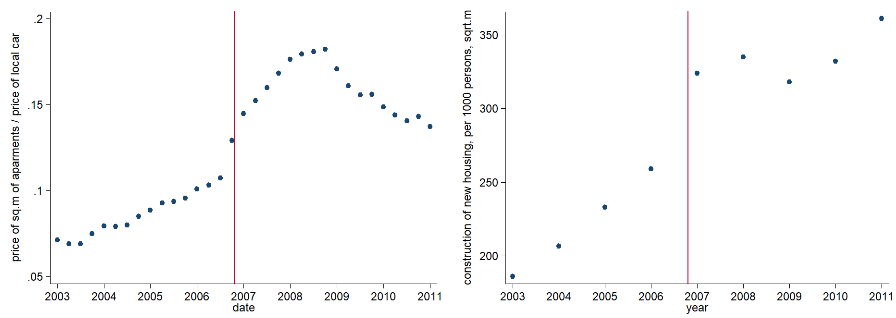
Figure 13: Share of children that live with single parent and Maternity Capital



Notes: Graph show the share of children that are reported to live with single parent by months of (child) birth. Source: Russian Census 2010

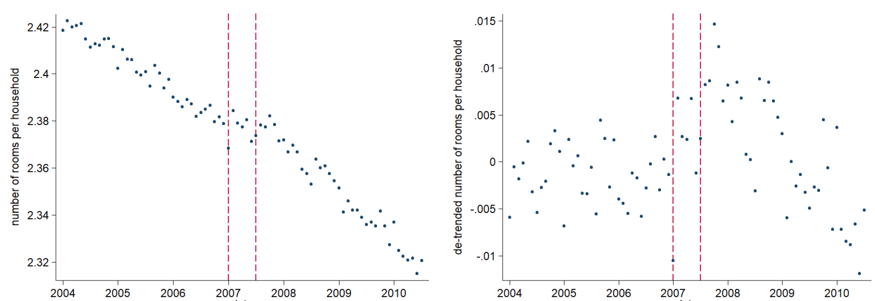
Figure 14: Housing Market, Short Run

Panel A: Housing prices. Panel B: Construction of new houses



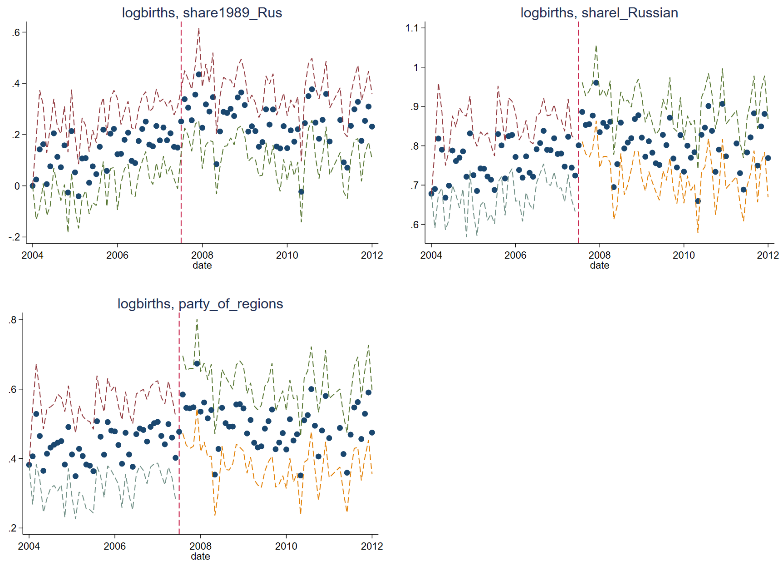
Notes: Left panel shows the quarterly data on average housing prices; right panel shows annual levels of construction of new housing. Source: Rosstat 2015

Panel B: Number of rooms per household member by date of birth, Census 2010



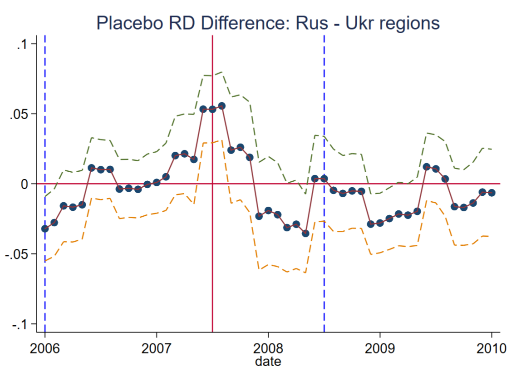
Notes: Left panel shows average # of rooms per household member by date of childbirth. The right panel shows the same variable after subtracting the date-of-birth trend. Source: 2010 Census

Figure 15: Difference in birth rates among Russian and Ukrainian Regions.



Notes: Figures show monthly data on the differences in birth rates among Ukrainian regions with Russian and Ukrainian majority. The dashed vertical line represents the date of the introduction of Maternity Capital in Russia. Panels use different measures of the share of regional population with Russian ethnicity: percent of the population with Russian ethnicity according to 1989 and to 2001 censuses (top two panels), and percent of votes for pro-Russian party of Regions (bottom panel).

Figure 16: Placebo RD estimates of difference in birth rates between regions with Ukrainian and Russian Majority



Notes: Figures show monthly data on the differences in birth rates among Ukrainian regions with Russian and Ukrainian majority.

