How the Introduction and Cancellation of a Child Benefit Affected Births and Abortions

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Cash Transfers and Fertility:

How the Introduction and Cancellation of a Child Benefit Affected Births and Abortions*

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Abstract: We study the effects of a universal child benefit on fertility, identifying separately the effects driven by conceptions and abortions. We focus on a generous lump-sum maternity allowance that was introduced in Spain in 2007 and cancelled in 2010. Using administrative, population-level data, we create a panel data set of the 50 Spanish provinces, with monthly data on birth and abortion rates between 2000 and 2017. Our identification is based on the timing of the introduction and cancellation of the policy (both its announcement and implementation), from which we infer when the effects on abortions and births can be expected. We find that the introduction of the policy led to a 3% increase in birth rates, due to both a decrease in abortions and an increase in conceptions. The announcement of the cancellation of the policy led to a transitory increase in birth rates of 4% just before the cancellation was implemented, driven by a short-term drop in abortions. The cancellation then led to a 6% drop in birth rates. Heterogeneity analysis suggests that the positive fertility effect of the benefit introduction was driven by high-skilled parents, while the negative impact of the cancellation was larger among low-skilled and out-of-labor-force parents, and in lower income, higher unemployment regions. We also find suggestive evidence that the child benefit had both a timing effect ("tempo"), so that some women had children earlier, and a level effect ("quantum"), where some women had more children than they would have had otherwise.

JEL codes: J13, J18

Keywords*: fertility, abortions, birth rates, policy evaluation, child benefit*

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1. Introduction

All OECD countries have subsidies that target families with young children, spending on average 2.4% of GDP on family benefits (OECD Family Database 2019). The goal of these subsidies is typically to promote fertility, and to ensure a minimum standard of living for all children. Their effectiveness in achieving these goals has been hard to demonstrate.

We study the effects of a universal child benefit on fertility, identifying separately the effects driven by conceptions and abortions. We focus on a generous lump-sum maternity allowance that was introduced in Spain in 2007 and cancelled in 2010. We use administrative, population-level data covering all births and abortions between 2000 and 2017. Our identification is based on exploiting the timing of the introduction and cancellation of the policy, paying careful attention to announcement and implementation dates, from which we infer when the subsequent effects on births and abortions can be expected.

We find that the introduction of the benefit led to a 3% increase in birth rates, due to both a decrease in abortions and an increase in conceptions. The announcement of the cancellation of the policy led to a transitory increase in birth rates of 4% just before the cancellation was implemented, driven fully by a short-term drop in abortions. The cancellation then led to a 6% drop in birth rates, due both to more abortions and fewer conceptions.

Several recent papers have attempted to estimate the causal effect of direct birth-related cash transfers on fertility, exploiting natural experiments in several different countries (Milligan 2005, Cohen et al. 2013, González 2013, Riphahn and Wiynck 2017). These papers find evidence consistent with a positive and significant price effect on overall fertility, with benefit elasticities around 1-2%.[1] In particular, González (2013) found that the introduction of a universal child benefit in Spain in 2007 led to an increase in births in the first years of the policy, in part driven by a drop in abortions right after the policy announcement.

In this paper, we extend the findings in González (2013) in several important dimensions. First, we exploit both the unexpected introduction and the later cancellation of the benefit, to evaluate the overall effect of a universal child subsidy on aggregate birth rates in Spain. Second, we separate the effects stemming from changes in conceptions (new pregnancies) and abortions, using high-quality population-level data. Third, we examine which types of households were more likely to react to the policy changes. Fourth, we study whether the effects of introduction and cancellation were symmetric, and to which extent aggregate economic conditions fueled families' reaction to the benefit. Finally, we also try to identify whether the policy affected only the timing of births ("tempo" effect) or whether the overall number of births increased as well ("quantum" effect).

We argue that the specific way in which the child benefit was introduced in Spain in 2007, and subsequently cancelled in 2010, creates a natural experiment that enables us to study the impact of a generous lump-sum "maternity bonus" on fertility. In a national speech on July 3, 2007, the Spanish prime minister unexpectedly announced the introduction of a new unconditional family benefit, which would pay €2,500 to all new mothers. The subsidy would be paid for all children born from July 1, 2007, onwards. Three years later, during the

[1] There are also a number of papers documenting the effects of tax incentives on fertility (Moffitt 1998, Rosenzweig 1999, Baughman and Dickert-Conlin 2003 and 2009, Kearney 2004, Brewer et al. 2012). Others have also documented fertility effects of changes in parental leave benefits (Lalive and Zweimüller 2009, Cygan-Rehm 2016, Malkova 2018, Raute 2019).

economic crisis, the same prime minister unexpectedly announced on May 12, 2010, that the benefit would remain in place only until the end of 2010.

We combine publicly available birth-certificate microdata with restricted-access microdata on registered abortions. We find that the introduction of the policy led to a temporary increase in birth rates of 0.9% due to an immediate drop in abortions, and to an additional increase of 1.7% due to a rise in conceptions. Once the cancellation of the policy was announced, there was a temporary increase in birth rates of 4.1% just before the actual cancellation of the policy, driven by abortions, while the longer-term negative effect of child benefit cancellation on birth rates was –5.5%. The observed effects were present at all parities, but were more pronounced among higher-order births.

In the heterogeneity analysis, we find that unmarried women reacted disproportionately more (through abortions) in the early months after the introduction of the policy. The introduction effects on fertility are found only among couples where at least one partner is high-skilled, whereas cancellation effects appear only among couples where both partners are low-skilled or out of the labor force. Additionally, we find that general economic conditions did not play a role during the introduction of the child benefit (booming economy), but they were relevant during its cancellation (economic crisis): fertility in poorer provinces reacted twice as much, while fertility in provinces more affected by the crisis reacted four times as much. Finally, we find suggestive evidence that the child benefit led both to a change in the timing of births (tempo effect) and to an increase in completed fertility (quantum effect).

The remainder of this paper is organized as follows: In section 2, we offer background information on the universal child benefit in Spain. The next section elaborates on how and when we expect the policy to affect birth rates. Sections 4-6 describe the data, estimation methods, and results. The last section discusses the results and concludes.

2. Institutional background

On July 3, 2007, Spanish prime minister Zapatero announced in a national speech that a universal child benefit would be introduced in Spain. For every child that was born or adopted starting from that day, families would receive a lump-sum payment of €2,500. This universal child benefit was to be paid in addition to any other child support or family benefits that the family was already entitled to. The proposal of the new law was approved by the Spanish government on July 13, 2007, and it was announced that the parliament would pass the law in an accelerated procedure in November, with the actual payments of the benefit starting from December 2007.

The government launched helplines informing about the law, provided request forms, and started accepting these requests in Social Security offices in mid-July 2007. The Spanish parliament passed the new law on November 15, 2007, which in its final form stipulated that all children born or adopted as of July 1, 2007, would be eligible for the universal child benefit of €2,500. Eligible parents encompassed both Spanish and foreign nationals who had resided legally in Spain for at least two consecutive years prior to the birth or adoption. The benefit would be delivered in the form of a tax deduction, or directly in cash.

On May 12, 2010, the same prime minister announced that the so-called "baby check" would be available only until the end of the calendar year 2010, meaning that families with births or adoptions starting from January 1, 2011, would not receive the universal child benefit anymore. The cancellation of the policy was not expected. In 2009, Zapatero categorically denied any plans of cancelling the universal child benefit. The government's intention to substantially cut public expenditure due to the ongoing economic crisis was known only one week prior to announcing the cancellation of the child benefit.

Benefit take-up appears to have been close to full. The "baby check" was widely publicized, and mothers were given request forms directly after giving birth in the hospitals. We collected aggregate data on the number of tax returns requesting the universal child benefit in 2007-2010 from the Spanish tax authorities, as well as the number of claims made directly to the Social Security offices, and these records show that the total number of claims was very close to the registered number of births and adoptions that took place in Spain during the relevant period.[2]

Throughout its existence, the universal child benefit had a nominal value of €2,500, or between 150% (when introduced) and 130% (when cancelled) of average gross monthly earnings in Spain.[3] In terms of child raising costs, this amount is estimated to have covered the first 5-6 months after childbirth.[4]

3. Expected effects

The child benefit was a generous, one-time, lump-sum transfer, i.e. a positive income shock for families with newborn children in Spain. We next outline the expected effects of the introduction and cancellation of the child benefit on fertility, and we distinguish between

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[2] Depending on the source, between 1,610,000 and 1,960,000 child benefit claims were made, while approximately 1,770,000 children were born or adopted.

[3] The real value of the benefit at the time of its introduction was 250%, 190%, and 130% of the 25th percentile, median, and 75th percentile of gross monthly earnings, respectively (310%, 220%, and 150% of female gross monthly earnings). The earnings data come from wage surveys conducted in 2006 and 2010 by the Spanish statistical office (INE).

[4] Our calculation is based on a report by Save the Children (2018), which estimates that costs related to raising children aged 0-3 years amounted to €479 and €551 per month in poorer and richer regions of Spain in 2018, respectively, which corresponds to €418 and €481 in 2007 prices.

potential effects stemming from conceptions and abortions. Figure 1 shows the timing of announcements and implementations of the policy introduction and cancellation, and the timing of the expected effects on fertility. In the context of Becker's (1960) basic model of fertility, the benefit represents a reduction in the cost of raising children (the "price" of children), and is predicted to increase fertility via both income and substitution effects. We thus expect that the benefit introduction may have led to a higher birth rate, while the cancellation may have lowered it.

3.1 Benefit introduction

The policy was announced in July 2007 and effectively, it came into force immediately. Fertility could have reacted to the new policy in two ways: through more new conceptions, and through fewer abortions (since abortion is legal in Spain).

(1) Abortions: An expected decrease. The benefit announcement may have led to an immediate reduction in abortions. Regarding the timing, 94% of abortions in Spain in 2006 took place up to 16 weeks of gestation, while the average birth took place at 39 weeks.[5] Thus, fewer abortions (up to 16 weeks) starting in July 2007 would have led to more births starting from December 2007.

(2) Conceptions: An expected increase. An increase in conceptions starting from July 2007 would have led to an increase in births starting from April 2008, assuming that conception can take place within a few weeks after a couple starts trying to conceive, and the pregnancy lasts for approximately 39 weeks.

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[5] The average, median, and modal weeks of gestation at abortion were 9, 8, and 7 weeks, respectively. The average and median birth took place at 39 weeks of gestation, whereas the mode was 40 weeks. These statistics are based on authors' calculations using microdata covering the universe of births and abortions in Spain in 2006.

To summarize, positive effects of the child benefit on fertility would have led to higher birth rates starting from December 2007 (through fewer abortions), and an additional increase starting from April 2008 (through new conceptions). The decrease in abortion rates would be expected immediately after the announcement in July 2007.

3.2 Benefit cancellation

The cancellation was announced on May 12, 2010, and became effective as of January 1, 2011. Due to the different timing of the announcement (May 2010) and implementation (January 2011), we can distinguish two potential effects on fertility: a transitory effect (May-December 2010), and the main effect (January 2011 onwards).

3.2.1 Main effect

Once the universal child benefit was cancelled, we expect a potential decrease in fertility, both due to fewer conceptions and more abortions.

(1) Abortions: An expected increase. Families with a due date in January 2011 (or later) may have reacted with an increase in abortions. This seems particularly plausible given the ongoing economic crisis in Spain at the time. The bulk of the increase in abortions would show in the abortion data starting from August 2010, since a woman in pregnancy week 16 (or less) in early August 2010 would give birth in January 2011 (or later). These abortions would result in a decrease in births starting from January 2011.

(2) Conceptions: An expected decrease. A decrease in new conceptions starting from May 2010 would result in a decrease in births starting from February 2011.

In sum, we expect the main effects of the child benefit cancellation to go in the opposite direction of the introduction effects. We expect a negative effect on births starting from January 2011, and an increase in abortions starting from August 2010.

3.2.2 Transitory effect

In addition to the main effect, a transitory effect on fertility could arise due to the different timing of the announcement and the actual implementation of the cancellation.

(1) Abortions: An expected decrease. The announcement of the benefit cancellation may have led some pregnant women with a due date in 2010 to forego an abortion (in order not to miss the subsidy). Depending on the stage of the pregnancy, fewer abortions between May and July 2010 would result in additional births just before the cancellation of the child benefit. (between October and December 2010).

(2) Conceptions: No effect expected: Given that the time window between the announcement of the cancellation and its implementation was 33 weeks, we do not expect couples to react with additional conceptions immediately after the announcement, as these pregnancies would not result in childbirth before the benefit cancellation.

In sum, we expect a transitory effect of the *announced* cancellation of the benefit on fertility via abortions, which would result in a decrease in abortion rates between May and July 2010, and an increase in birth rates between October and December 2010.

3.2.3 Birth timing effect

On top of affecting conceptions and abortions, the announced cancellation may also have led to a birth timing effect: some families with a due date in early January 2011 may have scheduled an early elective delivery in late December 2010. Borra et al. (2019) estimate that there were around 2,000 such births. Since this birth timing effect could bias our estimates of the cancellation effects on fertility, we will take it into account in our estimation.

4. Data sources

We use administrative micro data on births and abortions in Spain between 2000 and 2017.

4.1 Birth data

We use the administrative registry of births, collected and made publicly available by the Spanish statistical office (INE). These microdata encompass the universe of all 7,932,077 births that took place in Spain in years 2000 to 2017. The data set includes information on month and year of birth of the child, and socio-demographic characteristics of the parents. We create a panel of monthly birth rates at province level: we calculate the number of births per day in each calendar month, restricted to women aged 15 to 44 who are residents in one of the 50 Spanish provinces, and divide it by the number of women aged 15-44 residing in that province and calendar month. The data on number of women aged 15-44 also come from INE, which reports population at province level in January and July of each year. We linearly interpolate population sizes in the remaining months.

We count the number of births, not the number of children born, so that multiple births are counted only once. We include both live and still births (0.3% of births in our data resulted in death). We exclude women aged 12-15 and 50-55 (0.05% of births). We also exclude 45-49 year-old women (0.27% of births). The share of women aged 45-49 over women aged 15-49 increased from 12% to 18% between 2000 and 2017. Thus, including this group (with very few births but an increasing relative size) would distort the birth rate.

We exclude two province-cities that belong to Spain but are located in North Africa (Ceuta and Melilla, with 0.25% and 0.29% of births, respectively), and mothers who are not residents in Spain (0.32% of births). We calculate the number of births and birth rates *per day* in a calendar month to enable comparability across months with different number of days.

We use monthly data for years 2000-2017, i.e. we have 216 monthly observations per province, and 10,800 observations overall. Figure A1 shows the daily number of births by calendar month in Spain between 2000 and 2017, and Figure 2 depicts the corresponding birth rate. The vertical lines mark the period when the universal child benefit was in effect.

4.2 Abortion data

We obtained microdata encompassing the universe of all 1,738,188 abortions that were performed in Spain in years 2000 to 2017 from the Ministry of Health. The data set includes information on the exact date of the procedure, reason for abortion, pregnancy weeks, and basic socio-demographic characteristics of the woman. We mimic the approach used in the birth data to create a panel of monthly abortion rates at province level. Abortion rates are expressed per day in each calendar month, and include women aged 15 to 44 years who are residents in one of the 50 Spanish provinces.

