

The Effect of Abortion Legalization on Fertility, Marriage, and Long-term Outcomes for Women[§]

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Abstract: We evaluate the short- and long-term effects for women of access to legal, subsidized abortion. We find evidence that the legalization of abortion in Spain in 1985 led to an immediate decrease in births, more pronounced for younger women in provinces with a higher supply of abortion services. Affected women were more likely to graduate from high school, less likely to marry young, less likely to divorce in the long-term, and reported higher life satisfaction as adults. We do not find negative effects on completed fertility, nor do we find significant effects on labor market outcomes in the long run.

Keywords: Abortion, fertility, education, labor market outcomes, satisfaction

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1. Introduction

Access to contraception and family planning has important social implications. It allows women and families to achieve their desired fertility, as well as control its timing, which can affect family well-being through multiple channels. Access to abortion services can also have direct effects on women's health, e.g. if the alternatives to regulated abortion are unsafe.

Abortion is legal and even publicly subsidized in many countries.¹ Abortion regulation, however, remains a heated topic, and many countries have debated and/or reformed their abortion legislation in recent years. For instance, Ireland voted in favor of legalizing abortion in May 2018, while legalization was voted down in the Argentinian Senate in August 2018.

Previous literature using data for different countries has shown that easier access to abortion has short-term effects on birth-rates (Pop-Eleches 2010 for Romania; Levine et al. 1996, 1999, Joyce et al. 2013, and Bailey and Lindo 2017 for the US; Clarke and Mühlrad 2018 for Mexico), and may affect completed fertility (Gruber et al. 1999, Ananat et al. 2007, 2009). Recent work by Myers (2017) provides evidence that abortion legalization may have affected age at first marriage and age at first birth in the US. It has also been shown that easier abortion affects the characteristics and outcomes of children born (Ananat et al. 2009, Gruber et al. 1999, Donohue and Levitt 2001, Pop-Eleches 2006).

A related recent literature suggests that access to oral contraception ("the pill") in the US had relevant effects on long-term outcomes for women, such as age at first marriage, human capital accumulation, and labor market participation (Goldin and Katz 2002, Bailey 2006, 2010, 2012).

We are unaware of previous studies providing causal evidence on the long-term effects of access to abortion on education and labor market

¹ Abortion Policies and Reproductive Health, United Nations 2014.

outcomes for women.² This may be due to identification problems. Abortion reforms usually take place at the national level, which complicates finding appropriate control groups. We address this challenge by combining the time variation provided by the legalization of abortion in Spain in 1985, with geographical variation in the availability of health centers that provided abortion services in the early years after legalization.³

In this paper we provide causal evidence on the long-term effects of access to abortion on women's completed fertility, educational attainment, family formation, labor market outcomes, and subjective well-being. We exploit the legalization of abortion in Spain in 1985, comparing cohorts of women who were affected to a different extent based on their age in 1985, combined with geographical variation in the availability of abortion clinics in the initial years after legalization.

We focus on women who were very young when abortion was legalized, so that they would have been able to avoid an early birth, unlike women who were older in 1985. In addition, the "treatment" of abortion legalization would have been stronger for women living near an abortion clinic, compared with those in a region where no health centers provided abortion services in the early years after legalization.

We construct a new dataset of abortion clinics with their geographical location and years of operation, and follow a difference-in-differences approach, exploiting variation across cohorts and the availability of abortion clinics. We are able to follow women for up to 30 years after the legal reform. We exploit a range of data sources, from administrative birth certificates to

² Molland (2016) provides some evidence for Norway suggesting that abortion availability may delay fertility and improve educational attainment for women.

³ A few recent papers have used distance to legal abortion providers in the US to study short-term effects of access to abortion services on abortion and birth rates (Joyce et al. 2013, Cunningham et al. 2017).

labor force survey data, in order to explore a range of short- and long-term outcomes.

The supply of abortion services in different locations may not be exogenous and reflect at least in part demand factors. In order to deal with this concern, we first provide evidence of parallel trends in fertility prior to the reform. In addition, we control directly for demand factors, such as religiosity and pre-existing teen birth rates at the local level, interacted with the reform, such that we are plausibly left with idiosyncratic variation in the supply of abortion services in an area.

We find that abortion legalization, combined with living close to an abortion clinic, led to a 6% short-term decline in birth-rates among women younger than 21. We find a delay in both first birth and marriage. We also find that women more affected by the reform were significantly more likely to graduate from high school.

In the long term, we find that completed fertility was unaffected. In addition, treated women are less likely to have ever married, and fewer of them report being divorced, suggesting better-quality matches. We find insignificant effects on long-term labor market outcomes (participation, employment, and earnings).

These results are unlikely to be confounded by the impact of access to oral contraceptives, since their introduction and regulation in Spain precedes the regulation of abortion by several years. The pill started being sold in Spain on 1964, and it became legal as a contraceptive method in 1978, i.e. 7 years before the legalization of abortion. Our results survive a robustness check where we control for knowledge of and/or usage of the pill at the regional level.

