

Short- and Long-Run Effects of a Sizable Child Subsidy: Evidence from the “Maternity Capital” program in Russia.

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Research topic

- ▶ Large-Scale Policy Experiment in Russia aimed to increase fertility:
- ▶ Facing long-lasting period of low fertility and natural decline in population Russian government introduced conditional child subsidy(es)
- ▶ “Maternity Capital Programs”

Research questions

- ▶ Effect of fertility
 - ▶ Short Run? Long Run?
 - ▶ Milligan, 2011, Cohen, Dehejia and Romanov, 2013, Gonsales, 2013, Slonimczyk and Yurko, 2014, Adda et al, 2015 vs Malkova, 2019
- ▶ Policy Motivation:
- ▶ Many countries face decline in fertility
 - ▶ United States, all European countries and the most of the remaining: fertility is below the replacement level
 - ▶ Comes at costs: future ability to finance old-age benefits
- ▶ Expensive policies (3% of GDP in developed countries)
- ▶ The effectiveness of the policies aimed to increase fertility is uncertain

Research questions

- ▶ General equilibrium effects of the this large scale policy (Acemoglu, 2015)
 - ▶ Family stability, Housing market
- ▶ Costs per induced birth?

Research Design

- ▶ Large-Scale Policy Experiment in Russia aimed to increase fertility
- ▶ “Maternity Capital Program”
- ▶ Facing long-lasting period of low fertility and natural decline in population Russian government introduced conditional child subsidy(es)

Institutional Set Up: Maternity Capital program

Two waves:

- ▶ MAIN , 1st wave, Federal
- ▶ Started on 1st Jan, 2007
 - ▶ was introduced to the State Duma, and announced to public in October 2006
- ▶ Eligibility: family with second or more child born after 1st Jan 2007
- ▶ One-time benefit (once per family)
- ▶ Size: more than 10,000 dollars
 - ▶ more than average 18-month wage
 - ▶ Relative size is much bigger than that in most of the countries
- ▶ Restricted use: can spend only on 1) housing (88%) 2) child education 3) mother pension

1st wave: Federal Maternity Program

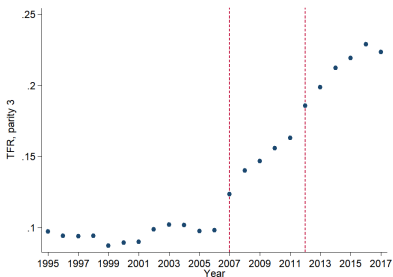
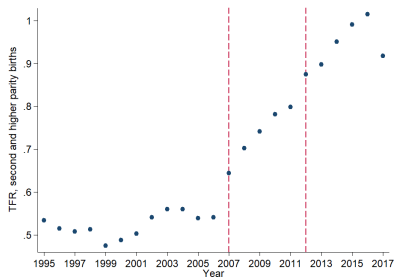
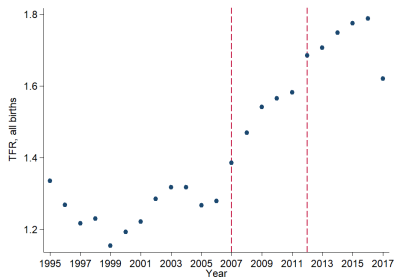


Fertility in Russia: discontinuous change in birth rate 9 months after announcing subsidy

2nd Wave: Regional Maternity Capital Programs

- ▶ 2nd wave, Regional MC programs
- ▶ Introduced at the end of 2011 and on Jan 1st of 2012
 - ▶ 85% of regions adopted subsidies in 2011- Jan 1st of 2012
 - ▶ 5% of regions adopted additional subsidies earlier, in 2008
 - ▶ 10% of regions do not have Regional MC program
- ▶ mainly for 3rd child, sometimes for 1st, also mostly restricted use (housing, education)
- ▶ average amount 2,500 dollars (varying from 1,000 to 10,000 dollars)
- ▶ on the top of federal money
- ▶ most programs started at 1st January 2012

Effect of two programs on birth rates (TFR)