Tables

Table 1. Summary Statistics

Variable	Obs	Mean	SD	Min	Max
Rayon×month Data, Census 2010					
# of births	228576	48.95	108.4	0	1990
Rooms per HH	228576	2.535	.4127	1.013	4.503
Rooms per cap	228576	.7650	.0941	.386	1.152
Individual Level Surveys, RLMS, females, age 18-50					
I(gave birth)	66771	.0372	.1892	0	1
I(gave birth, order≥2)	66771	.0174	.1309	0	1
Relative wage	53710	1	.235	.590	1.979
I(college)	66771	.3041	.460	0	1
Region×month Data, Rosstat					
net migration	11227	256.9	1796	-5335	53629
log # crimes	12764	7.414	1.080	2.83	10.55
log wage	12674	9.806	.5843	8.02	11.65
log unempl.	13367	2.527	.9252	-1.20	5.930
# of births	13302	1759	1664	9	13627
log TR	6560	8.509	.2018	6.39	9.583
marr./divorce	6708	2.209	3.201	.295	76.38
log house price	6452	10.19	.5002	8.43	12.04
Annual Regional Data, Long Run					
ratio of reg. to federal subsidy	664	.1028	.1730	0	1.085
living area	1239	21.68	3.399	4.2	30.4
log real income	1235	6.004	.567	4.126	7.588
metrs of housing per Mat. Cap.	1065	10.13	3.061	2.821	19.04

Variable	Obs	Mean	SD	Min	Max
Region×month, Census 2010, Fertility Database					
# of births, by birth order					
all	6400	1622	1398	37	9510
1st	9000	705.7	696.5	0	5832
2nd	9000	561.0	511.7	0	3423
3rd	9000	138.6	172.9	0	1565
4th	9000	38.98	74.3	0	723
Share of Single Parents, by birth order					
all	6400	.1928	.0511	.035	.4375
1st	9440	.381	.0640	0	.666
2nd	9440	.188	.0469	0	.6875
3rd	9426	.178	.0792	0	1
4th	9165	.180	.1667	0	1
National Level×month, Census 2010, Fert.Database					
Births, by birth order (thousands)					
all	81	129.8	10.50	109.9	152.8
1st	120	52.93	11.08	0	74.28
2nd	120	42.08	6.642	0	50.30
3rd	120	10.40	1.634	0	12.45
4th	120	2.923	0.488	0	3.640

Note: Source: Rosstat (www.gks.ru), 2010 Census, 2015 Microcensus, Russian Fertility Database (http://demogr.nes.ru/).

Table 2: RD estimates: Effect of Federal MC program (2007) on birth rates

Panel A. National Level Regressions

	(1)	(2)	(3)	(4)	(5)
			log births		
birth order:	all	all	1st	2nd	3rd
I(after 2007)	0.082***	0.089***	0.066***	0.114***	0.144***
	[0.008]	[0.012]	[0.018]	[0.017]	[0.018]
Obs	72	72	72	72	72
Data	HFD		2010 Census		

Panel B. Regional level regressions

	(1)	(2)	(3)	(4)	(5)
			log birth rate		
birth order:	all	all	1st	2nd	3rd
I(after 2007)	0.080***	0.094***	0.081***	0.131***	0.172***
	[0.019]	[0.012]	[0.017]	[0.016]	[0.019]
Observations	6,560	6,400	8,850	8,850	8,845
Data	Rosstat		2010 Census		

Panel C. Rayon level regressions

	(1)
	# of births
I(after 2007)	8.009***
	[2.244]
pp change	.15
Observations	283,339
R-squared	0.001

Panel D. National level regressions with transitional period

	(1)	(2)	(3)	(4)	(5)
			log births		
birth order:	all	all	1st	2nd	3rd
$TR(t)$	0.106***	0.110***	0.077***	0.136***	0.165***
	[0.012]	[0.015]	[0.017]	[0.019]	[0.020]
Obs	73	73	73	73	73
Data	HFD		2010 Census		

Notes: Table 2 shows the results of the RD estimates of the effect of maternity capital on birth rates by parity. Panels A, B, C show coefficients and standard errors for RD regressions based on nation$\times$month, region$\times$month, and rayon $\times$month levels respectively. In Panel D, the treatment variable $TR(t)$ equals one for dates of birth later than September 1, 2007, and zero for dates before March 1, 2007, and increases linearly from 0 to 1 in a half-year period between March 1, 2007, and September, 1, 2007. Counts of births instead of the log of counts of births are used in Panel C (rayon-level) because counts of births contain zero values. Robust standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Local Heterogeneity in Short-Run effect

Panel A: Regional Level Data				
	(1)	(2)	(3)	(4)
		log birth rate		
birth order	all births	all births	all births	births of 2nd child
After 2007×	-0.006***		-0.007***	-0.025**
living area	[0.001]		[0.001]	[0.012]
After 2007 ×		0.007***	0.002	0.019***
meters per MC		[0.002]	[0.002]	[0.002]
After 2007×			-0.034**	-0.014***
log income			[0.013]	[0.002]
After 2007	0.080***	0.081***	0.081***	0.131***
	[0.019]	[0.019]	[0.019]	[0.016]
Observations	6,396	6,240	6,240	8,468
R-squared	0.461	0.246	0.497	0.341

Panel B: rayon-level data		
	(1)	(2)
VARIABLES	# of births	# of births
After 2007 ×	-21.174***	
Rooms per capita	[3.809]	
After 2007 ×		-2.308***
Rooms per household		[0.675]
After 2007	7.548***	7.548***
	[1.515]	[1.515]
Observations	223,814	223,814
R-squared	0.034	0.016

Notes: Table 3 shows the differential short-run effect of Maternity capital on birth rates in different localities. In regions with a shortage of housing or more affordable housing, the effect of maternity capital is bigger. Counts of births instead of the log of counts of births are used in Panel B (rayon-level) because counts of births contain zero values. Robust standard errors in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4: Short-Run Effect of Regional Maternity Capitals on Fertility

Panel A. National Level Regressions

	(1)	(2)	(3)	(4)	(5)
			log births		
birth order:	all	all	1st	2nd	3rd
I(after 2012)	0.047***	0.037**	0.055**	0.021	0.058*
	[0.012]	[0.017]	[0.020]	[0.022]	[0.029]
Observations	71	71	71	71	71
Data source	HFD		2015 Micro Census		
Level			Nation×month		