We again exclude women aged below 15 and above 44 (0.88% of abortions), and abortions performed to residents in the two province-cities located in North Africa (0.11% of abortions) and to non-residents (2.14% of abortions). We again create a monthly data set for years 2000-2017 with 216 monthly observations per province, and 10,800 observations overall. Figure 3 shows the daily abortion rate by month in Spain between 2000 and 2017. The vertical lines mark the announcements of the introduction and cancellation of the child benefit.

5 Methodology

Women may have reacted to the introduction and cancellation of the child benefit with changes in abortions and new conceptions, both of which would lead to changes in the number of births. Our identification relies on capturing deviations from a smooth time trend at specific points in time (identified in section 3), after controlling for economic conditions. Births react with a varying time delay, due to the time necessary to conceive and due to the pregnancy length (which both vary at individual level), while abortions can, in principle, react immediately. Thus, we estimate different models for births and abortions, as follows.

5.1 Effects on births

In order to analyze the effects of the benefit on realized fertility, we construct a panel with monthly observations for the 50 Spanish provinces in years 2000-2017 (i.e. from 7 years before the policy introduction to 7 years after its cancellation). We estimate the following equation:

$$Y_{pt} = \alpha + \sum_j \gamma_{pj} t_p^j + \sum_{k=1}^4 \beta_k T_k + \rho X_{p,t-9} + \delta_p + \theta_m + \varepsilon_{pt} \quad (1),$$

where the dependent variable $\boldsymbol{Y}$ is either the natural log of the number of births per day in province $\boldsymbol{p}$ in month $\boldsymbol{t}$,[6] or the corresponding birth rate, for women aged 15 to 44. We estimate fixed effects regressions in which fertility is allowed to follow a polynomial ($\boldsymbol{j}$) time trend ($\boldsymbol{t}$), and this time trend is allowed to vary by province ($\boldsymbol{p}$). In order to estimate the effects of the universal child benefit ($\boldsymbol{\beta}$), we allow the time trend to "jump" in four time periods ($\boldsymbol{T}$), defined according to the expected timing of the effects (see section 3). Thus, there are five time periods:

k=0:	01/2000 – 11/2007	Pre-child-benefit period
k=1:	12/2007 – 03/2008	Transition into child benefit (potential effect of child benefit on new births due to a decrease in abortions)

[6] If there are no births (or abortions) in a certain province and month, we replace log(0) with log(0.01). For comparison, the minimum daily number of births (or abortions) is 0.0323 (=1 event/31 days).

k=2:	04/2008 – 09/2010	Child benefit period (potential effect of child benefit on new births due to fewer abortions and more conceptions)
k=3:	10/2010 – 12/2010	Transition out of child benefit (potential effect of the announced cancellation on new births due to a transitory decrease in abortions)
k=4:	01/2011 – 12/2017	Post-child-benefit period (potential effect of the cancellation on new births due to more abortions and fewer conceptions)

We thus include four binary variables $\boldsymbol{T_k}$ that take value 1 in periods k={1,2,3,4}.

Conceptually, the introduction of the child benefit may have led to a jump-wise increase in birth rates, but also to a change in trend (a steeper positive slope), or both. Since the time periods that we are looking at are rather short, there is not enough variation to estimate separately changes in slopes and levels, while controlling for seasonality in birth rates. Therefore, we simplified the model into estimating (1) a smooth, long-term trend in birth rates and (2) shifts in the overall fertility level during the different time periods, without attempting to tease out the source of these shifts (a change in the slope, a jump-wise change in birth rates, or both).

We include lagged (male) employment and unemployment rates to control for economic conditions ($\boldsymbol{X}$), calendar month of birth fixed effects to control for seasonality ($\boldsymbol{\theta_m}$), and province fixed effects to control for any time-invariant characteristics of each province ($\boldsymbol{\delta_p}$). The (un)employment rates are available quarterly at province level, and we consider a 3-quarter lag, reflecting economic conditions at the time of conception. Inclusion of (un)employment rates is crucial, given that the economic crisis in Spain started after the universal child benefit was introduced. Standard errors are clustered at province level.

5.2 Effects on abortions

Given that abortions can react immediately, we can follow a regression discontinuity design (RDD) to estimate the effects of benefit introduction and cancellation. The running variable is the month (in which the abortion takes place). Due to strong seasonalities, we always include two subsequent years in order to control for calendar month fixed effects, so that the approach combines RDD with difference-in-differences (DiD).

We restrict the sample to the immediate neighborhood of the month of announcement ("cut-off"), and to the same calendar months in the previous year. The equation we estimate is:

$$Y_{pt} = \alpha + \beta\, T + \theta_m + \gamma_y + \delta_p + \varepsilon_{pt} \quad (2)$$

$$\forall\, t\, \epsilon\, \big(\, c_{y,y-1} - 4, c_{y,y-1} + 3\big), T \equiv 1(t \geq c_y),$$

where the dependent variable $\boldsymbol{Y}$ is either the natural log of the number of abortions per day in calendar month $\boldsymbol{m}$ and year $\boldsymbol{y}$ (i.e. month $\boldsymbol{t}$) in province $\boldsymbol{p}$, or the corresponding abortion rate, for women aged 15 to 44. The forcing variable is month $\boldsymbol{t}$. The cut-off $\boldsymbol{c}$ is the month of announcement, i.e. July 2007 for introduction and May 2010 for cancellation regressions. Treatment $\boldsymbol{T}$ is a binary variable which takes value 1 in months post-July 2007 and post-May 2010 in introduction and cancellation regressions, respectively, and 0 otherwise. The key parameter of interest is $\boldsymbol{\beta}$, which identifies the (immediate) change in abortions once the introduction or cancellation of the benefit is announced. We include calendar month ($\boldsymbol{\theta_m}$), calendar year ($\boldsymbol{\gamma_y}$), and province ($\boldsymbol{\delta_p}$) fixed effects. Standard errors are clustered at province level. In terms of bandwidth around the cut-off, we chose a baseline of 4 months.

6 Results

6.1 Main results

We first present the results for birth rates, and then explore the role of abortions.

6.1.1 Effects on births

We start by providing descriptive graphical evidence. Figure 4 depicts the variable of interest (the daily birth rate per 100,000 women in reproductive age) for each calendar month separately. There is a positive time trend between 2000 and 2008. Fertility peaks in 2008, and this peak is followed by a negative trend. The change in trend coincides with the onset of the economic crisis in Spain in 2008, which led to an increase in the male unemployment rate from 6% to 27% between 2007 and 2013 (see Figure A2).

In line with the expected effects of the universal child benefit, outlined in section 3, we see an unusually high peak in the birth rate in April 2008, followed by further (even though declining) peaks in the following months (May-September 2008). This pattern corresponds to the expected increase in fertility that would result from new conceptions shortly after the child benefit was announced in July 2007. The expected increase in birth rates due to fewer abortions starting from July 2007, which would result in additional births in December 2007-March 2008, is not visible. Figure 4 also suggests that the positive effect of the benefit on fertility was not persistent, since the fertility peak lasted only for about six months.

We also see a clear disproportionate increase in births in October-December 2010 (partly already in September 2010), which corresponds to the expected temporary increase in fertility resulting from fewer abortions after the cancellation of the benefit was announced in May 2010. It is not obvious that births decreased after the cancellation (January 2011 onwards). Finally, we do note an extraordinarily high birth rate in December 2010 (the peak is much larger than in October-November 2010), followed by a dip in January 2011. This is graphical evidence for the birth timing effect, where some parents scheduled early elective deliveries in December 2010 as a reaction to the approaching cancellation of the child benefit (Borra et al. 2019).

Figure 5 zooms in on the birth rate during and around the time when the universal child benefit was in place; the dashed lines mark moments when the effects of the introduction or cancellation of the policy are expected to affect the birth rate. In line with Figure 4, there is a clear increase in births in April 2008, lasting for a few months, and another increase in October-December 2010.[7] Finally, Figure 6 plots the differences in birth rates between years 2008 (left) and 2010 (right) and the surrounding years. Again, we see that birth rates in April-September 2008 (October-December 2010) were substantially higher than birth rates in the same calendar months in the surrounding years 2007 and 2009 (2009 and 2011). Figure A3 shows that in placebo years 2006 (left) and 2012 (right), there is no such pattern.

Overall, the graphical evidence is consistent with the expected effects of the child benefit on fertility.[8] In order to quantify these effects, Table 1 presents our main regression results (equation 1). As dependent variables, we use the number of births in logs (columns 1-3), the birth rate (column 4), and the absolute number of births (column 5). Economic conditions at

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[7] At first sight, there seems to be a large increase already in September 2010. However, Figure 4 shows that September has systematically the highest birth rate, and that there was only a small disproportionate increase in September 2010. This small increase could be an effect of fewer abortions following the announcement in May 2010 (either fewer late abortions, or fewer abortions of pregnancies which resulted in premature births).

[8] The child benefit also covered adoptions. Figure A4 shows annual data on number of adoption requests. We focus on requests rather than actual adoptions because the adoption process is lengthy. As shown in the left panel, the number of national adoption requests increased substantially in 2007 and then peaked in 2008. It later decreased, but remained well above the pre-policy level. This figure suggests that couples reacted to the benefit with an increased interest in national adoptions. We see no similar pattern for international adoption requests (right panel). If anything, the number of such requests was declining in 2006-2014.

the time of conception are significantly correlated with fertility outcomes, with the expected signs. The effects of the child benefit on fertility are estimated through four coefficients measuring shifts in births coinciding with the four periods of interest. Coefficients are always reported as the estimated "jump" relative to the previous period.

Column 1 shows the results from the baseline specification.[9] In column 2, we allow for different fertility time trends in different provinces. The birth timing effect documented in Borra et al. (2019) and in Figures 4 and 5 would lead us to overestimate the cancellation effects. We thus also conduct a donut estimation (column 3), where we drop births in 12/2010 and 01/2011. This is our preferred specification. Columns 4 and 5 show the results of the donut specification for the alternative dependent variables.

We find that births increase by 3.5% in the "transition period" starting from December 2007 (column 3), which we interpret as the result of fewer abortions after the policy was announced in July 2007. Starting from April 2008, we find a further increase in births by 2.8%, which we interpret as the effect of new conceptions. In a short transition period just before the cancellation of the policy, in October-December 2010, we estimate a substantial increase in births by 4.7%, in line with fewer abortions immediately after the announcement of the cancellation in May 2010. Finally, after the actual benefit cancellation, we find a decrease in births by 5.7%, which may be the result of both more abortions (starting from August 2010) and fewer conceptions (starting from May 2010).

Ignoring the birth timing effect would have led to a substantial bias in our estimates of the cancellation effect: the third and fourth coefficients in column 2 are 6.3% and –7.4%,

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[9] In every regression, we allow for the time trend to be linear, quadratic, and cubic, and then we choose the most flexible time trend that is statistically significant. In column 1, the most flexible significant time trend is quadratic.

respectively, an overestimation by 30-34%. This confirms the donut approach (columns 3-5) as our preferred specification.

We also estimate the effects on birth rates, which may be more informative since the population of women in reproductive age in Spain was changing nonlinearly in 2000-2017, especially during the child benefit period (Figure A5).[10] The effects of the policy on birth rates shown in column 4 go in the same direction as the effects on number of births (column 3). The daily birth rate (per 1,000,000 women) increases by 1.2 during the transition into child benefit, by 2.2 during the child benefit, and by 5.3 during the transition out of the child benefit. After the cancellation, the birth rate fell by 7.0.[11] For context, the average daily birth rate in Spain in the 12 months prior to July 2007 and May 2010 was 125.6 and 127.3 births per 1,000,000 women, respectively. Thus, the estimated effects on the birth rate were 0.9% and 1.7% (compared to 2006-2007 level), and 4.1% and –5.5% (compared to 2009-2010 level). Note that these effects are somewhat smaller than the effects on *number* of births (column 3), especially during the introduction of the benefit.

6.1.2 Effects on abortions

In the previous section, we found changes in fertility that are consistent with preceding changes in abortions. In order to document this link directly, we estimate the effects of introduction (July 2007) and cancellation (May 2010) announcements on number of abortions and abortion rates. In our preferred specification, we include only abortions unrelated to fetal deformations (97% of all abortions), since abortions due to fetal health

[10] All dependent variables refer to women in reproductive age (15-44 years). As shown in Figure A5, number of women in reproductive age (left) and number of women of all ages (right) did not follow the same trend in Spain after 2008.
[11] The results are robust to the inclusion of weights (population of women in reproductive age 15-44 in each calendar month in each province) in the regression; the first coefficient loses its marginal significance because its standard error increases (results not shown).

concerns are less likely to react to financial incentives. Since abortions can in principle react immediately, we estimate the effects on abortions in an RDD-DiD framework. Table 2 shows the main results.

The data used to estimate the RDD-DiD regressions for the benefit introduction cover 8 calendar months (March-October of 2006 and 2007), i.e. 4 months prior to and 4 months after the announcement. We find that, when the introduction of the child benefit was announced in July 2007, the number of abortions dropped by 7.5% (panel A, column 1). This decrease can be linked to the increase in births starting in December 2007 (Table 1).

The data used to estimate the RDD-DiD regressions for the transitory (negative) effect on abortions after the announced cancellation (in May 2010) are limited to 5-7 calendar months (January-May, January-June, and January-July of 2009 and 2010). We exclude August because most abortions in August 2010 would have a due date in January 2011, and thus they would not be subject to the transitory effect. In Table 2 (panel A, column 2) we show the effects when using the January-May sample. We find a statistically significant 7.4% decline in abortions right after the announcement of the cancellation, which would have led to an increase in births between October and December 2010. The estimated effect is smaller and less precisely estimated when we include June and July abortions (Table A1, panel A, columns 1 and 2). This is likely due to an increasing fraction of June and July abortions being due in January 2011.

In addition to an immediate, transitory decrease in abortions in May 2010, we expect an increase in abortions starting from August 2010, as explained in section 3. We do not have a sharp RDD in this case, but we can still estimate whether there was a discrete change in the number of abortions starting in August 2010 (Table 2, panel A, column 3).[12] Indeed, we find a large, significant increase in abortions by 22.2%. This increase in abortions can be linked to the observed decrease in number of births starting from January 2011.[13]

We also estimate an alternative RDD-DiD specification where the dependent variable is number of abortions with a *due date* in a specific month (instead of abortions taking place in a specific month), where the cut-off is January 2011.[14] We find that there was a 7.6% increase in abortions due in January 2011, relative to December 2010 (Table A2, column 3).

Panel B in Table 2 shows the effects on daily abortion rates. We find that the abortion rate (per 1,000,000 women) decreases by 1.4 in July 2007 and by 0.9 in May 2010, while it increases by 4.4 in August 2010. This corresponds to changes by –6.2%, –4.1%, and 19.4%, respectively. Very similar effects are found when we include abortions due to fetal deformations (Table A1, columns 3-5), while we find no effects for the subsample of fetal deformations (Table A1, columns 6-8).

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[12] The sample includes January-April and August-November of 2009 and 2010. May-July are excluded since they would be subject to the transitory effect of opposite sign.