Data Sources for analysis

- ▶ Aggregate data: monthly, quarterly
 - ▶ Rosstat data: monthly births by Russian regions; on other outcomes
 - ▶ HFD: monthly births by country
 - ▶ Russian Fertility and Mortality Database (RFMD, Regional level data): annual data on various fertility measures
 - ▶ 2010 Census data: monthly; various dimensions; retrospective data
 - ▶ 2015 Micro-census data: quarterly; various dimensions; retrospective data
- ▶ Individual data: (annual)
 - ▶ RLMS

Short Run Effect on Fertility: RD design

- ▶ RD look on small neighborhood within July, 2007 (Jan, 2012)
- ▶ Regression discontinuity approach RD specification:

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

- ▶ where t is date ($year + (month - 1/12)$) normalized to be 0 at the month maternity capital was announced
- ▶ $f(t)$ and $g(t)$ the smooth function of time
- ▶ Y_{rt} stands for log births: for all, and by birth order (1st, 2nd, 3rd child)
- ▶ the set of controls D_{rt} includes the month fixed effects to control for seasonality
- ▶ use triangular kernel, $f(t)$ is parameterized to be a first-order polynomial, and the error terms u_{rt} are clustered at date level
- ▶ bandwidth equals to 3 years
- ▶ the parameter of interest θ stands for the effect of maternity capital

RD Regression Results: 2007

	(1)	(2)	(3)	(4)
		log birth rate		
birth order:	all	1st	2nd	3rd
I(after 2007)	0.090*** [0.013]	0.072*** [0.018]	0.120*** [0.017]	0.150*** [0.018]
Other specs				
CCT	0.079*** [0.026]	0.086** [0.035]	0.094*** [0.032]	0.120*** [0.038]
bandwidth, CCT	1.16	0.97	0.94	0.9
bandwidth, Own	3	3	3	3

Robust standard errors in brackets, data on regional*monthly cells;

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

RD Regression Results: 2012

	(1)	(2)	(3)	(4)
		log births rate		
Birth order:	all	1st	2nd	3rd
I(after 2012)	0.043***	0.084***	0.011	0.101***
	[0.015]	[0.026]	[0.019]	[0.033]

Robust standard errors in brackets. *** $p < 0.01$, ** $p < 0.05$,

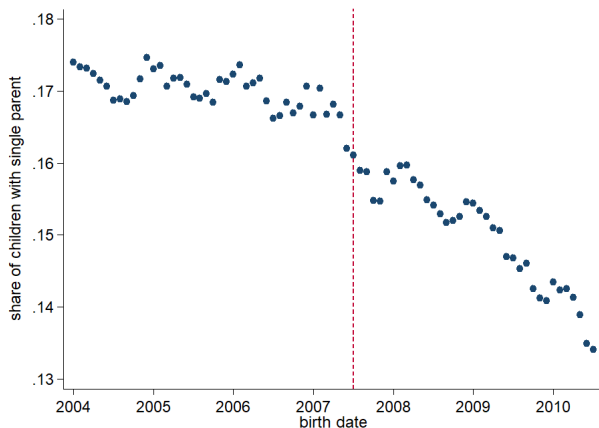
* $p < 0.1$, data on region X quarterly cells

RD Regression Results

- ▶ 2007 Federal Maternity Capital results in SR increase in total fertility rate by 9%
- ▶ Higher effect for second and higher order children
 - ▶ birth rates of 1st child increase by 5 - 7 %
 - ▶ 2nd child: + 12%
 - ▶ 3rd child: + 15%
- ▶ 2012 Regional Maternity Capital results in further increase in total fertility rate by 4%
 - ▶ Higher effect for third and higher order children
 - ▶ 2nd child: no effect
 - ▶ 3rd child: + 12%