Panel A. Regional Level Regressions

	(1)	(2)	(3)	(4)	(5)
			log births		
birth order:	all	all	1st	2nd	3rd
I(after 2012)	0.048**	0.043***	0.084***	0.011	0.101***
	[0.024]	[0.015]	[0.026]	[0.019]	[0.033]
Observations	5,460	2,214	2,214	2,213	2,195
Data source	Rosstat		2015 Micro Census		
Level	Region ×month		Region × quarter		

Panel C. National level regressions with transitional period

	(1)	(2)	(3)	(4)	(5)
			log births		
birth order:	all	all	1st	2nd	3rd
$TR(t)$	0.060***	0.038**	0.055**	0.030	0.062
	[0.013]	[0.017]	[0.024]	[0.022]	[0.040]
Observations	73	73	73	73	73
Data source	HFD		2015 Micro Census		
Level			Nation×month		

Notes: Table 5 shows the results of the RD estimates of the effect of Regional Maternity Capital on birth rates by parity. Panels A and B show coefficients and standard errors for RD regressions based on nation×month, region×month (quarter) data. In Panel C, the treatment variable $TR(t)$ equals one for dates of birth later than March 1, 2012, and zero for dates before October 1, 2011, and increases linearly from 0 to 1 in a half-year period between October 1, 2011, and March 1, 2012. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Difference-in-Difference Effect on Fertility

Panel A: Relative increase in birth rates of higher-parity children.

	(1)	(2)
	Log Fertility Rate	
γ_{21}: $I(year \geq 2007)\times$ $I(parity \geq 2)$	0.116***	
	[0.035]	
γ_{22} : $I(year \geq 2012)\times$ $I(parity \geq 2)$	0.061	
	[0.037]	
$\gamma_{21} + \gamma_{22}$	0.177***	
	[0.053]	
$t \times I(parity \geq 2)$		-0.003
		[0.010]
Observations	1,116	434
R-squared	0.966	0.967
Time span	2000-2017	2000-2006

	(3)		
	Log Fertility Rate		
γ_{21}: $I(year \geq 2007)\times$ $I(parity = 2)$	0.137***		
	[0.039]		
γ_{22} :$I(year \geq 2012)\times$ $I(parity = 2)$	0.010	$\gamma_{21} + \gamma_{22}$	0.147**
	[0.043]		[0.064]
γ_{31}: $I(year \geq 2007)$ $I(parity = 3)$	0.109***		
	[0.038]		
γ_{32}: $I(year \geq 2013)\times$ $I(parity = 3)$	0.154***	$\gamma_{31} + \gamma_{32}$	0.262***
	[0.038]		[0.055]
Observations	1,672		
R-squared	0.942		
Time span	2000-2017		

Panel B: Cross-regional Difference-in-Difference

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Log Fertility Rate								
S_{rt}	0.073***	0.055***	0.117***	0.119***	0.071***				
	[0.023]	[0.020]	[0.027]	[0.027]	[0.022]				
$I(year \geq 2007)\times$ meters per MC		0.012***							
		[0.004]							
$I(year \geq 2007)\times$ living area		-0.014***							
		[0.003]							
$\overline{S_{rt}} * t$						-0.005	0.008	0.003	-0.005
						[0.010]	[0.010]	[0.010]	[0.010]
Observations	47,926	47,220	47,926	47,926	47,926	33,036	20,810	20,810	33,036
R-squared	0.974	0.975	0.964	0.973	0.964	0.964	0.971	0.972	0.970
Time span			2000-2017				2000-2006		
Regional, Year, Age FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
age-specific trends	YES	YES		YES				YES	YES
time trend			YES			YES	YES		
region-specific trends	YES	YES			YES				

Notes: Panel A shows differential effect of the Maternity Program on higher parity children using nationalXage specific data. Age and order-specific time trends, as well as year, age and parity fixed effects are included in all regressions of Panel A. Panel B estimates the differential effect of regional Maternity Capital programs, with control for local economic conditions, regional specific and mother age-specific trends. In all regressions, robust standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Long-Run Effect on Fertility Rates: Within country analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log Fertility Rate							
birth order:	all	all	all	all	all	1st	2nd	3rd
$\theta_1 : I(year \geq 2007)$	0.140***	0.136***	0.112***	0.109***	0.160***	0.055*	0.137***	0.137***
	[0.009]	[0.009]	[0.008]	[0.008]	[0.020]	[0.031]	[0.034]	[0.043]
$\theta_2 : I(year \geq 2012)$	0.080***	0.059***	0.107***	0.090***	0.110***	0.048*	0.053	0.154***
	[0.009]	[0.011]	[0.007]	[0.008]	[0.025]	[0.026]	[0.047]	[0.050]
S_{rt}		0.151***		0.117***				
		[0.026]		[0.024]				
$\theta_1 + \theta_2$	0.220***	0.195***	0.219***	0.200***	0.270***	0.103**	0.190***	0.290***
	[0.014]	[0.015]	[0.012]	[0.013]	[0.035]	[0.048]	[0.066]	[0.078]
Observations	47,926	47,926	47,926	47,926	736	704	702	690
R-squared	0.973	0.973	0.973	0.973	0.997	0.996	0.996	0.993
Data	Region×Age				Nation×Age			
Age trends	YES	YES	YES	YES	YES	YES	YES	YES
Regional FE	YES	YES	YES	YES				
Age FE	YES	YES	YES	YES	YES	YES	YES	YES
Regional trends			YES	YES				

Notes: Table 6 estimates the long-run effect of Federal and Regional Maternity Capital programs on birth rates by parity. The data on age (of mother) specific birth rates is used in regressions, both and national and at regional levels. The long run effect is estimated as a sum of two (DIF) effects of Federal Maternity Capital Program, I(after 2007) and Regional Maternity Capital Programs, I(after 2012)), and differential effect of Regional Maternity Capital Programs (DIF-in-DIF, $(S_{rt} - \overline{S})$), with control for regional specific and mother age specific trends and for regional-specific and mother age specific fixed effects; average income and housing availability. Robust standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1