[13] Note that abortion law in Spain changed on July 5, 2010. Prior to that date, abortion was allowed in the following cases: (1) risk to the life or the physical or mental health of the woman, (2) fetal deformations, and (3) rape. The vast majority of abortions claimed (1), usually under mental health risk. As of July 5, 2010, abortion was allowed at the woman's request in the initial 14 weeks of the pregnancy. This reform could have increased the incidence of abortions. However, this does not seem to be the case. First, the annual number of abortions performed in 2007-2009 was around 111,000-116,000 whereas in 2010, the number was approximately 113,000. Second, we test directly for an effect of the abortion law reform with an RDD-DiD specification with weekly number of abortions (the week starting on July 5, 2010 is the cut-off). We find no significant increase in abortions in regressions with bandwidths 1-5 weeks, and if anything, we find a significant *decrease* in abortions with bandwidths 1-3 weeks (results not shown). Thus, the estimated increase starting in August 2010 (Table 2) seems unrelated to contemporaneous changes in legislation.

[14] The due date is calculated as "abortion date – (weeks of gestation * 7) + 40 * 7 – 3". We subtract 3 days because we observe completed weeks of gestation, not days, and thus we overestimate the actual due date by 0-6 days, i.e. 3 days on average.

To summarize, the estimated effects of the child benefit on abortion rates map into the estimated effects on subsequent birth rates, thus providing additional support for our hypotheses. First, we find a decrease in the daily abortion rate in July 2007, followed by an increase in the daily birth rate starting from December 2007. Second, a decrease in the abortion rate in May 2010 is followed by an increase in the birth rate in October-December 2010. Third, an increase in the abortion rate in August 2010 is followed by a decrease in the birth rate starting in January 2011.

6.2 Heterogeneous effects

We have shown that the introduction and cancellation of the universal child benefit had an impact on fertility, in part via abortions. In the following, we explore whether the effect on fertility was particularly strong in specific subgroups of population. The characteristics that we consider are: birth order of the child, mother's age, marital status, parents' occupational skill level or education, and area of residence.[15] Figure A6 shows the number of births in 2000-2017 in the different subgroups. Whereas number of first and higher-parity births followed a similar pattern over time, fertility trends in the other subgroups differed substantially. The decline in births starting from 2009 (Figure 2) was driven by younger, married, and not-high-skilled women with not-high-skilled partners. On the contrary, fertility

[15] Mothers are divided into "younger" (15-32 years; 57% of the sample) and "older" (33-44 years; 43%) age groups, based on median maternal age in 2000-2017. Parents are classified as having a high-skilled occupation if they are employed (at the time of birth) as administrators, technicians, or scientific workers (37% of mothers and 30% of fathers in our sample). The remaining parents, referred to as "not-high-skilled" from now on, either belong to other occupational groups (25% of mothers and 53% of fathers), or they are not working (38% of mothers and 17% of fathers). We define three areas of residence: rural (<20,000 inhabitants in the municipality; 30% of the sample), urban (between 20,000 and 100,000 inhabitants in the municipality; 27%), and metropolitan (>100,000 inhabitants or capital of the province; 42% of the sample).

of older, not married, high-skilled women with high-skilled partners, kept rising beyond 2008, throughout the universal child benefit period.

Note that Figure A6 and all heterogeneity analyses focus on *number* of births/abortions instead of the preferred birth/abortion *rates*. We are unable to calculate rates here because the denominator, i.e. number of women in the particular sub-group, is unknown.[16] The birth rate would evolve differently from number of births if the overall population of women was changing non-linearly over time (which we confirmed in Figure A5) and/or if population shares of the different subgroups were changing differentially over time (which is plausible).

Tables 3-5 and A3-A4 present regression results of the heterogeneity analyses. In the following, we look at the effects of the universal child benefit in the different subgroups separately.

First, in terms of ***birth order***, columns 1 and 2 in Table 3 reveal that the positive fertility effect during the transition into the child benefit is driven only by higher-parity births and is large in magnitude (8.3%). All subsequent positive and negative effects are found both among first and higher-parity births, albeit the magnitudes of cancellation effects are substantially larger among higher-parity births (2.2% versus 7.7%, and –3.5% versus –8.2%). When looking at the effects on abortions in Table 4, we see that childless women react to both the introduction and cancellation of the benefit. On the other hand, the negative effects in July 2007 and May 2010 are only imprecisely estimated among women with children (column 2), while the positive effect in August 2010 is significant and large (32%).[17]

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[16] We know the total number of women aged 15-44 years, but the size of a particular sub-group, or their fraction among all women 15-44, is unknown. Additionally, this fraction is likely changing over time, e.g. there might be more unemployed women during the crisis etc.
[17] When separating the different higher-parity birth orders (columns 3-5 in Table 3), we see that the effects on births are, in general, universally present albeit sometimes imprecisely estimated. One notable point is that the main child benefit effects, both positive (period 2)

Second, we analyze the effects by ***age of the mother*** (columns 1 and 2 in Table 5, respectively). We find that both younger and older mothers react to the policy changes, but younger mothers react more in periods 1 (+) and 4 (–), whereas older mothers react more in periods 2 (+) and 3 (+). Interestingly, the addition of the positive effects in periods 1-3 is similar for younger and older women (10-11%). The corresponding abortion estimates suggest that the effects are similar among younger and older women, albeit they are imprecisely estimated in the older group (columns 3 and 4 in Table 4).[18]

Third, fertility reactions of women with different ***marital status*** (columns 3 and 4 in Table 5) are fairly similar, except for the transition into the benefit, when only unmarried women react (8.1% more births). The subsequent effects are similar for married and unmarried women. This is not entirely reflected in the abortion data (columns 5 and 6 in Table 4) where we see that married women react more in July 2007 (–13.7%; unmarried women –5.4%) and in August 2010 (32.2%; unmarried women 18.4%). The transitory decrease in abortions in May 2010 is found only among unmarried women (–7.6%); among married women it is similar in size but imprecisely estimated (–6.4%).

Fourth, when looking at parents in different ***occupational groups*** (Table A4), we find strong heterogeneity. High-skilled parents (columns 1 and 3) react to the introduction of the benefit, whereas not-high-skilled parents (columns 2 and 4) react to the cancellation.[19]

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and negative (period 4), are substantially larger among 4th and higher parity births (8.6% and –16.1%, respectively). Also the main abortion effect of child benefit cancellation (August 2010) is the largest among the highest parity category (42%, column 3 in Table A3).

[18] The distinction between younger (15-32) and older (33-44) women is based on the median age in the birth data. Older women in abortion data account only for 28% of abortions, which may cause the imprecision of estimates.

[19] Note that the not-high-skilled group includes both low-skilled and out-of-labor-force individuals. Out-of-labor-force includes students, retirees, stay-at-home, and unemployed parents.

Fertility among high-skilled parents increases by 10.4% and 13.2% in December 2007, which are three to four times larger effect sizes than in the full sample. Throughout the child benefit period, fertility keeps rising by additional 6.5% and 4.0% among high-skilled mothers and fathers, respectively. Cancellation of the policy did not affect their fertility; if anything, high-skilled mothers have by 2.5% *more* births starting from January 2011, despite the cancelled child benefit. Among the not-high-skilled parents, the situation is different. These groups react to cancellation as expected, with more births just prior to the end of the policy and fewer births afterwards (–13.0% and –9.3% among mothers and fathers, respectively). However, they do not react to the introduction of the policy with more births; in fact, their fertility *decreases* as of December 2007 by 3.6% and 2.8%, respectively. Analysis of *couples* with different combinations of skill levels (columns 5-7 in Table 5) shows that couples with at least one high-skilled partner react positively to the introduction, while low-skilled or out-of-labor-force couples react to the cancellation of the benefit.[20]

In the abortion data, parental occupation is not reported, but we know the ***educational attainment*** of the woman. As shown in columns 7 and 8 in Table 4, abortions of women with less than high school react similarly to those of women with high school or more. Within the more educated group, women with high-school react in July 2007 (–14.6%) and in August 2010 (34.0%), whereas college-educated women react in May 2010 (–19.6%). Disaggregation of women with low education shows no heterogeneity (results not shown).

[20] The counterintuitive negative introduction effects among not-high-skilled couples are entirely driven by parents who are both out-of-labor-force; couples with at least one low-skilled partner react as expected, with an increasing number of births starting from December 2007 (3.2%), and do not react during the benefit period (results not shown). The puzzling *decrease* in births among out-of-labor force couples during the child benefit could be explained by labor force reacting (decreasing) in anticipation of receiving the child benefit.

Finally, we explore whether couples living in ***municipalities of different sizes*** react to the policy differently. Columns 5-7 in Table A4 show that the effects in rural, urban, and metropolitan areas are rather similar. The main substantial difference occurs after benefit introduction, when we see that there was no impact on births in rural areas, and the effect in urban areas (2.6%) was half the size of the effect size in metropolitan areas (4.6%).

To summarize the results of the heterogeneity analysis, we found fertility effects across birth orders, maternal age groups, and marital status. One exception is the fertility increase in December 2007 (driven by a drop in abortions) which is found only among higher-parity, young, and unmarried women. In terms of occupational skills, high-skilled and mixed-skilled couples react to the introduction of the benefit, while not-high-skilled couples react to the cancellation. Finally, the positive fertility effects during the main benefit period (2008-2010), are largest in metropolitan areas, less pronounced in urban areas, and absent in rural areas, while the cancellation effects were present in all three areas. All these heterogeneity results need to be taken with a grain of salt, as we were able to estimate the policy effect only on *number* of births and abortions, but not on birth and abortion *rates*. Rates might have evolved somewhat differently, given that the population of women in reproductive age evolved non-linearly throughout the period (Figure A5).

6.3 Impact of economic conditions

One may expect the child benefit to have larger effects among couples with lower income, where the lump-sum payment of €2,500 has a relatively higher value in real terms. Information on household income is not available in our data, but we explore differential effects by GDP per capita at province level. We also explore heterogeneity across provinces that were affected by the economic crisis with different intensity. We expect the effects of policy introduction and cancellation to be larger in provinces with lower income, and the cancellation effects to be larger in provinces more affected by the crisis.

First, we examine heterogeneity with respect to income level in the province. Based on GDP per capita at province level, we create a binary indicator of low-income provinces,[21] and interact it with the four different time periods of interest. Columns 1 and 2 in Table 6 show the results for number of births and birth rates. First, we find that couples in poorer provinces do not react differentially to the introduction of the benefit. However, their reaction to the cancellation is more pronounced: the positive transitory effect on daily birth rate just before the cancellation is higher by 3.7 in poorer provinces, on top of the base effect of 3.4 in richer provinces, and the negative effect of the cancellation is by –4.2 larger than in richer provinces (–5.0). This means that the effect magnitudes are about twice as large in poorer than in richer provinces for the positive transitory effect and the negative main effect.

Second, we create a province-level indicator of crisis intensity,[22] and interact it with the four different time periods. Provinces that were to be more exposed to the economic crisis, which started in late 2008, do not react differentially to the introduction of child benefit in

[21] We use data on GDP per capita in each province in 2007 and 2010 to create a province-level indicator of income level. We first rank the provinces according to their GDP p.c. in each year. Then we create a binary variable that takes value 1 for the 25 provinces that were relatively poorer in 2007, and 0 otherwise. We assign these values to each province in months January 2000-April 2010. In months May 2010-December 2017, the binary variable takes value 1 for the 25 provinces that were relatively poorer in 2010, and 0 otherwise. The idea is that families are reacting to the real value of the benefit around July 2007, when the benefit is introduced, and around May 2010, when the cancellation is announced. Only two provinces change their income status between 2007 and 2010.

[22] We define our crisis measure as the absolute increase in the male unemployment rate in a province between the point in time when it was the lowest (third quarter of 2006; 6.0%) and the highest (first quarter of 2013; 26.7%) in Spain nationwide. Then, we rank the 50 Spanish provinces, and we create a binary variable which indicates a more intense exposure to the crisis. This variable takes value 1 for the 25 provinces that experienced a larger increase in the male unemployment rate, and 0 for the rest.

mid-2007 (columns 3 and 4, Table 6). More exposed provinces do react more strongly to the cancellation of the benefit, which took place during the crisis. In terms of daily birth rates, the transitory increase just before the cancellation is 2.2 in provinces less exposed to the crisis, and an additional 6.1 in provinces more exposed to the crisis. The negative effect of the cancellation, observed starting from January 2011, is –3.0 in provinces less affected and an additional –8.1 in provinces more affected by the economic crisis. These are large disparities, both in absolute and relative terms: the temporary increase in birth rates in late 2010, as well as the subsequent decrease, were almost four times larger in provinces more affected by the crisis.

To conclude, our analysis shows that women in poorer provinces, where the real value of the child benefit was higher, did not react differentially to the introduction of the benefit, but they did react twice as strongly to its cancellation, compared to couples in richer provinces. Similarly, fertility in Spanish provinces more affected by the economic crisis reacted four times as much to the cancellation compared to areas less affected by the crisis.

6.4 Quantum versus tempo effects

We have provided evidence on the overall effect of the child benefit on fertility, and on the extent to which some subgroups reacted disproportionately. Another important question is whether the observed effects can be interpreted as actual increases in fertility ("quantum" effect), or whether they merely reflect changes in the timing of otherwise unchanged fertility ("tempo" effect). In other words, did the documented increases in birth rates lead to an increase in completed fertility (for some women), or was the effect only of a temporary nature? This question is relevant since policy makers diverted substantial economic resources to finance the universal child benefit, with an explicit intention to elevate the fertility rate (quantum effect). If families did not have more children overall, the cost-effectiveness of the policy would be questionable. Given the short duration of the benefit (3.5 years), and given the onset of the economic crisis in the same period, it is hard to identify clearly whether the overall number of children increased as a consequence of the child benefit. We present several pieces of evidence suggesting the presence of a quantum effect.

The first piece of evidence comes from Table 3, where we saw more births during the child benefit period at all parities (and a decrease afterwards). If the effect was exclusively of a tempo nature, i.e. stemming from having the same number of children only earlier, we would not necessarily expect to see any increase among parities larger than 2, as these are relatively rare (91% of births in 2006 were the mother's 1st or 2nd child).

Second, it is useful to explore the effects of the benefit on birth rates among women of different ages (Table 7). The positive effects of policy introduction were not restricted to younger women, which may happen in case of a pure tempo effect. For instance, the birth rate among women aged 35-39 increased substantially during the child benefit period (see column 5 in Table 7). This positive fertility effect is found among women aged 35-39 at all parities (column 5 in panels A-D, Table A5). More *first* births among "older" women (panel A) likely represent "additional" births, as the median age was 30 and 33 years for first and higher-parity births in 2006, respectively. In addition, the fact that *all* higher parities among "older" women are positively affected (panels C and D) hints towards additional births as well (quantum effect).

On the other hand, we also find evidence of a tempo effect, as birth rates among "young" women aged 20-24 and 25-29 years increased (Table 7), and this happened across all parities (columns 2 and 3 in panels A-D, Table A5). Another piece of evidence supporting the tempo effect among young mothers stems from the fact that the birth interval among women aged

20-24 who had a second child became significantly shorter (by 2 months) during the child benefit period (Table A6).[23] However, it is possible that these young women would have had *additional* children later on, if the policy had been in place for longer than just 3.5 years. In other words, the evidence of a tempo effect could have been the onset of a quantum effect that would show in the "medium run".[24]

Finally, the short positive transitory effect on fertility just before the cancellation of the policy also led to additional births, which is demonstrated by an increase in second births among virtually all maternal age groups (panel C, Table A5). Furthermore, we observe an increase in less common parities 3+ (women aged 30-34; column 4 in panel D, Table A5), an increase in first births among "older" women (women aged 35-39; column 5 in panel A, Table A5), and a general increase in the birth rate among "older" women (aged 35-39 and 40-44, Table 7). All these seem to be additional births that would not have taken place otherwise (quantum effect). However, note that this positive transitory effect was not intended by the policy makers.