Our findings suggest that the legal regulation of abortion can have important implications for women's lives, affecting the timing of family formation as well as educational attainment, while not lowering completed

fertility. Our interpretation is that those effects are overall positive, as suggested by our analysis of long-term, self-reported well-being.

The remainder of the paper is organized as follows. In the next section we describe the events that led to the legalization of abortion in Spain in 1985. In section 3 we evaluate the short-term effects of the legal change on fertility and marriage rates. Section 4 presents the results on long-term outcomes, and section 5 concludes.

2. The legalization of abortion in Spain

Abortion was banned in Spain until 1985. In October 1982, the Socialist Party won the national election with a large majority, and in January 1983 the Health Minister announced that abortion would be legalized. A draft of the law was approved in the national Parliament in October. However, in December 1983 the law was challenged by conservative legislators, and sent to court with the argument that it was unconstitutional. In April 1985, the High Court upheld the charges. However, the government announced that they would make some minor changes to the writing of the law in order to make it constitutional. In late May 1985, the new draft was approved in parliament. The law was finally passed in July, and became effective in August 1985.

Since August 1985, abortions were allowed when: 1) there was serious risk to the physical or mental health of the pregnant woman, 2) the woman became pregnant as a result of rape, provided that the abortion was performed within the first 12 weeks of gestation and the rape had been reported; or 3) there was risk of malformations or defects, physical or mental, in the fetus, provided that the interruption was done within the first 22 weeks of gestation. In the first and third cases, a medical report was required to certify compliance with the conditions laid down by law. In the three cases, abortion was not punishable if undertaken by a doctor, or under their supervision, in a medical establishment approved for abortions, whether public or private, with the express consent of the woman.

In practice, about 98% of all abortions reported between 1986 and 2010 were filed under “risk to the health of the mother”. Many of those cases argued risks to the mother’s mental health, as confirmed by a psychologist, and this was easy to argue for unwanted pregnancies.

Figure 1 shows the annual number of registered abortions, as reported by the Spanish Ministry of Health. By 1992, one out of every 10 pregnancies was terminated legally (45,000 annual registered abortions, for under 400,000 live births). By 2010, it was 1 out of every 5 pregnancies. In 2010, a new law was passed which decriminalized the practice of abortion during the first 14 weeks of the pregnancy, without the need for any special circumstance to concur.

3. Short-term effects of access to abortion

3.1. Effects on fertility and marriage

We first study the effects of abortion legalization on the reproductive outcomes of women. The abortion law was implemented in August 1985. Therefore, abortions taking place in and after August 1985 would have led to fewer births a few months later.⁴ To make sure that we are able to capture all abortions occurring after the law (even those at unusually late stages of the pregnancy), we analyze the time series of births over time, and we look for a break around December 1985.

Figure 2 shows the annual number of *births* in Spain for two age groups (under 21, and 21 and over), between 1979 and 1992 (normalized to 100 in 1985). The number of births displays a decreasing trend for both groups, more

⁴ More than 95% of all registered abortions take place before week 17 of the pregnancy. The birth-certificate data for 1986 show that about 95% of all births took place after week 35 of the pregnancy. The first registered legal abortions took place on August 9, 1985. An abortion that took place on August 9, 1985 at weeks 7-16 of pregnancy would have led to a birth on weeks 36-42 of the pregnancy, i.e. the birth would have taken place between late December, 1985, and early April, 1986. Thus, our first “post” month in the birth data is December 1985. The most common scenario for an August 9, 1985 abortion would be: the abortion taking place on weeks 7-8, which would have led to a birth on weeks 39-40, i.e. in March of 1986.

pronounced for the younger one. We observe a more marked decline after the reform among women under 21, suggesting that the reform may have affected fertility among younger women, but the fall is hardly distinguishable from the pre-existing trend.

The impact of abortion legalization was unequal across the Spanish territory, mainly due to the different availability of abortion clinics. By 1989, all clinics that practiced at least one abortion in a year had the legal obligation to report it to the Ministry of Health, who, in turn, publishes the list of clinics annually. Using the first annual report available, we construct an indicator of the number of clinics per 100,000 inhabitants for each of the 50 provinces in Spain.⁵ As shown in Figure 3, there are large geographical differences in the supply of abortion services: in 10 provinces, there were 0.3-0.6 clinics per 100,000 inhabitants, while 24 out of 50 provinces had no clinics reporting abortions in 1989.

Figure 4 shows the annual number of births (normalized to 100 in 1985), splitting the population into two groups: women living in provinces without abortion clinics in 1989, and those living in provinces with at least one clinic that practiced abortions in 1989. Panel A displays the results for all ages. While fertility shows the same decreasing trend in both groups of provinces before the reform, the decrease after the reform is more pronounced in provinces with a higher supply of abortion services. This pattern is also observed when we look at women younger than 21 (Panel B).