Table 7: Changes in Mother Age at Births, Time Spacing between Births and Desired Number of Children

	(1)	(2)	(3)	(4)	(5)	(6)
	mother age at birth		age difference with older child		desired number of children	
I(after 2007)	0.230***	0.256	0.010	-0.258	0.180***	0.058**
	[0.030]	[0.252]	[0.046]	[0.342]	[0.025]	[0.025]
I(after 2007)*t	0.068***	0.311***	0.026	-0.013		0.258***
	[0.017]	[0.055]	[0.022]	[0.072]		[0.012]
t	0.182***	0.068	0.016	0.020	0.039***	0.005
	[0.009]	[0.047]	[0.019]	[0.064]	[0.004]	[0.004]
Observations	72	7,264	198,665	3,130	12,298	12,298
R-squared	0.986	0.062	0.000	0.000	0.075	0.108
Data source	Census 2010	RLMS	Cencus 2010 microdata	RLMS	RLMS	RLMS

Note: Robust standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1

Table 8: Long-Run Effect on Total Fertility Rates: Russia vs Eastern Europe Case Study

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	TR	adjTFR	adjTFR1	adjTFR2	adjTFR3	TR	adjTFR	adjTFR1	adjTFR2	adjTFR3
A)										
Russia$\times I(year \geq 2007)$	0.147***	0.212***	0.056	0.070***	0.057***	0.191***	0.340***	0.115**	0.105**	0.078***
	[0.030]	[0.064]	[0.034]	[0.021]	[0.010]	[0.037]	[0.059]	[0.035]	[0.026]	[0.008]
Percentage change:										
2000/6 vs 2007/14	.084	.122	.065	.118	.281	.109	.195	.135	.177	.383
B)										
Russia×I(2007)	0.027	0.060	0.011	0.008	0.024**	0.044	0.138*	0.076*	0.007	0.033*
Russia×I(2008)	0.048	0.159**	0.018	0.071***	0.045***	0.073*	0.286***	0.107**	0.090***	0.055***
Russia×I(2009)	0.076**	0.229**	0.054	0.086***	0.063***	0.112**	0.359***	0.153**	0.091***	0.076***
Russia×I(2010)	0.130***	0.151**	-0.004	0.060**	0.065***	0.197**	0.252**	0.039	0.083**	0.083***
Russia×I(2011)	0.169***	0.163*	0.030	0.047	0.059***	0.237***	0.318**	0.062	0.122**	0.086***
Russia×I(2012)	0.237***	0.360***	0.138**	0.108**	0.079***	0.298***	0.538***	0.178**	0.193***	0.114***
Russia×I(2013)	0.249***	0.389***	0.150**	0.125**	0.072***	0.300***	0.580***	0.202***	0.206***	0.115***
	[0.041]	[0.112]	[0.049]	[0.051]	[0.019]	[0.045]	[0.060]	[0.050]	[0.027]	[0.009]
Russia×I(2014)	0.244***					0.284***				
	[0.046]					[0.065]				
Percentage change:										
2014 vs 2006	.139	.223	.176	.21	.355	.162	.333	.238	.347	.565

Note: Table 8 compares long-term growth in fertility rates in Russia with Eastern and Central European countries. All regressions use country-level data on tempo-adjusted fertility rates by parity. In regressions shown in columns 1 to 5 all Eastern European Countries are in the control group. In regressions shown in columns 6 to10 Eastern European Countries that have not introduced pro-natalist policies are in the control group. In all regressions, country FE, time trends are included. Robust standard errors in brackets. *** p<0.01, ** p<0.05,* p<0.1.

Table 9: Short-Run Effect of Maternity Capital on Family Outcomes

	(1)	(2)	(3)
	share of families with a single parent		share of married mothers
I (After 2007)	-0.008***	-0.007***	-0.004***
	[0.001]	[0.001]	[0.001]
Observations	6,240	73	73
R-squared	0.050	0.96	0.538
value of dep.var. at t=0	0.22	0.22	0.132
percentage change	-3.7%	-3.2%	-3%

Notes: Table 9 shows the results of the RD estimates of the effect of Federal maternity capital on family outcomes. We use both the share of married parents and share of single parents as dependent variables because a couple may be married, but not live together. Robust standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1. Data source: 2010 Census.

Table 10: Maternity Capital and Housing Markets

Panel A: Short-run Effect, 2007 Federal Maternity Capital

Panel A1: Regional housing markets

	(1)	(2)	(3)
	log real price, 1 sq.m new	log real price, 1 sq.m secondary	log construction of new housing
I(after 2007)	0.160***	0.196***	0.116***
	[0.037]	[0.034]	[0.029]
Observations	5,629	7,418	580
R-squared	0.322	0.332	0.086

Panel A2: Housing characteristics, Census 2010

	(3)	(4)
	number of rooms per household member	live with other households
I(after 2007)	0.010***	-0.002***
	[0.002]	[0.000]
Observations	73	73
R-squared	0.979	0.651

Panel B: Long-run Effect

	(1)	(2)	(3)
	log real price, 1 sq.m new	log real price, 1 sq.m secondary	log construction of new housing
$I(year \geq 2007)$	0.187***	0.162***	0.147***
	[0.022]	[0.027]	[0.046]
$I(year \geq 2012)$	0.043***	0.026	0.021
	[0.016]	[0.016]	[0.040]
Log real income	0.280***	0.411***	0.589***
	[0.083]	[0.089]	[0.191]
log population	-0.035	-0.377	-2.165**
	[0.545]	[0.535]	[1.059]
Housing availability	0.013	-0.030	-0.040
	[0.016]	[0.020]	[0.027]
log # banks	0.001	-0.047	-0.039
	[0.042]	[0.043]	[0.059]
log credits	0.081***	0.114***	0.101***
	[0.017]	[0.020]	[0.028]
Term credit	0.002***	0.002***	0.000
	[0.000]	[0.000]	[0.001]
Interest rate	0.000	0.003	0.026*
	[0.008]	[0.012]	[0.014]
Time trend	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes
Observations	651	694	697
R-squared	0.540	0.600	0.559
Number of id	76	79	79