In conclusion, we cannot distinguish clearly whether the additional births among *younger* women were exclusively a tempo effect (i.e. young women had children earlier) or whether these births would have led to a higher overall fertility, had the policy remained in

[23] The only other statistically significant effect in Table A6 is an *increase* in birth interval among women of prime fertility age (25-29 and 30-34) during the child benefit, which is consistent with a quantum effect (women who had finalized their fertility with only one child, and who then decided to have another child, after a longer break).

[24] Interpretation of increasing birth rates among young women is generally not straightforward, if observed only over a short period of time. For instance, more births of parity 3+ among young women aged 20-24 (column 2 in panel D, Table A5) hint towards a quantum effect, since parities higher than 2 are uncommon (9% of births in 2006). On the other hand, these additional higher parity births to young mothers could just as well reflect a tempo effect, if the increase took place exclusively in the population of women who had planned to have more than 2 children, independently of the child benefit.

place for longer (i.e. young women who decided to have more children as a reaction to the policy might have started their reproductive life earlier and/or might have chosen shorter birth spacing). What we can say, looking at the evidence after only 3.5 years of the policy, is that the additional births that we document seem to have been a combination of a tempo effect (among younger women) and a quantum effect (among older women). A potential onset of a quantum effect in the medium run among younger women cannot be identified due to the short duration of the policy.

7 Discussion and conclusions

We show that a universal child benefit introduced in Spain in the late 2000s led to an increase in fertility. Three years later, the announcement of the cancellation of the benefit led to a temporary increase in birth rates (through a decrease in abortion rates), and to a decrease after the cancellation came into effect. In general, the policy effects on fertility were present across all birth orders, maternal age groups, and marital statuses. However, different occupational groups reacted differently: couples with at least one high-skilled partner reacted to the introduction, while couples with no high-skilled partner reacted to the cancellation of the benefit. Also, economic conditions seemed to be relevant, especially in the reactions to the cancellation: families in poorer regions reacted twice as much, while families in regions more affected by the crisis reacted four times as much. The observed effects were driven by changes in both conceptions and abortions. We also provide suggestive evidence that the observed effects reflected both timing effects (tempo) as well as changes in completed fertility (quantum).

In order to quantify how many additional births were induced by the policy, we estimate the effects of the benefit on the absolute number of births in the different periods (column 5 in Table 1), and multiply the coefficients by the number of months in each period.[25] According to this back-of-the-envelope calculation, the policy brought about 70,000 additional births, which would correspond to "2 extra months of births" over a 37-month period. As we have shown, some of these births reflected a mere timing effect (tempo), while some were additional births (quantum).

Our identification strategy relies on estimating changes in abortion and birth rates at specific points in time, following the timing of benefit introduction and cancellation. Two limitations are worth discussing. First, while abortions and intentions to conceive can react immediately to policy announcements, births respond with some delay, which varies across couples, making identification harder. Second, since we exploit before-after variation, it is important to consider other policy changes that may have taken place in the same time period.

Regarding the first issue, conception is in general not immediate, and the time necessary to conceive a child varies across couples. Moreover, not all conceptions result in a birth, as women can experience a miscarriage or opt for an abortion. The length of the pregnancy also varies.[26] Ideally, we would have liked to measure intentions to conceive, which can react immediately after policy announcements. We provide suggestive evidence that they did react, based on monthly data from Google trends on searches of words related to birth control in Spain in 2004-2013 (contraceptives, pill, and birth control pills). We run a simple regression where we include a linear trend, calendar month fixed effects, and two dummy variables of

[25] Since the estimated effects are cumulative throughout the subsequent periods, and since we measure the dependent variable as births per day per province, the final calculation is: {[0.67*4 months] + [(0.67+0.52)*30 months] + [(0.67+0.52+1.13)*3 months]} * {50 provinces} * {30.46 days per month in the average month in 12/2007-12/2010} = 69,227 additional births. This corresponds to 1.90 additional months of births, since the average number of births per month in Spain prior to the policy (01/2000-11/2007) was 36,514.

[26] In 2000-2017, the 10th, 50th, and 90th percentiles of the distribution of weeks of gestation were 37, 39, and 41.

interest: "post-July-2007" which takes value 1 in July 2007 and later, and "post-May-2010" which takes value 1 in May 2010 and later. As before, the coefficients are reported as a shift in levels compared to the previous period (Table A7). Daily searches decreased by 18-39% starting from July 2007 (depending on the word and population). Conversely, searches increased starting from May 2010, by 22-28%. This provides suggestive evidence that couples' intentions to conceive increased when the introduction of the benefit was announced, and decreased following the cancellation announcement.

Regarding the second issue, we attribute the documented changes in abortion and birth rates over time to the child benefit. Even though the evidence is compelling, it is possible that other contemporaneous changes may have partly driven the observed fertility shifts. We control for a smooth time trend as well as employment and unemployment rates, but it is worth discussing other policy changes during the relevant years.

A potentially relevant reform was the introduction of a two-week paternity leave in March 2007. If the new policy had led to an increase in conceptions, this could have contributed to more births starting from January 2008. We do indeed observe an increase in births starting in December 2007, which we attribute to fewer abortions after the introduction of the child benefit. In support for this interpretation, we provide evidence that abortions showed a discrete fall in July 2007. Moreover, Farré and González (2019) find that the introduction of paternity leave in 2009 may have, in fact, lowered subsequent fertility.

As for the cancellation of the child benefit, several other public budget cuts were announced in May 2010 due to the ongoing economic crisis, some of which became effective as of January 2011. These general budget cuts may have led to a decrease in birth rates starting from January 2011, but it is harder to link them to the transitory increase in birth rates in October-December 2010. In addition, the evidence that we provide for abortion rates is well identified within an RDD-DiD framework. Finally, it is also worth mentioning that the abortion law in Spain changed in July 2010. We test directly for potential effects of this change on abortion rates (see section 6.1.2), and find no evidence that the reform had an impact on the number of abortions.

In the paper, we provide evidence from both benefit introduction and cancellation, using data on both abortions and births, combined with careful attention to the expected timing of the effects. All in all, we believe that our estimates credibly identify the impact of the universal child benefit on fertility, even though one should be cautious when interpreting the exact magnitudes, given that we exploit time variation and there were other policy changes that may have also affected conceptions and abortions during the period.

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Figures

Figure 1: Timeline of the universal child benefit policy and of its expected effects on birth rate

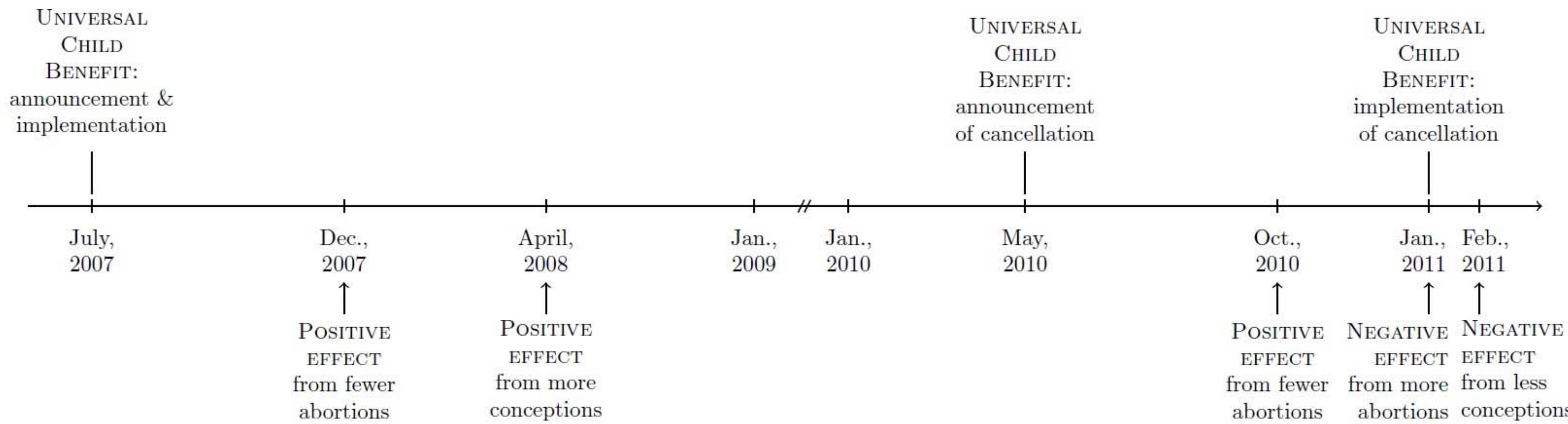
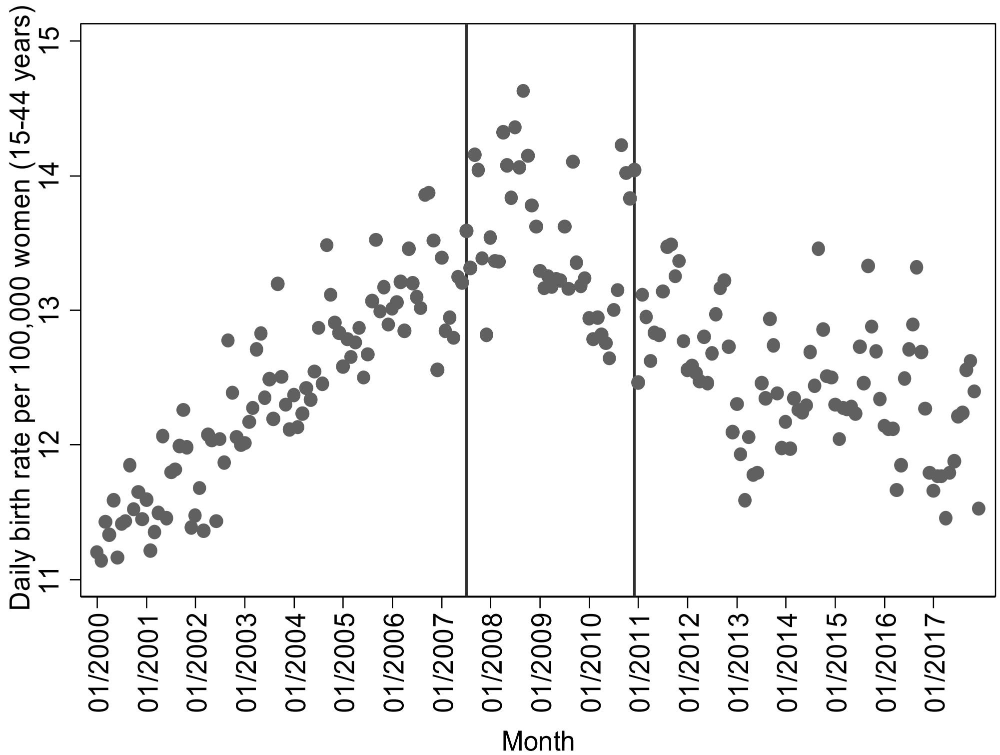
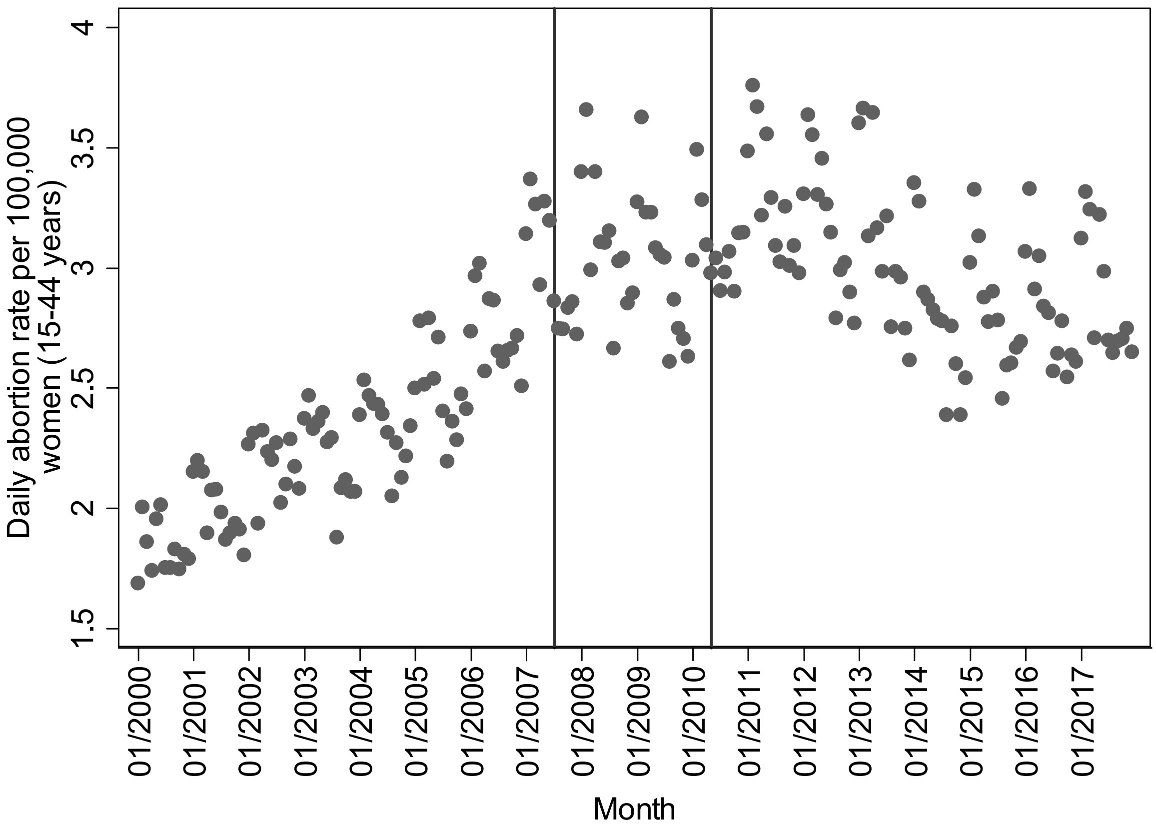