To quantify this effect, we estimate a generalized difference-in-differences specification that interacts the post-reform variable with our measure of the supply of abortion services:

$$Y_{pt} = \alpha + \beta Post_t * Supply_p + \mu_p + \delta_y + \lambda_m + \epsilon_{pt}, \quad (1)$$

⁵ The Ministry of Health started to collect this information in 1988. However, the information for that year is incomplete (for example, there is no information for the whole region of Catalonia). Therefore, we use the first year of complete information, 1989. We leave out of the analysis the Autonomous cities, Ceuta and Melilla.

where Y_{pt} is the outcome of interest in province p and month t , $Post$ is a binary indicator taking the value 1 in all months starting in December 1985 and 0 otherwise, and $Supply$ is our measure of access to abortion services. We use two alternative indicators for the potential supply of abortion services: i) the number of clinics per 100,000 inhabitants in the province in 1989 (continuous treatment variable), and ii) an indicator which takes value 1 if there was at least one clinic practicing abortions in the province in 1989, and zero otherwise (binary treatment variable). We also check the robustness of our results using the absolute number of clinics, and the distance to the nearest province with at least one clinic. μ , δ , and λ denote province, year, and calendar month fixed-effects, and ϵ_{pt} is the error term.

We estimate equation (1) using monthly birth records by province. We use three measures of fertility: the monthly number of births, the number of births in logs, and the rate of births per 1,000 women. We include 60 months pre- and post- the implementation of the 1985 abortion law, so that our sample contains 120 months, starting in December 1980 and ending in November 1990. A negative β (our coefficient of interest) would indicate a (persistent) relative fall in the number of live births with respect to the pre-existing trend in provinces with more access to abortion services.

Results are displayed in Table 1. The first row reports the coefficient on the interaction between the post dummy and the number of clinics per 100,000 inhabitants in the province. We find that regions with a higher supply of abortion clinics experienced a more pronounced drop in short-term fertility. The average province with positive supply of abortion services had 0.24 clinics per 100,000 inhabitants in 1989, so that we estimate that the legalization of abortion led to a 3.7% decline in birth rates in the province during the first five years.⁶

When we stratify births by age of the mother, we find that the results are driven by younger mothers (21 and under), especially for birth rates. The

⁶ $(-0.7274 \times 0.24) / 4.7$, where 4.7 was the average birth-rate.

equivalent magnitude is about 10.6%.⁷ The results when using the binary treatment dummy also indicate a drop in birth rates after the reform: in provinces with at least one clinic in 1989 the birth rate decreases 0.28 percentage points on average during the first five years after the abortion legalization, equivalent to a drop of 6% with respect to the mean birth rate. Again, the decline was higher among younger women: -0.31 percentage points or -18.9%.

The drop in early fertility may have been accompanied by a reduction in the number of early *marriages*. Figure 5 shows an index (1985=100) for the annual number of marriages of women between 17 and 22 by age, 5 years before and after the reform. Similar to the decreasing trend in fertility, the annual number of marriages was falling over time, but visual inspection does not suggest any change in this trend after the abortion legalization. If anything, there may have been a decrease in the number of marriages among women under 18.

We next estimate equation (1) using the monthly number of marriages as a dependent variable. Note that in this case, the post-reform period starts immediately after the law was implemented, in August 1985. The results are shown in Table 2. Consistently with the strong drop in fertility among younger women, we find evidence of a significant drop in the number of marriages among women aged 21 and younger, in provinces with a larger supply of abortion services. In the specification with the continuous treatment variable, we find a reduction of 0.63 percentage points in the marriage rate of this group, or a reduction of 8.5% respect to the mean marriage rate (1.77).⁸ The equivalent magnitude when using the binary treatment dummy is about 10%.

Robustness checks

Treatment intensity

⁷ $(-0.725 \times 0.24) / 1.64$.

⁸ $(-0.6296 \times 0.24) / 1.77$

Appendix Table A1 shows that our main fertility results are robust to alternative measures of treatment intensity. In Panel A, we interact the post-reform indicator variable with the distance to the nearest province with at least one clinic that practiced abortions in 1989.⁹ We find that the larger the distance, the lower the drop in fertility. In Panel B we use the absolute number of clinics, and find again that the drop is higher in provinces with a larger number of clinics practicing abortions, although the estimates are less precise. Our preferred specification is the one interacting the post reform variable with the number of clinics per 100,000 inhabitants, as it exploits variation across provinces while taking into account the size of each province.

In sum, we find that the drop in the number of births as a result of the abortion reform was stronger in provinces with a higher treatment intensity (as measured by the density of abortion clinics), as well as for young women.

Controlling for demand factors

We interpret the number of abortion clinics per 100,000 inhabitants as a measure of the supply of abortion services. However, the supply of clinics could be driven by demand factors, such that higher underlying demand for abortion services could be driving clinic availability, and thus the supply of clinics would be endogenous.