Notes: Panel A shows the short-run effect of Federal Maternity Capital. Panel A1 shows the results of regressions at× date level. Housing price data is available at the quarterly level; data on the construction of new housing is available at the annual level. The childbirth date is a running variable in Panel 2. The childbirth date is at the monthly level. Panel B of Table 10 shows the effect of Federal and Regional Maternity Capitals on the regional housing markets. Robust standard errors are in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 11: Effect of Russian Federal Maternity Program on birth rates in Ukraine

	(1) log births	(2) log births	(3) log births	(4) log births
$I(year \geq 2007)\times$ share of Russian population (census 2001)	0.047***			
	[0.012]			
$I(year \geq 2007)\times$ share of Russian population (census 1989)		0.110***		
		[0.019]		
$I(year \geq 2007)\times$ share of votes for party of regions			0.055***	
			[0.013]	
$I(year \geq 2007)\times$ I(Russian majority)				0.023***
				[0.006]
$I(year \geq 2007)$	0.011	0.010	0.011	0.011
	[0.022]	[0.022]	[0.022]	[0.022]
Observations	1,971	1,898	1,971	1,971
R-squared	0.045	0.297	0.055	0.076

Notes: Table 11 shows the effect of Maternity Capital in Russia on birth rates in Ukraine. It shows that differences in birth rates between regions with Russian and Ukrainian majorities jump after the introduction of federal Maternity Capital in Russia. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 12: Family characteristics before and after program

Panel A: Sample: females age 18-50; Regression controls for age, region, and year fixed effects, and age-specific time trends

	(1)	(2)	(3)	(4)	(5)	(6)
	mother:	mother:	quantiles by head of household income			grandfather
	I(married)	I(college)	bottom 25%	middle 50%	top 25%	college
$I(year \geq 2007)$	0.029	0.008	-0.031	-0.014	0.044**	-0.018
$\times I(give\, birth)$	(0.020)	(0.018)	(0.019)	(0.022)	(0.018)	(0.018)
Observations	66,771	66,771	65,920	65,920	65,920	47,678
R-squared	0.116	0.103	0.113	0.070	0.199	0.09

Panel B: Sample: females age 25-50; regression controls for age, region, and year fixed effects, and age-specific time trends

	(1)	(2)	(3)	(4)	(5)	(6)
	mother:	mother:	quantiles by head of household income			grandfather
	I(married)	I(college)	bottom 25%	middle 50%	top 25%	college
$I(year \geq 2007)$	0.074***	-0.006	-0.049*	-0.000	0.050*	-0.044*
$\times I(give\, birth)$	(0.028)	(0.029)	(0.029)	(0.032)	(0.027)	(0.027)
Observations	50,304	50,304	49,597	49,597	49,597	37,060
R-squared	0.042	0.099	0.139	0.085	0.208	0.098

Panel B: Sample: females age 18-50; unconditional effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	mother:	mother:	quantiles by head of household income			grandfather:	mother:
	I(married)	I(college)	bottom 25%	middle 50%	top 25%	I(college)	age
$I(year \geq 2007)$	0.078***	0.047**	-0.045**	0.004	0.041**	-0.018	1.861***
$\times I(give\, birth)$	(0.020)	(0.020)	(0.020)	(0.023)	(0.020)	(0.019)	(0.260)
Observations	66,771	66,771	65,920	65,920	65,920	47,678	66,771
R-squared	0.010	0.011	0.001	0.016	0.019	0.002	0.021

Notes: Table 12 shows the changes in mothers' characteristics after the introduction of Maternity Capital programs. It shows how characteristics of women who gave birth in a particular year changed after 2007 compared to changes in characteristics of other women of the same age and the same region. Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 13: Robustness check

Panel A. Short Run Effect on Log Birth rates. Federal MC program

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	log fertility rate, all births						log births	
I(after)	0.082***	0.090***	0.069***	0.085***	0.050**	0.054***	0.094***	0.060***
	[0.008]	[0.013]	[0.017]	[0.013]	[0.023]	[0.012]	(0.018)	(0.016)
Data	HFD	Census	Rosstat	Census	HFD	Rosstat	Census	Census
sample	National×month		Regional×month		National×month		Residents, national×month	
	Federal (2007) MC				Regional (2012) MC		Federal MC	Regional MC

Panel B. CCT Regression Discontinuity estimates. Federal MC program

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	log births							
Birth order	all	1st	2nd	3rd	all	1st	2nd	3rd
	National×month level data				Regional×month level data			
Robust RD	0.079***	0.086**	0.094***	0.120***	0.095***	0.091***	0.100***	0.085
	[0.026]	[0.035]	[0.032]	[0.038]	[0.029]	[0.028]	[0.025]	[0.062]
bandwidth	1.951	1.766	1.721	2.096	.66	1.056	1.005	1.302

Panel C. Estimates with a half-year transition period of treatment variable.

	(1)	(2)	(3)	(4)
	log fertility rate, all births			
I(after)	0.092***	0.076***	0.067***	0.063***
	[0.011]	[0.010]	[0.012]	[0.005]
Data	National	Regional	National	Regional
	Federal (2007) MC		Regional (2012) MC	

Panel D. Age of Mother cells. Federal and Regional MC programs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log Fertility Rate				Log Fertility Rate			
birth order	all	1st	2nd	3rd	all	1st	2nd	3rd
RD	0.107***	0.058***	0.154***	0.122***	0.059**	0.044	0.102***	0.086*
	[0.025]	[0.020]	[0.034]	[0.028]	[0.023]	[0.035]	[0.037]	[0.045]
	Federal (2007) MC				Regional (2012) MC			