Effect of Family Stability and Housing Market

Share of children that live with single parent



Source: 2010 Census

Effect on Family

	log births: married	log births: non married	share non married
I(after 2007)	0.103*** [0.017]	0.067*** [0.019]	-0.004*** [0.001]
Mean before (always-takers)			.128
Predicted Mean After			.124
Mean for Compliers			.079

	log births: both parents	log births: single parent	share with single parent
I(after 2007)	0.107*** [0.014]	0.083*** [0.017]	-0.005** [0.003]
Mean before (always-takers)			.29
Predicted Mean After			.284
Mean for Compliers			.225

Effect on Family

- ▶ Also: decrease in share of mother with college degree, increase in average age of mother, no difference between urban and rural
- ▶ 5% 2010 Census Micro-Sample: annual data on births, but can control for everything simultaneously

	I(give birth)
I(after 2007) × I(non married)	-0.062*** [0.001]
I(after 2007) × I(single parent)	-0.077*** [0.002]

Regressions include year age, regional FE, mother education, I(urban area), regional characteristics and their interaction with I(after 2007).

Regional Housing Markets and Heterogeneity in RD (2007) effect

- ▶ 2007 reform
- ▶ relative size of maternity capital to price of real estate in a region
 - ▶ if family buys apartments using maternity capital, then children - by the law also became owners of the apartments
 - ▶ some families that bought expensive apartments prefer not to use maternity capital
 - ▶ In Moscow can buy 2.4 sq.m. of apartments, in North Ossetia 20 sq.m.

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

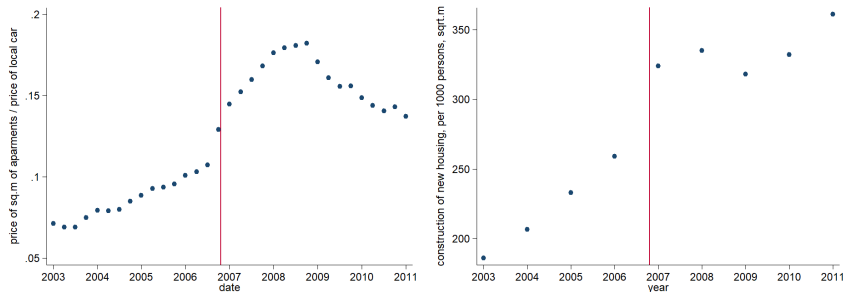
- ▶ Z_{rt0} stands for pre-reform regional characteristics (in year 2006),
- ▶ the availability of housing is average size of living area (per person) in a region
- ▶ the affordability of housing is defined as the size of apartments that can be bought using maternity capital

Regional Heterogeneity: Estimates

VARIABLES	(1)	(2)	(3)	(4)	(5)
		all births		1st child	2nd child
After ×	0.007***		0.002	0.017***	0.019***
meters per MC	[0.002]		[0.002]	[0.003]	[0.002]
After ×		-0.006***	-0.007***	-0.024***	-0.014***
living area		[0.001]	[0.001]	[0.002]	[0.002]
After	0.081***	0.080***	0.081***	0.083***	0.131***
	[0.019]	[0.019]	[0.019]	[0.017]	[0.016]
Observations	6,240	6,396	6,240	8,468	8,468
R-squared	0.246	0.461	0.497	0.496	0.341

Maternity Capital and Local Housing Markets

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



MC may affect Housing market, but part of the effect may come from development of mortgage market

Maternity Capital and Local Housing Markets

- ▶ Regional-level Regressions:
- ▶ After controlling for extensive set of characteristics regional credit market, average mortgage characteristics, local mortgage markets, regional economy characteristics, time trend and regional fixed effects, time trends
- ▶ Prices increase by 16-20%; construction rises by 12%

	(1)	(2)	(3)
	log real price, 1 sq.m new	secondary	log const- ruction of housing
I(after 2007)	0.160*** [0.037]	0.196*** [0.034]	0.116*** [0.029]

Long and Medium Run Effects on Fertility

- ▶ RD:
 - ▶ local (Short Run) Effect
- ▶ Can say more?