Figure 2: Birth rate in Spain in 2000-2017



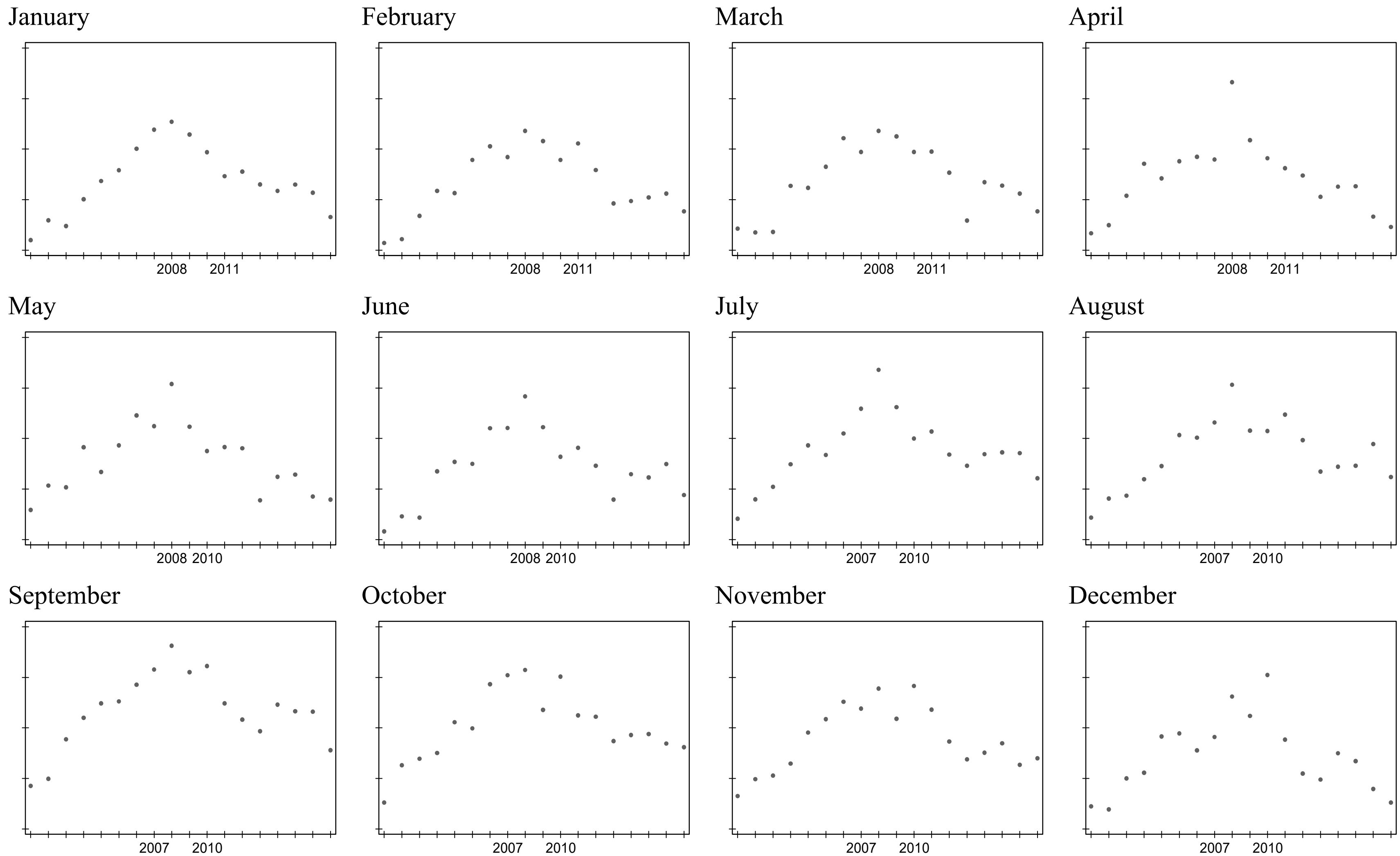
Notes: The birth rate is calculated as the number of births per day to women in reproductive age (15-44 years), divided by the number of women in reproductive age, in each calendar month between January 2000 and December 2017, and expressed per 100,000 women in reproductive age. Vertical lines depict the start (July 2007) and the end (December 2010) of the universal child benefit policy.

Figure 3: Abortion rate in Spain in 2000-2017



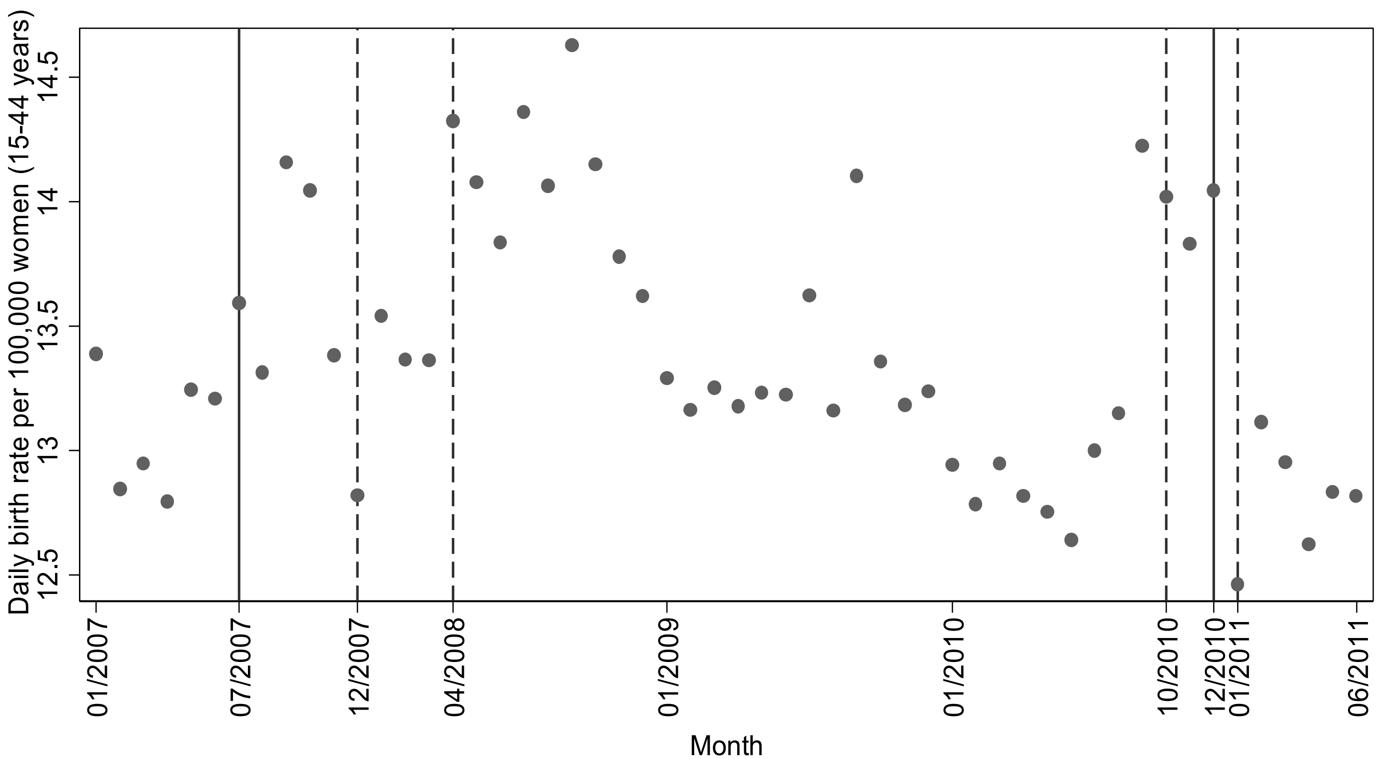
Notes: The abortion rate is calculated as the number of abortions per day to women in reproductive age (15-44 years), divided by the number of women in reproductive age, in each calendar month between January 2000 and December 2017, and expressed per 100,000 women in reproductive age. Vertical lines depict the announcement of introduction (July 2007) and of cancellation (May 2010) of the universal child benefit policy.

Figure 4: Birth rate in Spain in 2000-2017, by calendar month



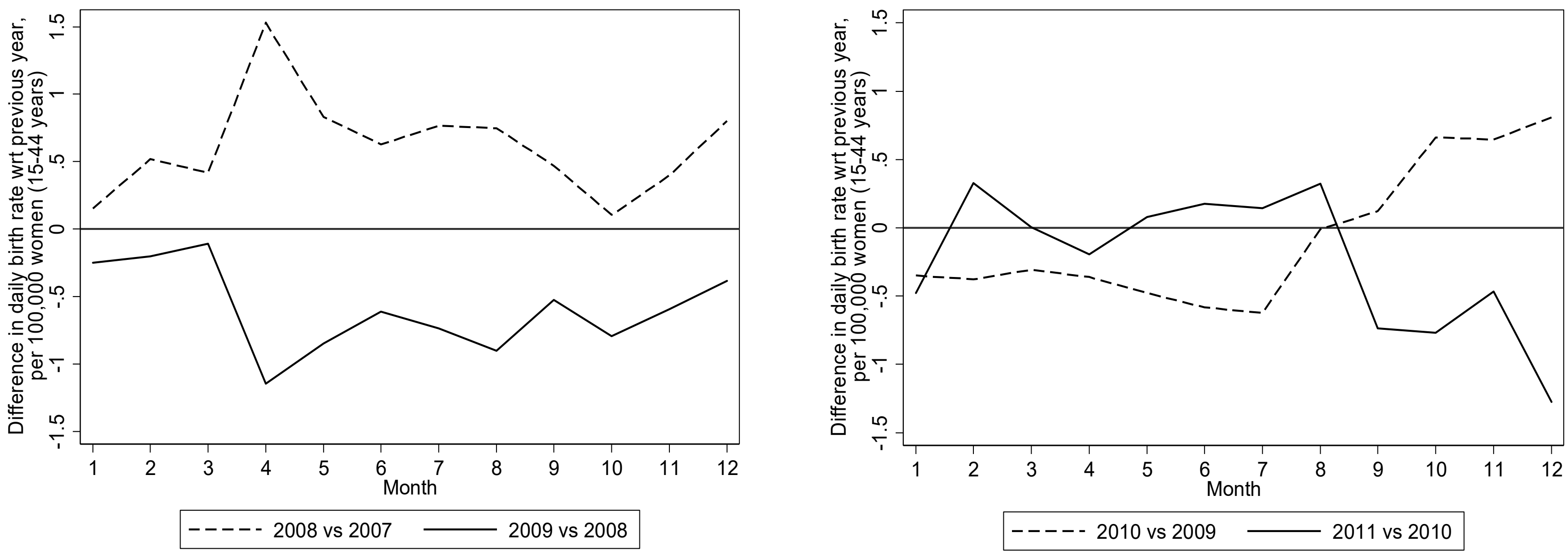
Notes: The birth rate is calculated as in Figure 2. The range of the y-axis is 11-15 births per day per 100,000 women aged 15-44 years; all graphs are on the same scale. Year is shown on the x-axis; period covered is 2000-2017.

Figure 5: Birth rate in Spain during universal child benefit policy



Notes: The birth rate is calculated as in Figure 2. Period covered is January 2007-June 2011. Solid vertical lines depict the start and the end of the universal child benefit policy. Dashed vertical lines mark months when the effects of the policy are expected to show.

Figure 6: Differences in birth rates in years 2008 and 2010, and the surrounding years



Notes: Displayed are the differences in birth rates in the same calendar month in two consecutive years. The birth rate is calculated as in Figure 2.

Tables

Table 1: Estimated effects of universal child benefit on births

	(1) Log(births)	(2) Log(births)	(3) Donut Log(births)	(4) Donut Birth rate	(5) Donut Births
Transition into child benefit	0.0356***	0.0347***	0.0351***	0.1187*	0.6744***
(12/2007-03/2008)	(0.0078)	(0.0075)	(0.0075)	(0.0701)	(0.1834)
Child benefit period	0.0189*	0.0276***	0.0277***	0.2154***	0.5186***
(04/2008-09/2010)	(0.0101)	(0.0077)	(0.0077)	(0.0759)	(0.1827)
Transition out of child benefit	0.0538***	0.0629***	0.0471***	0.5273***	1.1295***
(10/2010-12/2010)	(0.0094)	(0.0062)	(0.0075)	(0.0912)	(0.2371)
Post-child-benefit period	-0.0793***	-0.0740***	-0.0569***	-0.7049***	-1.5875***
(01/2011-12/2016)	(0.0070)	(0.0063)	(0.0079)	(0.0940)	(0.3453)
Employment rate, male	0.5500*	0.4191***	0.4205***	1.9841*	13.5033***
	(0.3067)	(0.1009)	(0.1011)	(1.0959)	(4.7444)
Unemployment rate, male	0.0671	-0.1628**	-0.1675**	-3.8812***	-4.0412**
	(0.2143)	(0.0679)	(0.0677)	(0.7645)	(1.9271)
Month	0.0194***				
	(0.0013)				
Month squared	-0.0000***				
	(0.0000)				
Province-specific month		YES	YES	YES	YES
Province-specific month ^ 2		YES	YES	YES	YES
Province-specific month ^ 3				YES	
Province FE	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES
Observations	10,800	10,800	10,700	10,700	10,700
R-squared	0.9920	0.9945	0.9944	0.8054	0.9964

Notes: OLS regressions. Monthly data on 50 Spanish provinces between 01/2000 and 12/2017. Dependent variables are: logarithm of number of births per day in each calendar month among women aged 15-44 years (columns 1-3); the corresponding birth rate, expressed per 100,000 women aged 15-44 years (column 4); and number of births per day in each calendar month among women aged 15-44 years (column 5). In columns 3-5, births in 12/2010 and 01/2011 are set to missing. Column 4 is our preferred specification. (Un)employment rates are included with a lag of three quarters. Standard errors are clustered at province level.

Table 2: Treatment effects of universal child benefit on abortions

Panel A: Dependent variable Log(abortions)	(1) July 2007	(2) May 2010	(3) August 2010
Treatment	**-0.0748****	**-0.0736****	**0.2215*****
	(0.0298)	**(0.0352)**	**(0.0349)**
Year FE	YES	YES	YES
Province FE	YES	YES	YES
Calendar month FE	YES	YES	YES
Observations	800	500	800
R-squared	0.9776	0.9827	0.9721
Panel B: Dependent variable Abortion rate	(1) July 2007	(2) May 2010	(3) August 2010
Treatment	**-0.1378*****	**-0.0930***	**0.4437*****
	(0.0490)	**(0.0536)**	**(0.0606)**
Year FE	YES	YES	YES
Province FE	YES	YES	YES
Calendar month FE	YES	YES	YES
Observations	800	500	800
R-squared	0.8991	0.9093	0.8378

Notes: Estimates of discontinuity at the cut-off in an RDD-DiD framework. Monthly data on 50 Spanish provinces. Dependent variables are logarithm of number of abortions per day in each calendar month among women aged 15-44 years (panel A) and the corresponding abortion rate, expressed per 100,000 women aged 15-44 years (panel B). Forcing variable is the difference between the month of abortion and the cut-off (July 2007, May 2010, August 2010), measured in months. Data used in the estimations are: March-October 2006 and 2007 in column 1, January-May 2009 and 2010 in column 2, January-April and August-November 2009 and 2010 in column 3. Excluded are abortions related to fetal deformations. Standard errors are clustered at province level.