Panel E. Long-Run effect for births by parity, regional-level regressions

	(1)	(2)	(3)
	Log Fertility Rate		
birth order:	1st	2nd	3rd
$(S_{rtb} - \overline{S}_b)$	0.042		0.156***
	[0.052]		[0.041]
$I(year \geq 2007)$	0.098***	0.189***	0.165***
	[0.008]	[0.009]	[0.011]
$I(year \geq 2012)$	0.061***	0.079***	0.183***
	[0.009]	[0.009]	[0.009]

Notes: Table 13 shows the results of various robustness checks of the estimation of the effects on fertility. Columns 1 to 6 of Panel A show the results of an RD estimation using log fertility rates instead of the log number of births as a dependent variable. Columns 7 and 8 of Panel A show the results of an RD estimation for only resident (without immigrants) population. Panel B shows the results of an RD estimation using CCT regression discontinuity estimator. Panel C shows results of regressions where we allow for a transition period of treatment variable from 0 to 1 within a half of year before the programs start instead of a discontinuous jump of treatment variable from 0 to 1 at the threshold date. Panel D shows the RD estimates using mother age cells, and controlling for age-specific time trends. Panel E shows the long-run effect of the program on birth rates for births by parity using available for a subset of regions data on birth rates by parity. In all panels robust standard errors are in brackets, *** p<0.01, ** p<0.05, * p<0.1.

APPENDIX

Figure A1. RD estimates for different bandwidth sizes

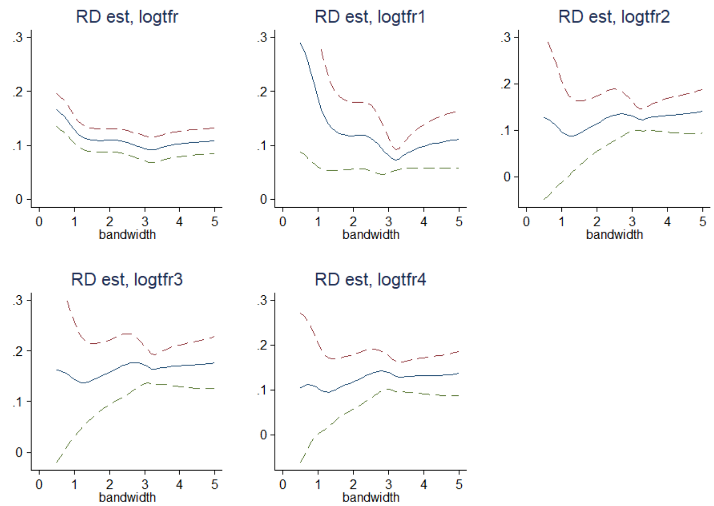
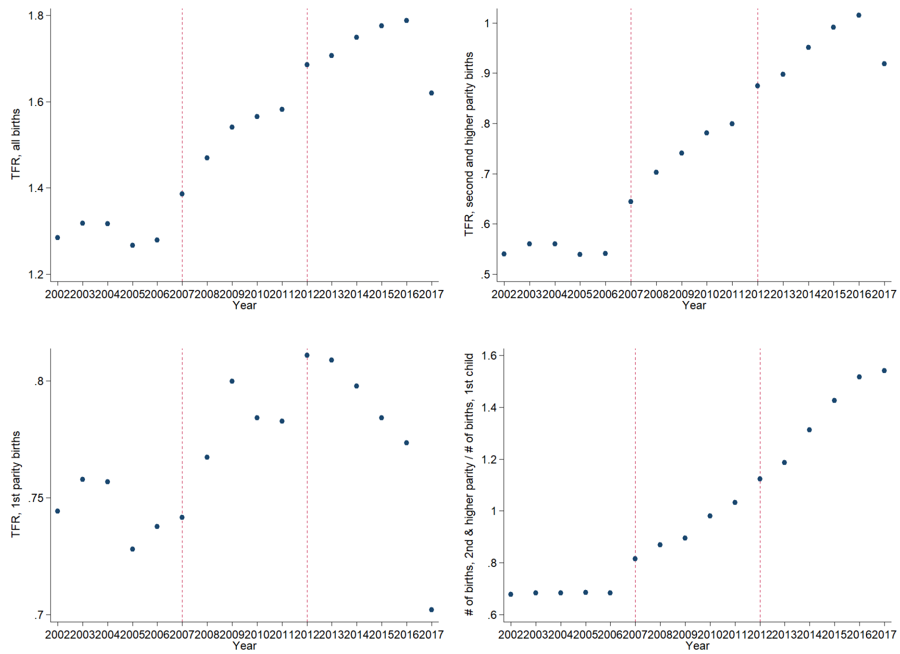


Figure A2. Effect of of the Maternity Capital on TFR and decomposition of births



Note: First figure (left) shows TFR for all births; second figure (right) shows TFR for second and higher-order births, the third figure shows TFR for 1st order births. The drop in TFR in 2017 shown in Figure A1 may happen partly because families scheduled giving birth within the initially proposed 10-year interval of Maternity Capital. Forth figure (bottom, right) shows ratio of births of second and higher parity children relative to # of births of first children.

Figure A3. Size of age cohorts of female population over 2000-2017.