In order to test for this possibility, we gathered information on some of the most relevant demand factors. In order to take into account cultural and religious factors (since the Catholic church is strongly against abortion), we collected information on religiosity by region from the 1985 Fertility Survey.¹⁰

⁹ We use the geographic coordinates of the province's center and use geodetic distances to find the nearest neighbor province with at least one clinic.

¹⁰ The 1985 Fertility Survey (FS) was carried out by the Spanish National Statistical Institute. The sample included 8,782 observations (women 15 to 49). The survey asked women about their place of residence and their religiosity. Regarding the second, the answers are grouped into: non-believer, non-practicing Catholic, practicing Catholic, another religion, and do not know/do not answer. We calculate the fraction of women who were practicing Catholic by province in 1985. Seven provinces are missing (Avila,

As a direct measure of underlying demand, we calculate the fraction of teenage births before abortion legalization in each province.

Appendix figures A1-A3 show the regional distribution of the percentage of births to women aged 18 or younger in 1984, the percentage of births to unmarried women aged 21 or younger in 1984, and the percentage of adults who declare being practicing Catholics in 1984, by province. Visually, there is not much apparent overlap across these different indicators. We then re-estimate our fertility specifications, additionally controlling for the birth rates to young women in 1984 (and its interaction with the post indicator) and the percentage of practicing Catholics in 1985 (and its interaction with the post indicator). Table A2 shows that our baseline results remain statistically significant, even after controlling for these demand-driven (potentially competing) explanatory factors.¹¹ This supports our conclusion that the short-term fertility effects that we find are driven by the supply of abortion services.

Therefore, we conclude that the legalization of abortion led to a fall in birth rates in the short term, which was stronger among younger women, as well as to a drop in marriages among younger women.

3.2. Effects on education and labor market participation

If women who were very young when abortion was legalized were able to postpone fertility and avoid teen births, this could have had short-term effects on women's schooling and/or labor supply decisions. We analyze women's education and employment outcomes in the years immediately following the implementation of the reform (years 1987-1994), using micro data from the

Guadalajara, Huelva, Lleida, Segovia, Soria and Teruel). To estimate the religiosity of these missing provinces, we follow the multiple imputation methodology suggested by Rubin (1987), and regress the fraction of practicing Catholic at the province-level on other indicators (fraction of left-wing voters in 1980, birth rates of young women in 1984).

¹¹ Our baseline results also remain statistically significant when controlling for the province-level proportion of women who reported that they have taken and/or were currently taking the pill (1985 Fertility Survey).

Labor Force Survey. We define treatment based on the age of each woman at the time of abortion legalization.

We focus on women born between 1955 and 1974 (inclusive). We define as “treated” those who were born in 1965 or later, so that they were 21 or younger at the time of the reform (while “control” women were older). This is motivated by our finding of significant fertility and marriage effects in this age group. We estimate the following generalized diff-in-diffs specification at the individual level:

$$Y_{icpt} = \alpha + \beta Treated_c * Supply_p + \mu_p + \delta_t + \gamma_c + \epsilon_{icpt}, \quad (2)$$

where Y_{icpt} is the outcome of interest for individual i who belongs to cohort (year of birth) c and lives in province p in year t . The variable $Treated$ takes value 1 for all treated cohorts (1965 to 1974), and this variable is interacted with the supply of abortion services in each province in 1989, which we define again in two alternative ways: as the ratio of the number of abortion clinics per 100,000 inhabitants (continuous treatment variable), and as a dummy variable identifying the existence of abortion clinics in each province in 1989 (binary treatment indicator). We also include province, year, and cohort fixed effects.

Education and labor market outcomes are measured in 1986-90, i.e. during the 5 years immediately following abortion legalization. As before, standard errors are clustered at the province level (50 provinces). As outcome variables, we use two dummy variables indicating labor force participation and full-time education.

The Spanish Labor Force Survey (EPA) is a rotating quarterly survey carried out by the Spanish National Statistical Institute. Sample size is about 64,000 households per quarter, including approximately 150,000 adult individuals. We use the second interview of each year in order to minimize repeated observations of the same individual. Age at the time of the interview is indirectly controlled for, since it equals the year of the survey minus the year of birth, which are both included in the regression.

Table 3 reports the results of these regressions. Although none of the effects are statistically significant, we find that women who were very young (21 or under) when abortion was legalized, in regions with a higher supply of abortion services, were more likely to be in full-time education, compared to the control group, and less likely to be in the labor force. This is consistent in the regressions using the two alternative treatment definitions.¹²

4. Long-term effects of access to abortion

4.1. Completed fertility

We next evaluate whether the short-term fertility effects persisted, leading to the affected women having fewer children throughout their lifetime. In order to do so, we follow two different approaches. First, we construct the accumulated number of children born per woman, by year of birth and province, at different ages (18, 21, 34, and 44), combining birth-certificate and population data. We estimate the following specification:

$$Y_{cpa} = \alpha + \beta Treated_a * Supply_p + \mu_p + \gamma_c + \epsilon_{cpa}, \quad (3)$$

where Y_{cpa} is the accumulated number of births per woman for cohort c in province p by age a . The variable $Treated$ takes value 1 for all treated cohorts (women born between 1965 and 1974), and it is interacted with the supply of abortion services (abortion clinics per 100,000 inhabitants or the indicator of clinic availability in the province) at the time of the reform. We control for province and cohort fixed-effects.