Table 3: Heterogeneity analysis of births by birth order

Dependent variable: Log(Births)	(1) Firstborn	(2) Higher parity	(3) Second born	(4) Third born	(5) Parity 4+
Transition into child benefit	0.0044	0.0834***	0.0840***	0.0919***	0.1048**
(12/2007-03/2008)	(0.0107)	(0.0180)	(0.0194)	(0.0251)	(0.0410)
Child benefit period	0.0266**	0.0292***	0.0244***	0.0190	0.0860**
(04/2008-09/2010)	(0.0100)	(0.0088)	(0.0089)	(0.0244)	(0.0373)
Transition out of child benefit	0.0216**	0.0767***	0.0811***	0.0533	0.0592
(10/2010-12/2010)	(0.0093)	(0.0102)	(0.0105)	(0.0327)	(0.0568)
Post-child-benefit period	-0.0352***	-0.0821***	-0.0748***	-0.0916***	-0.1609***
(01/2011-12/2016)	(0.0102)	(0.0094)	(0.0103)	(0.0285)	(0.0440)
Province-specific month	YES	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES	YES
Province-specific month ^ 3					
Province FE	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES
Observations	10,700	10,700	10,700	10,700	10,700
R-squared	0.9907	0.9869	0.9842	0.9383	0.8503

Notes: OLS regressions. Monthly data on 50 Spanish provinces between 01/2000 and 12/2017. Dependent variable is the logarithm of number of births per day in each calendar month among women aged 15-44 years. Births in 12/2010 and 01/2011 are set to missing. (Un)employment rates are included with a lag of three quarters but not shown. Standard errors are clustered at province level.

Table 4: Heterogeneity analysis of abortions by mother's socio-demographic and educational characteristics

Dependent variable: Log(Abortions)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Parity 0	Parity 1+	Mother younger	Mother older	Married	Not married	Less than high school	High school and more
Post-July-2007	-0.0653*	-0.0783	-0.0796**	-0.0945	-0.1366**	-0.0544*	-0.0844*	-0.1010**
	(0.0346)	(0.0639)	(0.0308)	(0.0796)	(0.0598)	(0.0301)	(0.0484)	(0.0433)
Post-May-2010	-0.1289***	-0.0698	-0.0688*	-0.1556	-0.0638	-0.0755*	-0.0840*	-0.0769
	(0.0445)	(0.0812)	(0.0357)	(0.1049)	(0.0728)	(0.0430)	(0.0489)	(0.0765)
Post-August-2010	0.1265***	0.3167***	0.2137***	0.2562***	0.3217***	0.1840***	0.2072***	0.2160***
	(0.0309)	(0.0591)	(0.0373)	(0.0621)	(0.0727)	(0.0387)	(0.0673)	(0.0496)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Estimates of discontinuity at the cut-off in an RDD-DiD framework. Monthly data on 50 Spanish provinces. Dependent variable is logarithm of number of abortions per day in each calendar month among women aged 15-44 years. Forcing variable is the difference between the month of abortion and the cut-off (July 2007, May 2010, August 2010), measured in months. Data used in the estimations are: March-October 2006 and 2007 in row 1, January-May 2009 and 2010 in row 2, January-April and August-November 2009 and 2010 in row 3. Division into younger (15-32 years) and older (33-44 years) age groups in columns 3 and 4, respectively, is based on median maternal age in birth data in 2000-2017. Excluded are abortions related to fetal deformations. Standard errors are clustered at province level.

Table 5: Heterogeneity analysis of births by parents' socio-demographic and occupational characteristics

Dependent variable: Log(Births)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mother younger	Mother older	Married	Not married	Both parents high-skilled	One parent high-skilled	Both parents not-high-skilled
Transition into child benefit	0.0537***	0.0125	0.0090	0.0806***	0.0782***	0.1652***	-0.0874***
(12/2007-03/2008)	(0.0098)	(0.0080)	(0.0094)	(0.0126)	(0.0238)	(0.0199)	(0.0179)
Child benefit period	0.0152*	0.0461***	0.0229**	0.0278**	0.0560***	0.0551***	-0.0188*
(04/2008-09/2010)	(0.0084)	(0.0091)	(0.0096)	(0.0106)	(0.0184)	(0.0133)	(0.0111)
Transition out of child benefit	0.0340***	0.0653***	0.0432***	0.0448***	0.0219	0.0090	0.0451**
(10/2010-12/2010)	(0.0081)	(0.0110)	(0.0086)	(0.0149)	(0.0169)	(0.0125)	(0.0169)
Post-child-benefit period	-0.0849***	-0.0296***	-0.0508***	-0.0669***	0.0096	0.0245	-0.1477***
(01/2011-12/2016)	(0.0087)	(0.0102)	(0.0099)	(0.0126)	(0.0149)	(0.0152)	(0.0150)
Province-specific month	YES	YES	YES	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES	YES	YES	YES
Province-specific month ^ 3					YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES	YES
Observations	10,700	10,700	10,700	10,700	10,700	10,700	10,700
R-squared	0.9916	0.9898	0.9921	0.9853	0.9708	0.9769	0.9878

Notes: OLS regressions. Monthly data on 50 Spanish provinces between 01/2000 and 12/2017. Dependent variable is logarithm of number of births per day in each calendar month among women aged 15-44 years. Division into younger (15-32 years) and older (33-44 years) age groups in columns 1 and 2, respectively, is based on median maternal age in 2000-2017. Category "not-high-skilled" includes low-skilled individuals and those out of the labor force. Births in 12/2010 and 01/2011 are set to missing. (Un)employment rates are included with a lag of three quarters but not shown. Standard errors are clustered at province level.

Table 6: Estimated effects of universal child benefit on births by economic conditions in the province

Economic conditions indicator	Income level		Economic crisis intensity	
Dependent variable	(1)	(2)	(3)	(4)
	Log(births)	Birth rate	Log(births)	Birth rate
Main effects:				
Transition into child benefit	0.0387***	0.1579**	0.0380***	0.1523*
(12/2007-03/2008)	(0.0066)	(0.0709)	(0.0075)	(0.0763)
Child benefit period	0.0247***	0.2615***	0.0325***	0.2900***
(04/2008-09/2010)	(0.0062)	(0.0791)	(0.0057)	(0.0625)
Transition out of child benefit	0.0279***	0.3430***	0.0231**	0.2201*
(10/2010-12/2010)	(0.0102)	(0.1241)	(0.0104)	(0.1236)
Post-child-benefit period	-0.0419***	-0.4972***	-0.0265**	-0.3024**
(01/2011-12/2016)	(0.0128)	(0.1508)	(0.0115)	(0.1342)
Interaction with economic indicators:				
Transition into child benefit	-0.0073	-0.0795	-0.0055	-0.0625
(12/2007-03/2008)	(0.0143)	(0.1271)	(0.0143)	(0.1271)
Child benefit period	0.0067	-0.0916	-0.0125	-0.1522
(04/2008-09/2010)	(0.0168)	(0.1645)	(0.0167)	(0.1614)
Transition out of child benefit	0.0389**	0.3688*	0.0449***	0.6107***
(10/2010-12/2010)	(0.0155)	(0.2077)	(0.0147)	(0.1934)
Post-child-benefit period	-0.0298	-0.4155*	-0.0627***	-0.8061***
(01/2011-12/2016)	(0.0190)	(0.2229)	(0.0174)	(0.2007)
Employment rate, male	0.4104***	1.9352*	0.4256***	2.0316*
	(0.1043)	(1.1083)	(0.1006)	(1.0885)
Unemployment rate, male	-0.1791**	-3.9284***	-0.1416**	-3.7983***
	(0.0722)	(0.7754)	(0.0665)	(0.7496)
Province-specific month	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES
Province-specific month ^ 3		YES		YES
Province FE	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES
Observations	10,700	10,700	10,700	10,700
R-squared	0.9945	0.8056	0.9945	0.8059

Notes: OLS regressions. Monthly data on 50 Spanish provinces between 01/2000 and 12/2017. Dependent variables are logarithm of number of births per day in each calendar month among women aged 15-44 years (columns 1 and 3) and the corresponding birth rate, expressed per 100,000 women aged 15-44 years (columns 2 and 4). Columns 1-2 show interaction terms with a dummy variable that takes value 1 for the 25 provinces with lower GDP p.c. in 2007 and 2010, and 0 otherwise. The dummy variable is also included in the model but not shown. Columns 3-4 show interaction terms with a dummy variable that takes value 1 for the 25 provinces more affected by the economic crisis, and 0 otherwise. Births in 12/2010 and 01/2011 are set to missing. (Un)employment rates are included with a lag of three quarters. Standard errors are clustered at province level.

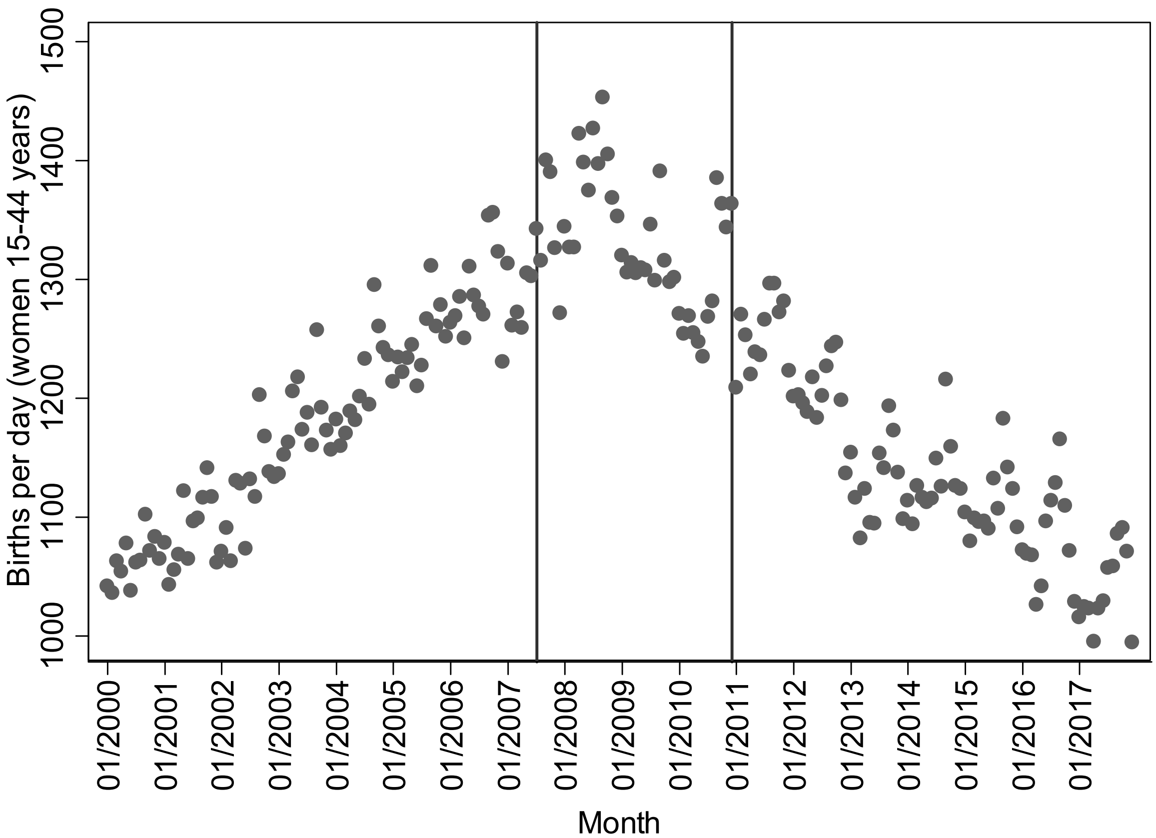
Table 7: Estimated effects of universal child benefit on age-specific birth rates

Dependent variable: Birth rate	(1) 15-19	(2) 20-24	(3) 25-29	(4) 30-34	(5) 35-39	(6) 40-44
Transition into child benefit	0.0923	0.5844***	0.3777**	-0.2674	0.0484	0.0340
(12/2007-03/2008)	(0.0752)	(0.1172)	(0.1691)	(0.2174)	(0.1429)	(0.0607)
Child benefit period	-0.1093	0.2444*	0.0772	0.3136	0.5600***	0.0089
(04/2008-09/2010)	(0.0728)	(0.1302)	(0.1463)	(0.1960)	(0.1540)	(0.0589)
Transition out of child benefit	-0.1048	0.2011	0.4346*	1.0995***	1.0096***	0.1481*
(10/2010-12/2010)	(0.1287)	(0.1330)	(0.2381)	(0.2462)	(0.2324)	(0.0863)
Post-child-benefit period	-0.3128***	-1.1820***	-1.1468***	-0.8440***	-0.6173***	-0.0525
(01/2011-12/2016)	(0.1165)	(0.1657)	(0.2465)	(0.2473)	(0.1991)	(0.0842)
Province-specific month	YES	YES	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES	YES	YES
Province-specific month ^ 3	YES	YES	YES	YES		YES
Province FE	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES
Observations	10,700	10,700	10,700	10,700	10,700	10,700
R-squared	0.5583	0.7494	0.7472	0.6250	0.6850	0.5575

Notes: OLS regressions. Monthly data on 50 Spanish provinces between 01/2000 and 12/2017. Dependent variable is the daily birth rate among women in a given age group, expressed per 100,000 women in that age group, in each calendar month. Births in 12/2010 and 01/2011 are set to missing. (Un)employment rates are included with a lag of three quarters but not shown. Standard errors are clustered at province level.