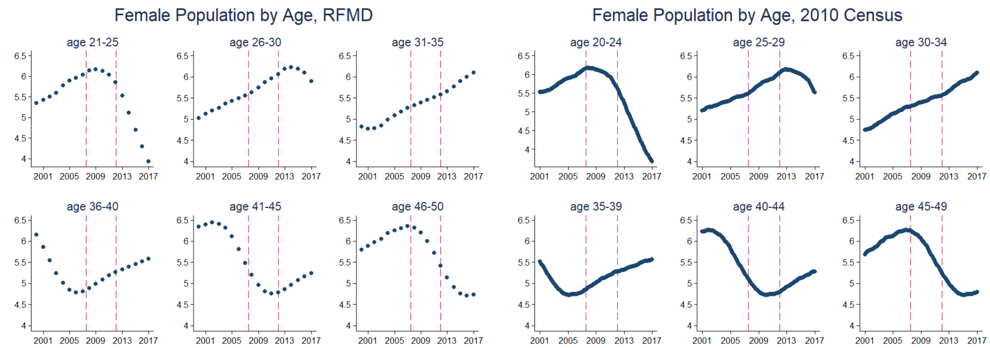
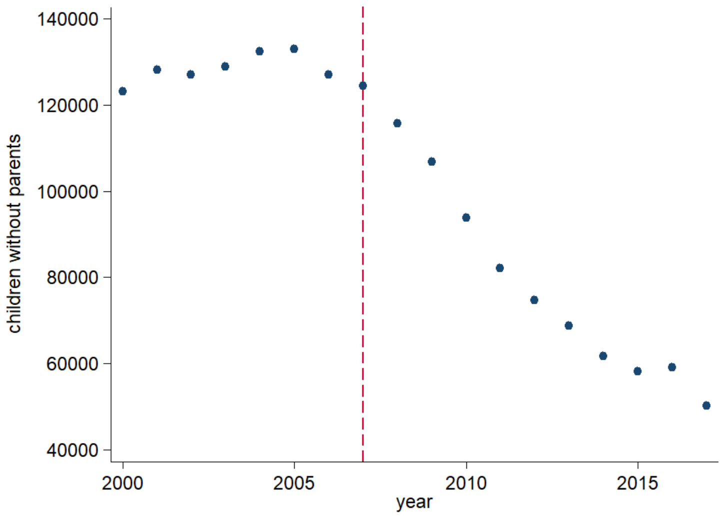


Figure A4. Maternity Capital and the number of children that have been abandoned by parents



Note: Source: The Ministry of Education, http://www.usynovite.ru/structure/

Table A1. Effect of 2008 Child Subsidy on Fertility in Ukraine

	(1)	(3)
VARIABLES	log births	log births
RD: own	0.078***	
	[0.017]	
RD: CCL		0.242***
		[0.079]
Observations	2,511	729
R-squared	0.034	
bandwidth	3	1.127

Note: Standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table A2. Long-Run Effect on Fertility Rates.

Panel A All Eastern European Countries are in Control Group.

VARIABLES	(1) ASFR	(2) ASFR1	(3) ASFR2	(4) ASFR3	(5) CPFR	(6) CPFR1	(7) CPFR2	(8) CPFR3
Russia×$I(year \geq 2007)$	0.002***	-0.001**	0.002***	0.001***	0.072***	-0.016*	0.051***	0.026***
	[0.001]	[0.000]	[0.000]	[0.000]	[0.021]	[0.009]	[0.010]	[0.005]
Russia×I(2007)	0.001	-0.001***	0.001***	0.000***	0.011	-0.025***	0.019**	0.010**
Russia×I(2008)	0.001	-0.001***	0.001***	0.001***	0.018	-0.034***	0.027***	0.017***
Russia×I(2009)	0.001	-0.001***	0.001***	0.001***	0.027	-0.025***	0.028***	0.016***
Russia×I(2010)	0.002*	-0.001**	0.002***	0.001***	0.051*	-0.016	0.040***	0.019**
Russia×I(2011)	0.003**	-0.001	0.002***	0.001***	0.077**	-0.005	0.048***	0.024***
Russia×I(2012)	0.005***	-0.000	0.003***	0.002***	0.120***	0.000	0.070***	0.034***
Russia×I(2013)	0.005***	-0.001	0.003***	0.002***	0.136***	0.001	0.079***	0.039***
	[0.001]	[0.001]	[0.001]	[0.000]	[0.031]	[0.015]	[0.015]	[0.007]
Russia×I(2014)					0.144***	-0.015	0.093***	0.046***
					[0.032]	[0.016]	[0.015]	[0.007]

Panel B. Eastern European Countries without pro-natalist policy are in control group.

	(1) ASFR	(2) ASFR1	(3) ASFR2	(4) ASFR3	(5) CPFR	(6) CPFR1	(7) CPFR2	(8) CPFR3
Russia×$I(year \geq 2007)$	0.004**	-0.001*	0.003***	0.002***	0.112**	-0.020	0.076***	0.039***
	[0.001]	[0.001]	[0.001]	[0.000]	[0.032]	[0.014]	[0.012]	[0.005]
Russia×I(2007)	0.001	-0.001**	0.001**	0.001***	0.033	-0.021*	0.029**	0.016**
Russia×I(2008)	0.002	-0.001**	0.002**	0.001***	0.047	-0.030**	0.041**	0.024***
Russia×I(2009)	0.002	-0.001**	0.002*	0.001***	0.048	-0.029*	0.041**	0.025***
Russia×I(2010)	0.004	-0.002	0.003**	0.002***	0.098	-0.023	0.070**	0.035***
Russia×I(2011)	0.004*	-0.002	0.004***	0.002***	0.143**	-0.006	0.087***	0.043***
Russia×I(2012)	0.007***	-0.001	0.005***	0.002***	0.185***	0.000	0.108***	0.053***
Russia×I(2013)	0.008***	-0.001	0.005***	0.003***	0.202***	0.001	0.119***	0.059***
	[0.002]	[0.001]	[0.001]	[0.000]	[0.034]	[0.016]	[0.010]	[0.005]
Russia×I(2014)					0.191***	-0.022	0.125***	0.062***
					[0.039]	[0.020]	[0.010]	[0.006]

Note: Robust standard errors in brackets. ***p<0.01,**p<0.05,*p<0.1.
In all regressions, country FE, age FE, time trends are included.

NOTE 1: FERTILITY RATES MEASURES: CALCULATION

This description is copied from the methodology section in the human fertility database (www.humanfertility.org, Jasilioniene et al 2016).