To calculate the accumulated number of children born per woman by cohort, we pool the total number of births (from birth certificates) from 1975 to 2015, and calculate the cumulative number of births by cohort and province. We focus as before on the cohorts born between 1955 and 1974. The cumulative number of births by cohort and province is then divided by the size of the cohort, to get the average number of children born per woman in a cohort and province, at the different ages.

¹² The results are robust to broader age ranges.

We approximate the size of each cohort of women by province of residence with the number of women living in each province in 1981, by age, from the (pre-reform) 1981 Population and Housing Census. The 1981 Census does not provide information about the year of birth of each woman, only their age, so that we assign each woman to a cohort according to their age at the time when the Census was carried out. This approach ignores migration across provinces after 1981,¹³ so we alternatively approximate the size of each cohort by province with the (post-reform) 1991 Population and Housing Census.

Panel A of Table 4 reports the results when following this approach. Columns 1 to 4 show the results from estimating equation (4) for the average number of children born per woman, by cohort and province, by ages 18, 21, 34, and 44, respectively. The specification groups the cohorts more affected by the abortion legalization (those born between 1965-1974), and compares them with the less affected cohort group (women born between 1955 and 1964), in different provinces according to the number of clinics that practiced abortions in 1989 (per 100,000 inhabitants).

We find that the most affected cohorts tend to have fewer children at earlier ages, and that the effect is larger the greater the supply of abortion services in the province. More specifically, the first row shows that women who were younger than 21 in 1985 and lived in provinces with abortion clinics had significantly fewer children by ages 18 and 24, relative to older cohorts and women living in provinces with no abortion clinics. The effect becomes smaller as women age, and by age 44 it is statistically insignificant and very small in magnitude.

Regarding the size of these effects, the average province with positive supply of abortion services had 0.24 clinics per 100,000 inhabitants in 1989. Thus, our estimates suggest that the average clinic availability led the treated

¹³ According to the 2011 Population and Housing Census, between 21 and 27 percent of women born between 1958 and 1971 were living in a province different from where they were born. These figures are similar 10 years before, suggesting that they tended to migrate at earlier ages.

cohorts to reduce their teen birth rates by close to 22% $((-0.0453 \times 0.24) / 0.050)$, while the effect was 18% by age 24. By age 34, the effect on accumulated fertility amounted to about 2% of average birth rates, while by age 44 it was down to 1%.

The second row of Panel A displays the results when using the binary treatment variable to approximate the supply of abortion services. In this case, we find a significant effect of the legalization of abortion on fertility by ages 18, 24, and 34, but the coefficient turns insignificant at 44, suggesting again a small (if any) effect on completed fertility.¹⁴

As an alternative data source, in panel B we use the four waves of the Spanish Fertility Survey (1985, 1999, 2006, and 2018). The survey targets women across all of Spain, and includes information on the province of residence and year of birth of the surveyed woman, as well as information on her children and past pregnancies. We restrict the sample to cohorts born between 1955 and 1975. We compute the number of children by ages 18, 21, 34 and 44, which are defined only for women who were at least that age at the time of the interview.¹⁵ We also create a variable related to the timing of the first child (*Age first child*), which is defined for women who have had a child and who are at least 40 years old at the time of the interview.

The results in Panel B confirm the drop in early fertility after abortion legalization. The size of the coefficients are very similar though less precise

¹⁴ We find very similar results when we use the 1991 Census instead of the 1981 Census to estimate the size of each cohort by province: a drop in early fertility, but no significant effects on completed fertility measured at age 44. We also try with an alternative specification in which we interact the supply of abortion services with a continuous cohort variable, and the results hold.

¹⁵ For the first three waves of the survey, the variable is defined as the number of children at the time of the interview, minus the number of children the respondent had after the corresponding age. Due to data availability problems, for women from the 2018 survey the variable is defined in a slightly different way: it includes all the biological children the respondent had at the time of the interview and is set to missing if her first child was born after the corresponding age.

when using the continuous treatment variable. The effect on the number of children by ages 34 and 44 are less consistent in terms of size and direction when comparing with panel A, but still statistically insignificant. The results in column 5 suggest that abortion legalization led to a delay of first birth between 0.8 and 2 years, on average.

In summary, our findings suggest that the effect of abortion legalization on early fertility did not translate into a significant decline in completed fertility, for the most affected cohorts of women.