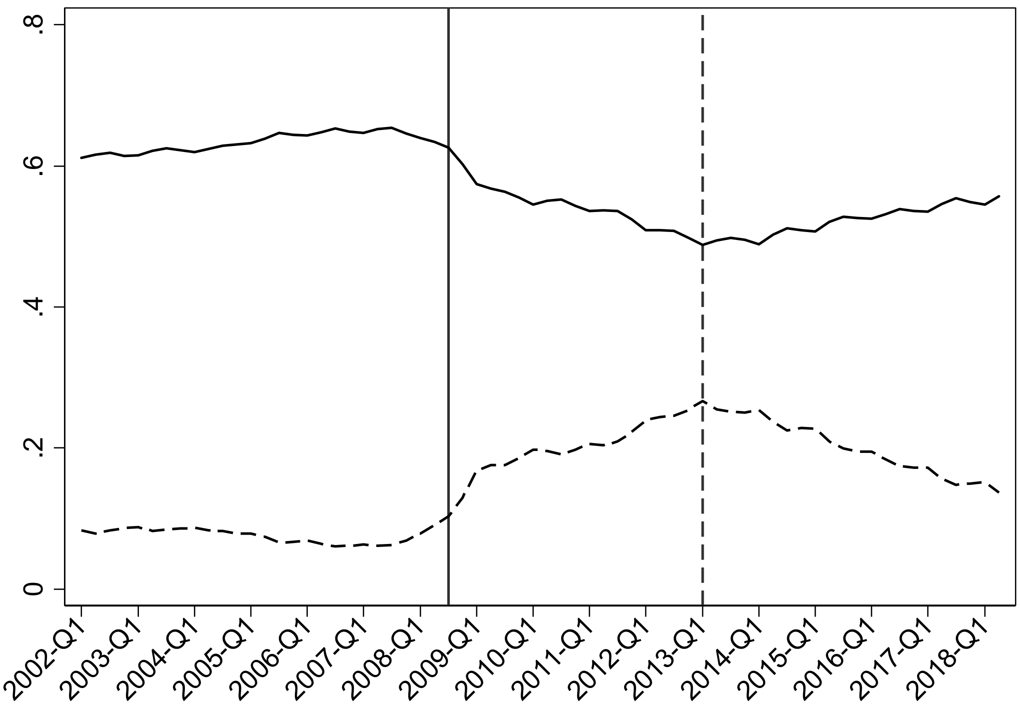
Annex

Figure A1: Number of births in Spain in 2000-2017



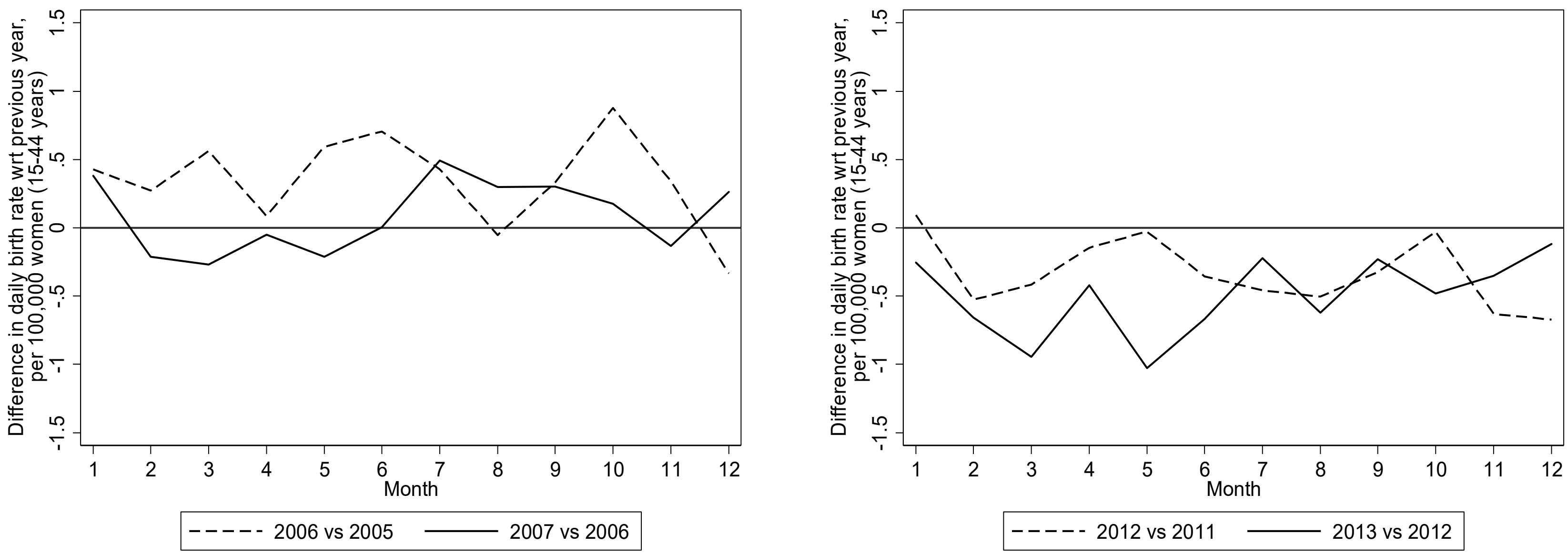
Notes: Number of births per day to women in reproductive age (15-44 years) in each calendar month between January 2000 and December 2017. Vertical lines depict the start (July 2007) and the end (December 2010) of the universal child benefit policy.

Figure A2: Employment and unemployment rates in Spain in 2002-2018



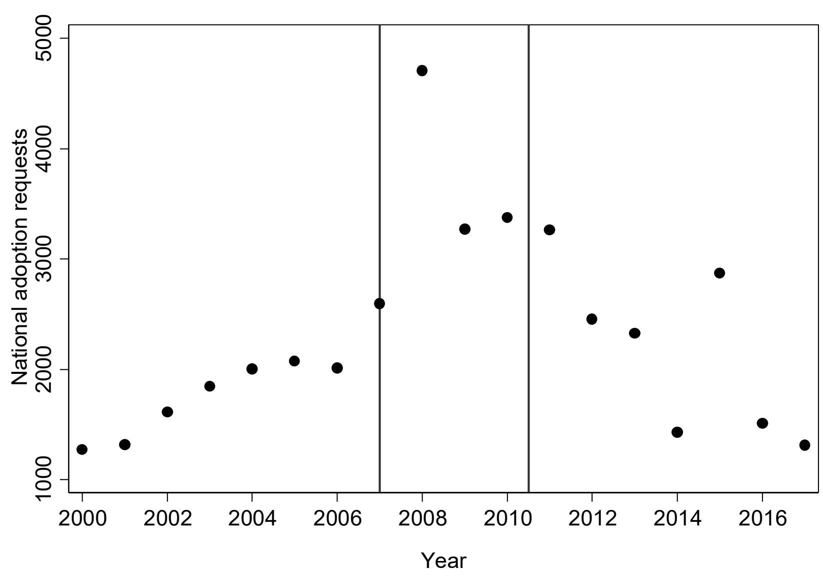
Notes: Quarterly data. Male employment (solid line) and unemployment (dashed line) rates. The solid vertical line marks the third quarter of 2008 when male unemployment rate rose above 10% for the first time. The dashed vertical line marks the first quarter of 2013 when male unemployment rate peaked.

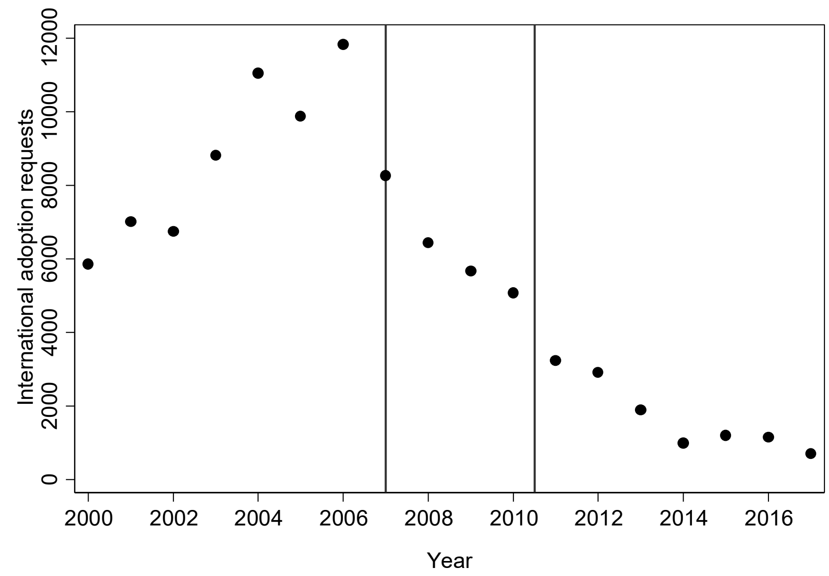
Figure A3: Differences in birth rates in placebo years 2006 and 2012, and the surrounding years



Notes: Displayed are the differences in birth rates in the same calendar month in two consecutive years. The birth rate is calculated as in Figure 2.

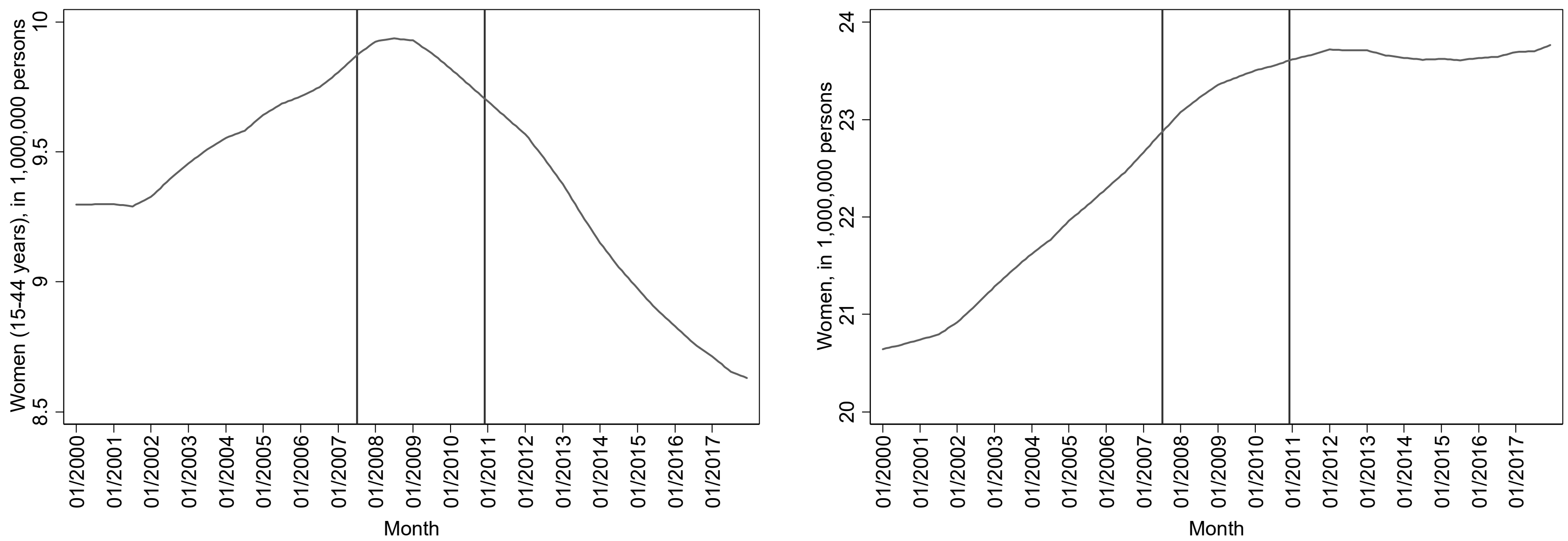
Figure A4: Number of national and international adoption requests in Spain in 2000-2017





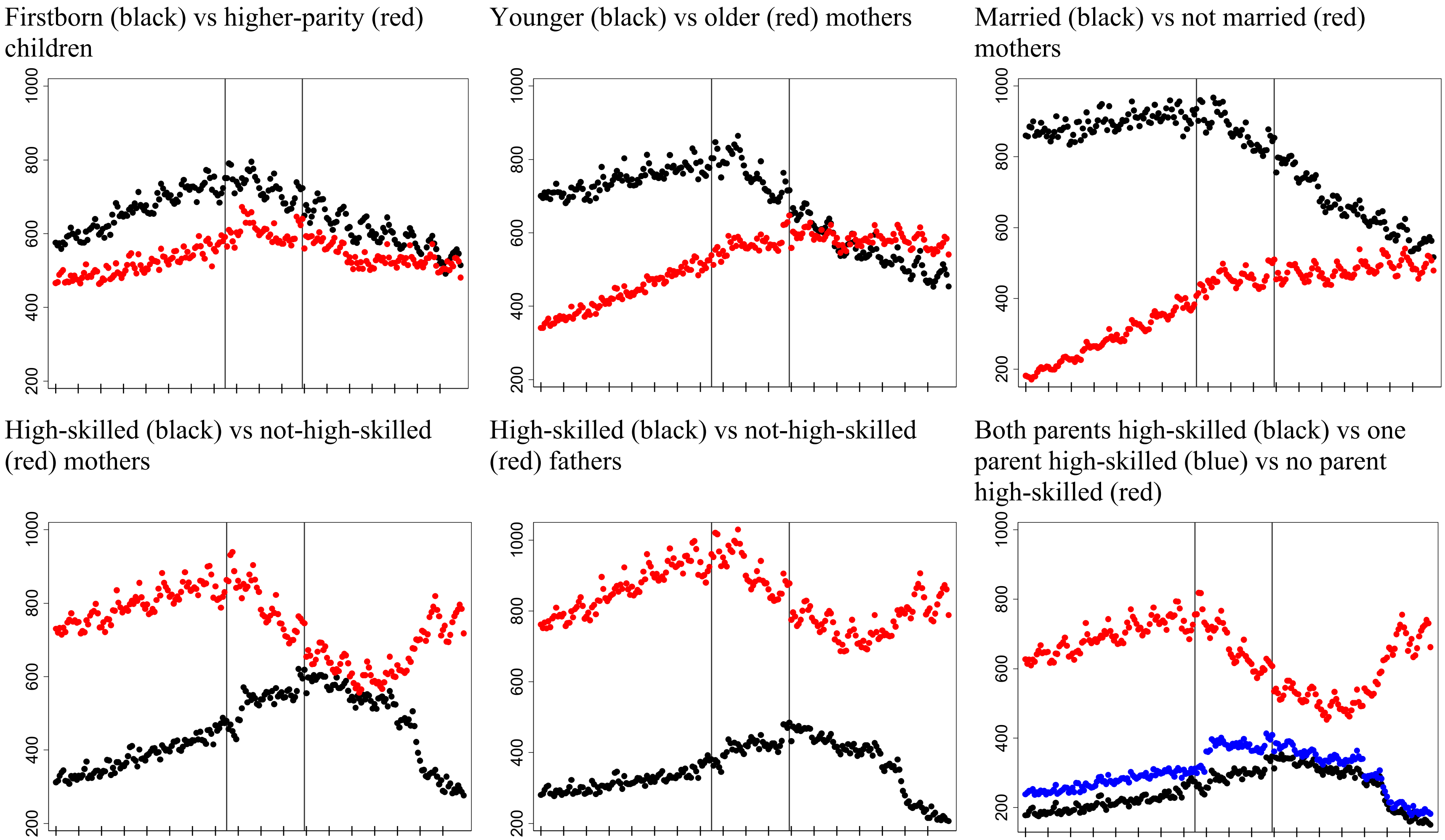
Notes: Annual data. Vertical lines represent the start (July 2007) and the end (December 2010) of the universal child benefit policy.

Figure A5: Number of women in Spain in 2000-2017



Notes: Number of women in reproductive age (15-44 years; left) and women of all ages (right) between January 2000 and December 2017. Vertical lines depict the start (July 2007) and the end (December 2010) of the universal child benefit policy.

Figure A6: Number of births in different subgroups in Spain in 2000-2017



Notes: Number of births per day to women in reproductive age (15-44 years) in each calendar month between January 2000 and December 2017. Ticks on the x-axes mark January of each year. Vertical lines depict the start (July 2007) and the end (December 2010) of the universal child benefit policy.

Table A1: Treatment effects of universal child benefit on abortions, additional specifications

Reason for abortion	Petition		All abortions			Fetal deformations		
Panel A: Dependent variable Log(abortions)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	May 2010	May 2010	July 2007	May 2010	August 2010	July 2007	May 2010	August 2010
Treatment	**-0.0244**	**-0.0329**	**-0.0725****	**-0.0515**	**0.2073*****	**0.0085**	**0.1478**	**-0.1987***
	(0.0236)	**(0.0306)**	**(0.0290)**	**(0.0352)**	**(0.0342)**	**(0.0853)**	**(0.1339)**	**(0.1059)**
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	700	600	800	500	800	800	500	800
R-squared	0.9816	0.9820	0.9779	0.9833	0.9731	0.7197	0.7500	0.7204
Panel B: Dependent variable Abortion rate	(2)	(1)	(3)	(4)	(5)	(6)	(7)	(8)
	May 2010	May 2010	July 2007	May 2010	August 2010	July 2007	May 2010	August 2010
Treatment	**-0.0017**	**0.0119**	**-0.1320****	**-0.0714**	**0.4293*****	**0.0058**	**0.0217**	**-0.0144**
	(0.0418)	**(0.0519)**	**(0.0503)**	**(0.0588)**	**(0.0612)**	**(0.0069)**	**(0.0159)**	**(0.0095)**
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	700	600	800	500	800	800	500	800
R-squared	0.9000	0.9051	0.8962	0.9076	0.8345	0.1699	0.1977	0.1839

Notes: Estimates of discontinuity at the cut-off in an RDD-DiD framework. Monthly data on 50 Spanish provinces. Dependent variables are logarithm of number of abortions per day in each calendar month among women aged 15-44 years (panel A) and the corresponding abortion rate, expressed per 100,000 women aged 15-44 years (panel B). Forcing variable is the difference between the month of abortion and the cut-off (July 2007, May 2010, August 2010), measured in months. Data used in the estimations are: January-June 2009 and 2010 in column 1, January-July 2009 and 2010 in column 2, March-October 2006 and 2007 in columns 3 and 6, January-May 2009 and 2010 in columns 4 and 7, January-April and August-November 2009 and 2010 in columns 5 and 8. Columns 1-2 exclude abortions related to fetal deformations, columns 3-5 include all abortions, and columns 6-8 include only abortions related to fetal deformations. Standard errors are clustered at province level.