Long Run Analysis: DID

- ▶ Cross-Regional DID

- ▶ $Y_{art} = \gamma S_{rt} + \delta_t + \delta_a + t * \delta_a + \delta_r + t * \delta_r + D'_{rt} \Gamma + u_{art}$
- ▶ S_{rt} = ratio of the regional subsidy to the federal subsidy
- ▶ Also: in regions with higher real price of federal MC

- ▶ DID for families with different family structure: birth rates of 2+ parity versus 1st



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

- ▶ Triple Differences (DDD)

- ▶ Both variations (by regions and by family structure)

Long Run Analysis: DID

Log Fertility Rate		
Cross-regional DiD		
S_{rt}	0.073*** [0.023]	0.055*** [0.020]
$I(\text{year} \geq 2007) \times$ meters per MC		0.012*** [0.004]
(2+ parity) vs (1st) DiD		
$I(2012 \geq \text{year} \geq 2007) \times$ $I(\text{parity} \geq 2)$	0.116*** [0.035]	
$I(\text{year} \geq 2012) \times$ $I(\text{parity} \geq 2)$	0.177*** [0.037]	
DDD		
$S_{rt} \times I(\text{parity} = 3)$	0.258** [0.116]	

Long Run Regional Analysis: cumulative effect



$$Y_{artb} = \theta_1 I(\text{year} \geq 2007)_{rt} + \theta_2 I(\text{year} \geq 2012) + \gamma S_{rt} \\ + \delta_{art} + t * \delta_{art} + D'_{rt} \Gamma + u_{art}$$

- ▶ Check that two Short-Run effects (2007 and 2012) survive in the long run
 - ▶ With and without various time trends
- ▶ On the top of this additional cross-regional DID variation
 - ▶ S_{rt} ratio of the regional subsidy to the federal MC subsidy
- ▶ Years: data till 2017 i.e. 10 years of the program

Long Run Regional Analysis: cumulative effect

VARIABLES	(1) all	(2) 1st	(3) 2nd	(4) 3rd	(5) 4th
Panel A: Regional Level data					
I(after 2007)	0.128*** [0.011]	0.098*** [0.015]	0.189*** [0.018]	0.166*** [0.022]	0.113*** [0.023]
I(after 2012)	0.064*** [0.015]	0.061*** [0.015]	0.079*** [0.013]	0.183*** [0.014]	0.181*** [0.015]
S_{rt}	0.081* [0.046]	0.042 [0.059]		0.185* [0.102]	0.236* [0.125]
Controls	Age and Regional fixed effects, Age-specific time trends, log average income and housing availability				

Note: Results are slightly higher than RD estimates

Completed Cohort Fertility Rate

- ▶ If look on of two RD (short run) estimates over 2007-2017 (and over 2012-2017)
- ▶ In the unrealistically pessimistic scenario where Russian women who are of age 35-45 in 2017 stop giving birth completely, the average number of children that they will have at the end of the fertility age (55) will exceed that of the control group
- ▶ In a region with an average regional subsidy, we document an increase in completed fertility for a cohort of women aged 38 to 55 in 2017.
- ▶ In a region with a maximum subsidy level, the increased completed fertility is documented for ages 35 to 55.
 - ▶ Note: this is pessimistic scenario: indeed we see larger increase for 25-35 yo women

WTP

- ▶ How much government is willing to pay for an birth that have been **induced** by this program?
- ▶ Family receives 10,000 dollars for a child
- ▶ The Maternity Capital subsidy results in an increase in fertility rates by 7% and 13% for the first and for higher order children correspondingly
- ▶ For this increase in fertility the government pays to 100% of second order child (10,000 dollars per child).
- ▶ There are approximately equal numbers of births of first and of 2nd (or higher) order children.
- ▶ Thus, WTP equals to $10,000 * (100 / (7 + 13))$ or **50,000 dollars**.

Overview of main Results

- ▶ Over 10 years of reform TFR in Russia grew up from 1.3 to 1.78 (by 37%)
- ▶ Already see increase in completed cohort fertility for females of age 35-40 in 2017
- ▶ Sizable Effects on other markets
 - ▶ Housing
 - ▶ Family Stability
- ▶ Program is tremendously expensive
- ▶ Paper is available in SSRN:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3416509

Thank you!