4.2. Labor market outcomes

We next investigate the long-term effects of the abortion reform on long-term educational attainment, family formation, and labor market outcomes. We use data from the Spanish Labor Force Survey for years 1992 to 2018 (i.e. between 7 and 33 years after the reform). As before, we use the second interview of each year, and select women born between 1955 and 1974 (inclusive), so that they were 11-30 at the time of the reform. These cohorts are between 37-63 (the oldest cohort) and 18-44 (the youngest one) at the time of the interview. Again, we define as treated women who were born in 1965 or later, so that they were 21 or younger at the time of the reform. We estimate equation (2), now focusing on the long-term effects of the reform on educational achievement, labor market outcomes, marriage, and divorce.

Table 5 shows the main results for both the continuous and the binary treatment variable. Panel A displays the results for educational attainment. We find that women who were more exposed to legal abortion were about 1 percentage point more likely to have attained (at least) a high school degree (0.24 times 0.0403). When we disaggregate these effects between just completing high school or completing a college degree, we see that these effects are driven by a 3.1 percentage points increase in high school graduation rates among treated women. We do not find significant effects on college graduation rates. Thus, the evidence suggests that legalizing abortion had long-term effects on educational attainment for young women.

We also estimate effects on family formation and dissolution (Panel B). We find no significant effect on the likelihood of being married at the time of the interview. We do find a significant reduction in the probability of being divorced or separated for women exposed to the reform. This suggests that exposure to legal abortion, which we showed led to fewer early marriages, may have increased the quality of matches, resulting in lower rates of marital dissolution in the long term.

Finally, Panel C shows effects on labor market outcomes. We study the effects of access to legal abortion on participation, employment, and unemployment, again with labor force survey data. The coefficients of interest are small, and none of them are statistically significant. We also analyze the effect on earnings using administrative Social Security data (last column). We find that annual earnings are slightly higher among more affected women, but again precision is low and we cannot reject null effects.¹⁶

We conclude that the legalization of abortion increased the educational attainment of women with better access to abortion services, but this improvement in educational levels did not translate into (significantly) better labor market outcomes in the long-run. We do find a lower divorce rate among the treated cohorts of women, suggesting that later marriage may have led to better matches.

4.3 Wellbeing

We use data from the 2013 wave of the Spanish Survey on Income and Living Conditions (SILC) to assess the long-term effects of abortion legalization on women's self-reported well-being. The survey includes some questions about individuals' health as well as subjective well-being. We estimate equation (3) using the following alternative dependent variables: an indicator for the

¹⁶ Earnings data come from Social Security (*Muestra Continua de Vidas Laborales*). We use the 2009 sample and construct annual earnings at the individual level for 2000-07.

woman having a chronic illness; how often the woman feels tense, with low morale, depressed, calm or happy; and the degree of satisfaction with her life.

We restrict our sample to native women born in 1955-1975, which results in a sample of 4,546 observations. In 2013, the youngest cohort in our sample (women born in 1975) was 38 years old, while the oldest one (1955 cohort) was 58, so that we are evaluating women's degree of satisfaction when they are mostly in their 40's and 50's.

Table 6 displays the results. We find evidence suggesting that women's exposure to legal abortion before age 21 led to an improvement in life satisfaction in the long term. Women with more access to abortion services when young are less likely to suffer chronic illnesses in their 40's or 50's, less likely to feel tense, with low morale or depressed, and more likely to feel calm or happy. They also report a higher overall degree of satisfaction with their life.

5. Conclusions

We analyze the short- and long-term effect of the legalization of abortion in Spain in 1985 on women's lives. We follow a difference-in-differences strategy, where we exploit the fact that younger cohorts of women were exposed to legal abortion at an earlier age, as well as the geographic variation in the supply of abortion services in the early years after legalization.

We find that women who had access to legal abortion before age 21 were less likely to have children at an early age, while their completed fertility was unaffected. We also find that they were less likely to marry early, and in the long term they were less likely to get divorced. We find a positive effect on high school graduation rates, and no effect on college attendance. We do not find significant long-term effects on labor supply or earnings, but we do provide suggestive evidence of a positive impact on overall life satisfaction almost 30 years after the reform.

Overall, our results suggest that legalizing abortion in Spain allowed young women to delay fertility and marriage and remain in full-time

education, resulting in higher life satisfaction several decades years down the line. Our findings also suggest that there were no aggregate costs in terms of lower fertility in the long run.

The fact that women were able to better control the timing of their first birth could imply positive effects for the cohort of children born after the abortion legalization. To what extent this may have translated into better outcomes for children in the long run, is a topic to be addressed in future research.