Table A2: Estimated change in abortions with a due date in January 2011

Reason for abortion	**All abortions**		**Petition**	
Dependent variable	(1)	(2)	(3)	(4)
	Log(abortions)	Abortion rate	Log(abortions)	Abortion rate
Post-January-2011	**0.0696****	**0.1712*****	**0.0761****	**0.1811*****
	(0.0294)	**(0.0579)**	**(0.0300)**	**(0.0553)**
Year FE	YES	YES	YES	YES
Province FE	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES
Observations	800	800	800	800
R-squared	0.9782	0.8713	0.9759	0.8750

Notes: Estimates of discontinuity at the cut-off in an RDD-DiD framework. Monthly data on 50 Spanish provinces. Dependent variables are logarithm of number of abortions per day with a due date in a specific calendar month among women aged 15-44 years at the time of abortion (columns 1 and 3) and the corresponding abortion rate, expressed per 100,000 women aged 15-44 years (columns 2 and 4). Forcing variable is the difference between the due month and January 2011, measured in months. Data used in the estimations are due months September 2009-April 2010 and September 2010-April 2011. Year FE refer to period FE (period 2009-2010 and 2010-2011). Columns 3-4 exclude abortions related to fetal deformations. Standard errors are clustered at province level.

Table A3: Heterogeneity analysis of abortions by mother's parity and educational characteristics

Dependent variable: Log(Abortions)	(1)	(2)	(3)	(4)	(5)
	Parity 1	Parity 2	Parity 3+	High school	University
Post-July-2007	-0.1154	-0.0921	0.0247	-0.1459**	-0.0306
	(0.0737)	(0.0901)	(0.0735)	(0.0625)	(0.0607)
Post-May-2010	-0.1130	-0.0002	-0.0052	-0.0204	-0.1962*
	(0.0844)	(0.1001)	(0.1116)	(0.0813)	(0.1037)
Post-August-2010	0.2562***	0.3440***	0.4217***	0.3397***	0.0644
	(0.0634)	(0.0773)	(0.0974)	(0.0780)	(0.0611)
Year FE	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES

Notes: Estimates of discontinuity at the cut-off in an RDD-DiD framework. Monthly data on 50 Spanish provinces. Dependent variable is logarithm of number of abortions per day in each calendar month among women aged 15-44 years. Forcing variable is the difference between the month of abortion and the cut-off (July 2007, May 2010, August 2010), measured in months. Data used in the estimations are: March-October 2006 and 2007 in row 1, January-May 2009 and 2010 in row 2, January-April and August-November 2009 and 2010 in row 3. Excluded are abortions related to fetal deformations. Standard errors are clustered at province level.

Table A4: Heterogeneity analysis of births by parents' occupational characteristics and area of residence

Dependent variable: Log(Births)	(1) Mother high-skilled	(2) Mother not-high-skilled	(3) Father high-skilled	(4) Father not-high-skilled	(5) Rural	(6) Urban	(7) Metropolitan
Transition into child benefit	0.1036***	-0.0364***	0.1322***	-0.0284**	0.0104	0.0138	0.0121
(12/2007-03/2008)	(0.0196)	(0.0134)	(0.0217)	(0.0111)	(0.0105)	(0.0177)	(0.0222)
Child benefit period	0.0648***	-0.0115	0.0401**	0.0080	0.0098	0.0261*	0.0458*
(04/2008-09/2010)	(0.0148)	(0.0095)	(0.0152)	(0.0090)	(0.0084)	(0.0155)	(0.0245)
Transition out of child benefit	0.0143	0.0463***	0.0196	0.0391***	0.0349***	0.0510***	0.0447***
(10/2010-12/2010)	(0.0117)	(0.0132)	(0.0136)	(0.0120)	(0.0111)	(0.0171)	(0.0117)
Post-child-benefit period	0.0247**	-0.1300***	0.0073	-0.0928***	-0.0592***	-0.0647***	-0.0456***
(01/2011-12/2016)	(0.0107)	(0.0121)	(0.0127)	(0.0117)	(0.0116)	(0.0221)	(0.0144)
Province-specific month	YES	YES	YES	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES	YES	YES	YES
Province-specific month ^ 3	YES	YES	YES	YES	YES	YES	
Province FE	YES	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES	YES
Observations	10,700	10,700	10,700	10,700	10,700	10,700	10,700
R-squared	0.9815	0.9906	0.9780	0.9920	0.9824	0.9930	0.9859

Notes: OLS regressions. Monthly data on 50 Spanish provinces between 01/2000 and 12/2017. Dependent variable is logarithm of number of births per day in each calendar month among women aged 15-44 years. Category "not-high-skilled" includes low-skilled individuals and those out of the labor force. Mother's area of residence is defined based on the number of inhabitants in the municipality: rural (<20,000), urban (between 20,000 and 100,000), metropolitan (>100,000 or capital of the province). Births in 12/2010 and 01/2011 are set to missing. (Un)employment rates are included with a lag of three quarters but not shown. Standard errors are clustered at province level.

Table A5 (part 1): Estimated effects of universal child benefit on births, by mother's age and parity

Panel A:	(1)	(2)	(3)	(4)	(5)	(6)
Firstborn children	15-19	20-24	25-29	30-34	35-39	40-44
Transition into child benefit	0.0593	0.0835***	-0.0113	-0.0113	-0.0339	0.0169
(12/2007-03/2008)	(0.0409)	(0.0212)	(0.0155)	(0.0139)	(0.0242)	(0.0439)
Child benefit period	-0.0336	0.0294	0.0079	0.0344***	0.0746***	-0.0257
(04/2008-09/2010)	(0.0341)	(0.0243)	(0.0154)	(0.0114)	(0.0247)	(0.0433)
Transition out of child benefit	-0.0808	-0.0165	0.0113	0.0363**	0.0540***	0.0714
(10/2010-12/2010)	(0.0629)	(0.0339)	(0.0187)	(0.0150)	(0.0179)	(0.0506)
Post-child-benefit period	-0.0963*	-0.1166***	-0.0631***	-0.0242	0.0024	0.0171
(01/2011-12/2016)	(0.0569)	(0.0378)	(0.0184)	(0.0148)	(0.0187)	(0.0436)
Province-specific month	YES	YES	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES	YES	YES
Province-specific month ^ 3	YES					
Province FE	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES
Observations	10,700	10,700	10,700	10,700	10,700	10,700
R-squared	0.8506	0.9345	0.9720	0.9780	0.9519	0.8037

Panel B:	(1)	(2)	(3)	(4)	(5)	(6)
Higher-parity (2+) children	15-19	20-24	25-29	30-34	35-39	40-44
Transition into child benefit	0.0574	0.1928***	0.1591***	0.0822***	0.0430**	0.0405
(12/2007-03/2008)	(0.0570)	(0.0359)	(0.0257)	(0.0202)	(0.0191)	(0.0330)
Child benefit period	0.0409	0.0698**	0.0009	0.0371***	0.0299**	0.0092
(04/2008-09/2010)	(0.0546)	(0.0324)	(0.0187)	(0.0127)	(0.0114)	(0.0286)
Transition out of child benefit	0.0919	0.0842**	0.0699***	0.0869***	0.0810***	0.0814**
(10/2010-12/2010)	(0.0806)	(0.0364)	(0.0223)	(0.0154)	(0.0169)	(0.0366)
Post-child-benefit period	-0.2483***	-0.1780***	-0.1479***	-0.0881***	-0.0378**	-0.0683*
(01/2011-12/2016)	(0.0806)	(0.0376)	(0.0185)	(0.0137)	(0.0164)	(0.0393)
Province-specific month	YES	YES	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES	YES	YES
Province-specific month ^ 3						
Province FE	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES
Observations	10,700	10,700	10,700	10,700	10,700	10,700
R-squared	0.6076	0.8547	0.9449	0.9730	0.9692	0.8653

Table A5 (part 2): Estimated effects of universal child benefit on births, by mother's age and parity

Panel C:	(1)	(2)	(3)	(4)	(5)	(6)
Second born children	15-19	20-24	25-29	30-34	35-39	40-44
Transition into child benefit	0.0916*	0.1741***	0.1580***	0.0741***	0.0526**	0.0690
(12/2007-03/2008)	(0.0535)	(0.0370)	(0.0272)	(0.0216)	(0.0213)	(0.0477)
Child benefit period	0.0006	0.1077***	-0.0007	0.0357**	0.0111	-0.0051
(04/2008-09/2010)	(0.0488)	(0.0310)	(0.0172)	(0.0136)	(0.0136)	(0.0417)
Transition out of child benefit	0.0806	0.0708*	0.0800***	0.0826***	0.1005***	0.0859**
(10/2010-12/2010)	(0.0764)	(0.0375)	(0.0282)	(0.0164)	(0.0179)	(0.0423)
Post-child-benefit period	-0.2377***	-0.1383***	-0.1569***	-0.0700***	-0.0453**	-0.0483
(01/2011-12/2016)	(0.0785)	(0.0409)	(0.0257)	(0.0158)	(0.0185)	(0.0504)
Province-specific month	YES	YES	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES	YES	YES
Province-specific month ^ 3						YES
Province FE	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES
Observations	10,700	10,700	10,700	10,700	10,700	10,700
R-squared	0.5937	0.8359	0.9299	0.9682	0.9598	0.8114
Panel D:	(1)	(2)	(3)	(4)	(5)	(6)
Parity 3+ children	15-19	20-24	25-29	30-34	35-39	40-44
Transition into child benefit	-0.0255	0.1891***	0.1976***	0.0969***	0.0164	0.0271
(12/2007-03/2008)	(0.0409)	(0.0558)	(0.0398)	(0.0360)	(0.0374)	(0.0481)
Child benefit period	0.0484	-0.0148	-0.0254	0.0270	0.0810**	0.0255
(04/2008-09/2010)	(0.0419)	(0.0550)	(0.0427)	(0.0371)	(0.0332)	(0.0477)
Transition out of child benefit	0.0294	0.1060	0.0635	0.1360***	-0.0066	0.0986
(10/2010-12/2010)	(0.0602)	(0.0749)	(0.0600)	(0.0411)	(0.0354)	(0.0604)
Post-child-benefit period	-0.0577	-0.3296***	-0.1347***	-0.2326***	-0.0271	-0.1224*
(01/2011-12/2016)	(0.0603)	(0.0732)	(0.0478)	(0.0398)	(0.0345)	(0.0637)
Province-specific month	YES	YES	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES		YES
Province-specific month ^ 3				YES		
Province FE	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES
Observations	10,700	10,700	10,700	10,700	10,700	10,700
R-squared	0.2178	0.6714	0.8050	0.8693	0.8829	0.7666

Notes: OLS regressions. Monthly data on 50 Spanish provinces between 01/2000 and 12/2017. Dependent variable is logarithm of number of births per day in each calendar month in a given age group. Births in 12/2010 and 01/2011 are set to missing. (Un)employment rates are included with a lag of three quarters but not shown. Standard errors are clustered at province level.

Table A6: Estimated effects of universal child benefit on birth interval among second-born children, by mother's age

Birth interval	(1)	(2)	(3)	(4)	(5)	(6)
Second born children	15-19	20-24	25-29	30-34	35-39	40-44
Transition into child benefit	-0.0079	-0.4611	1.2155**	-0.0675	0.1880	-1.1683
(12/2007-03/2008)	(0.7366)	(0.8114)	(0.5149)	(0.3916)	(0.6111)	(2.3628)
Child benefit period	0.5123	-1.6675**	-0.7344	0.9323**	0.7840	-0.5613
(04/2008-09/2010)	(0.7310)	(0.6279)	(0.5679)	(0.4310)	(0.5744)	(2.5824)
Transition out of child benefit	1.1330	-0.5223	-0.3160	0.6400	-0.0824	1.6478
(10/2010-12/2010)	(1.0398)	(0.8619)	(0.5192)	(0.4446)	(0.5626)	(2.1705)
Post-child-benefit period	0.2064	0.5583	0.2625	-0.6959	0.4564	-4.0609*
(01/2011-12/2016)	(0.9294)	(0.7474)	(0.5736)	(0.4614)	(0.5250)	(2.0712)
Province-specific month	YES	YES	YES	YES	YES	YES
Province-specific month ^ 2	YES	YES	YES	YES	YES	YES
Province-specific month ^ 3		YES			YES	
Province FE	YES	YES	YES	YES	YES	YES
Calendar month FE	YES	YES	YES	YES	YES	YES
Observations	6,591	10,429	10,777	10,800	10,800	10,375
R-squared	0.0348	0.0571	0.1451	0.4681	0.4776	0.1552

Notes: OLS regressions. Monthly data on 50 Spanish provinces between 01/2000 and 12/2017. Dependent variable is the average time since previous birth among women in a given age group in each calendar month, measured in months. Births in 12/2010 and 01/2011 are set to missing. (Un)employment rates are included with a lag of three quarters but not shown. Standard errors are clustered at province level.

Table A7: Estimated effects of universal child benefit announcements on Google searches on contraceptives

	Anticonceptivos		Pildora		Pastillas anticonceptivas	
	(1)	(2)	(3)	(4)	(5)	(6)
	Number	Rate	Number	Rate	Number	Rate
Post-July-2007	-0.1753***	-0.2118***	-0.3579***	-0.3944***	-0.1174	-0.1538
	(0.0592)	(0.0617)	(0.1357)	(0.1385)	(0.1205)	(0.1220)
Post-May-2010	0.0189	0.0419	0.2576*	0.2806**	0.2217*	0.2447*
	(0.0600)	(0.0626)	(0.1375)	(0.1404)	(0.1222)	(0.1236)
Month	-0.0027**	-0.0022*	-0.0076***	-0.0072**	0.0108***	0.0112***
	(0.0012)	(0.0013)	(0.0028)	(0.0029)	(0.0025)	(0.0025)
Calendar month FE	YES	YES	YES	YES	YES	YES
Observations	120	120	120	120	120	120
R-squared	0.6384	0.6093	0.4985	0.4845	0.6934	0.6986

Notes: OLS regressions. Monthly data on Spain between 01/2004 and 12/2013. Dependent variables are logarithm of number of searches per day in each calendar month (columns 1, 3, 5), and logarithm of number of searches per day in each calendar month per 100,000 women aged 15-44 years (columns 2, 4, 6).