The period total fertility rate for all birth orders combined and by birth order is computed as follows:

$$\mathrm{TFR}(t) = \sum_{x=x_{\min}}^{x_{\max}} f(x,t)$$

$$\mathrm{TFR}_i(t) = \sum_{x=x_{\min}}^{x_{\max}} f_i(x,t)$$

In formula above, $x_{\min}$ corresponds to 12 years or younger. The values of the TFR and TFR_i are computed for age $x_{\max} = 55 + years$; i.e., for the age span covering all reproductive ages. The HFD also lists a parallel estimate based on the sum of the observed fertility rates by age 40; i.e, with $x_{\max} = 39$ years. This information is more useful for cohort fertility analysis, where the cumulated fertility rates of cohorts nearing the end of their reproductive period provide a valuable approximation of their future completed fertility.

Tempo-adjusted total fertility rate Changes in period fertility measures are often driven by the temporary postponement or advancement of births. It is therefore difficult to identify to what extent fluctuations seen in the period TR result from such —timing changes, and to what extent these are —real (quantum) changes that would influence the completed fertility of real birth cohorts. A comparison of period and cohort fertility measures reveals that tempo distortions can cause a substantial gap between the two indicators for an extended period of time (Sobotka, 2004a, 2004b).

Tempo distortions in period fertility measures have inspired efforts to develop an adjustment method that would help to eliminate them. A simple and widely used TR adjustment, based on order-specific TFRs and changes in order-specific mean ages at birth, was proposed by Bongaarts and Feeney (1998). The Bongaarts-Feeney tempo-adjusted TR is computed as a sum of order-specific TFRs adjusted for changes in the mean age of order-specific fertility schedule, $r_i(t)$ as shown in formula below:

$$\text{adj TFR}(t) = \sum_i \text{adj TFR}_i(t)$$

where

$$\text{adj TFR}_i(t) \coloneqq \frac{\mathrm{TFR}_i(t)}{1 - r_i(t)}$$

Following Bongaarts and Feeney (2000: 563), the adjustment factor $r_i(t)$ is estimated as follows:

$$r_i(t) \coloneqq \frac{1}{2}\left(\mathrm{MAB}_i(t+1) - \mathrm{MAB}_i(t-1)\right)$$

where $\mathrm{MAB}_i(t)$ is the mean age at birth order i calculated from unconditional age- and order-specific fertility rates

$$\mathrm{MAB}_i(t) := \frac{\sum_{x=x_{\min}}^{x_{\max}} \bar{x} \cdot f_i(x,t)}{\sum_{x=x_{\min}}^{x_{\max}} f_i(x,t)}$$

Value $\bar{x}$ is the mean age at birth within the elementary age interval $[x, x+1)$:

$$\bar{x} = x + a(x)$$

where $a(x)$ is the average share of the age interval $[x, x+1)$ lived before giving birth to a child. We assume that all $a(x)$ values are equal to 0.5 for any completed age x and birth order i (for data organized by Lexis squares and horizontal parallelograms) and zero for any age x reached during the year and birth order i (for data organized by vertical parallelograms).

The tempo distortion in the observed TR then equals adj $\mathrm{TFR}(t) - \mathrm{TFR}(t)$.

Cumulative fertility rates computed for birth cohorts refer to the average number of children born to a woman by a certain age. They are usually shown for all birth orders combined, but they can also be disaggregated by birth order. When computed from period fertility rates, cumulative fertility is a hypothetical construct that can be interpreted as the average number of children that would be born to a woman by age x if she experienced at all ages below x the set of age-specific fertility rates observed in a given year.

In the HFD, cumulative fertility rates are calculated from unconditional age-specific fertility rates sorted by Lexis squares and vertical parallelograms (period dimension) and horizontal parallelograms (cohort dimension):

Cumulative period fertility rates by age x for year t for all birth orders combined (Lexis squares and vertical parallelograms):

$$\mathrm{CPFR}(x,t) = \sum_{z=x_{\min}}^{x-1} f(z,t)$$

Cumulative period fertility rates by age x for year t for birth order i (Lexis squares and vertical parallelograms):

$$\mathrm{CPFR}_i(x,t) = \sum_{z=x_{\min}}^{x-1} f_i(z,t)$$

In formulae above, x and z refer to the age in completed years (ACY) in case of the Lexis squares and the age reached during the year (ARDY) for Lexis vertical parallelograms; $x_{\min}$ corresponds to age 12 or younger. If the upper age limit of the summation is equal or very close to the maximum reproductive age (i.e., if it is 50 or higher), the cumulative fertility rate equals the total fertility rate (TR).

The cumulative cohort fertility rate (CCFR) refers to the average number of children born to a woman from birth cohort c by age x, and is computed by summing up the set of age-specific fertility rates of the cohort c observed over their reproductive lives up to age x. CCFRs are calculated for all cohorts c who are observed from age $x_{\min}$ that is equal to 15 or younger.

Cumulative cohort fertility rates by age x for cohort c for all birth orders combined (horizontal parallelogram) is

$$\mathrm{CCFR}\left(x,c\right)=\sum_{z=x_{\min}}^{x-1}f\left(z,c\right)$$

Cumulative cohort fertility rate by age x for cohort c and birth order i (horizontal parallelogram) is

$$\mathrm{CCFR}_i\left(x,c\right)=\sum_{z=x_{\min}}^{x-1}f_i\left(z,c\right)$$

For birth cohorts, the corresponding quantities represent the completed cohort fertility (CCF). The completed cohort fertility for all birth orders combined and by birth order is computed as follows:

$$\mathrm{CCF}\left(c\right)=\sum_{z=x_{\min}}^{x_{\max}}f\left(x,c\right)$$

$$\mathrm{CCF}_i\left(c\right)=\sum_{z=x_{\min}}^{x_{\max}}f_i\left(x,c\right)$$

The CCF is calculated for all cohorts c that are observed from age $x_{\min}$ that is equal to age 15 or younger until age 50 or older. Again, two types of the CCF are shown. The first one represents the CCF at age 50 or older ($x_{\max}=49+$ years), whereas the second one shows the CCF (or, more correctly, cumulated cohort fertility) by age 40 (with $x_{\max}=39$ years) and thus represents an incomplete approximation of the future CCF.