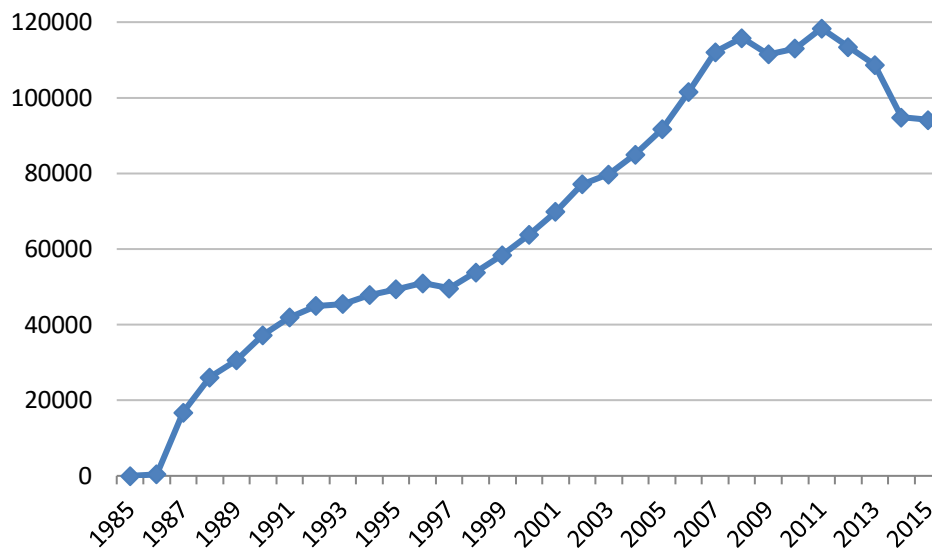
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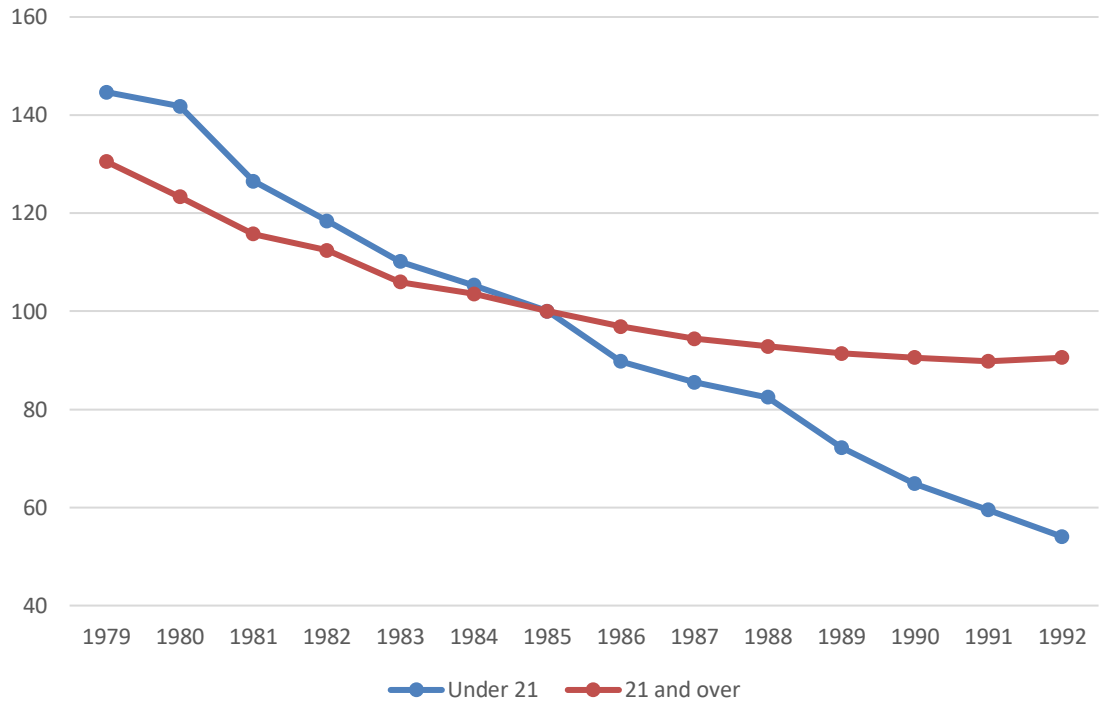
Tables and Figures

Figure 1. Annual number of registered abortions, Spain 1985-2015



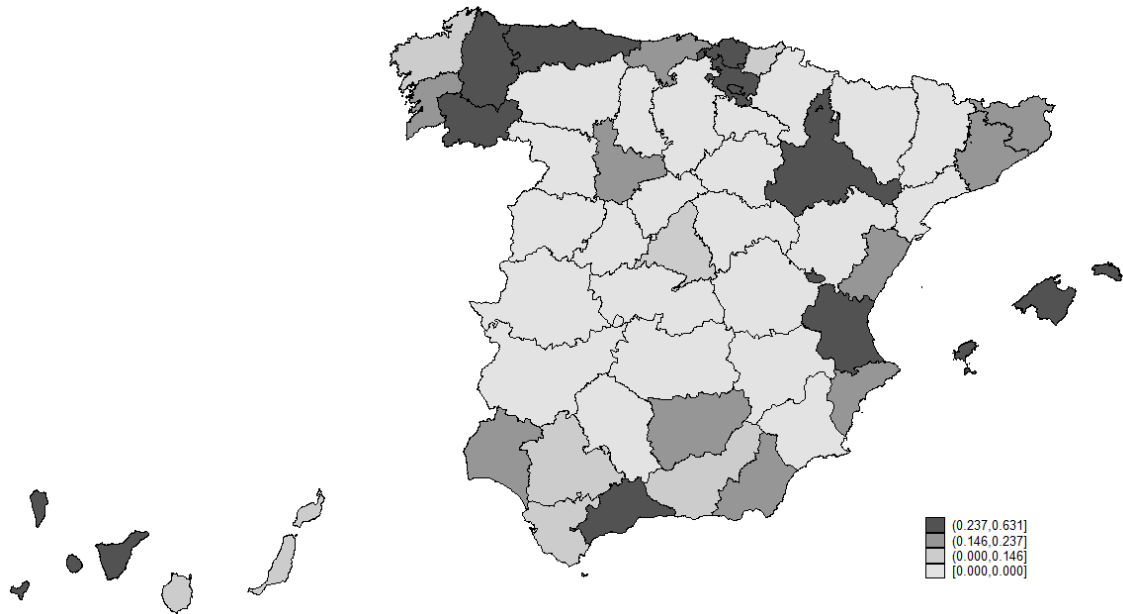
Source: Spanish National Statistical Institute.

Figure 2. Annual number of births by age of the mother (1985: 100).



Source: Birth-certificate data, Spanish National Statistical Institute.

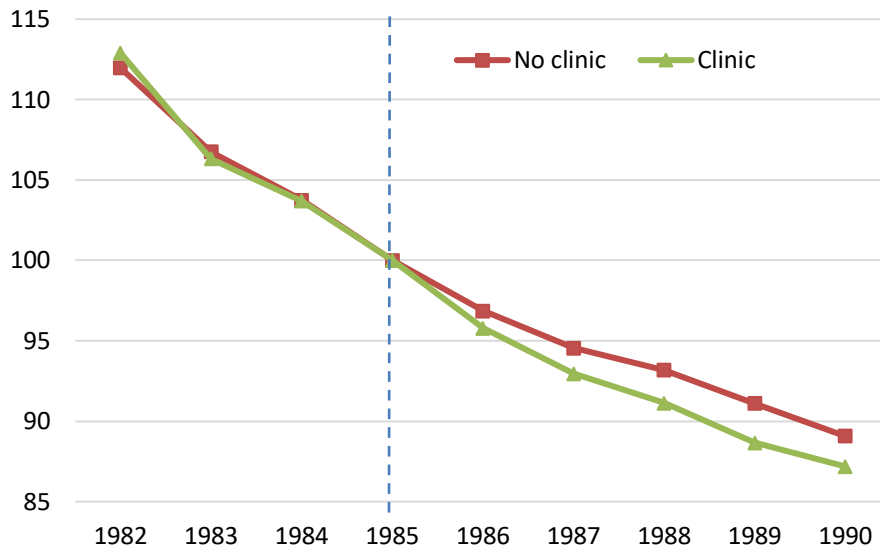
Figure 3. Number of clinics that practiced abortions in 1989 per 100,000 inhabitants, by province



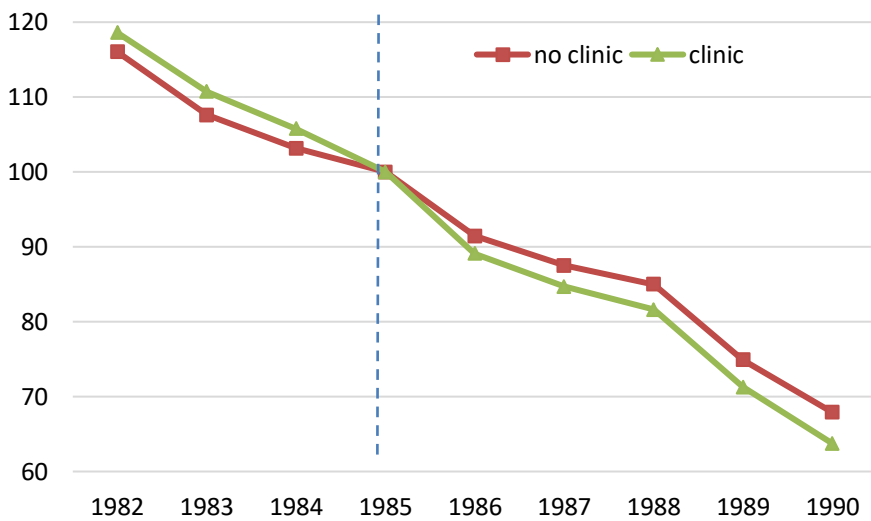
Notes: Authors' calculations based on data from the 1989 report of voluntary pregnancy interruptions from the Spanish Ministry of Health, Social Services and Equality and province-level population from the Spanish National Statistical Institute.

Figure 4. The effect of the supply of clinics on the number of births

Panel A. Women of all ages, living in provinces with vs. without clinics in 1989

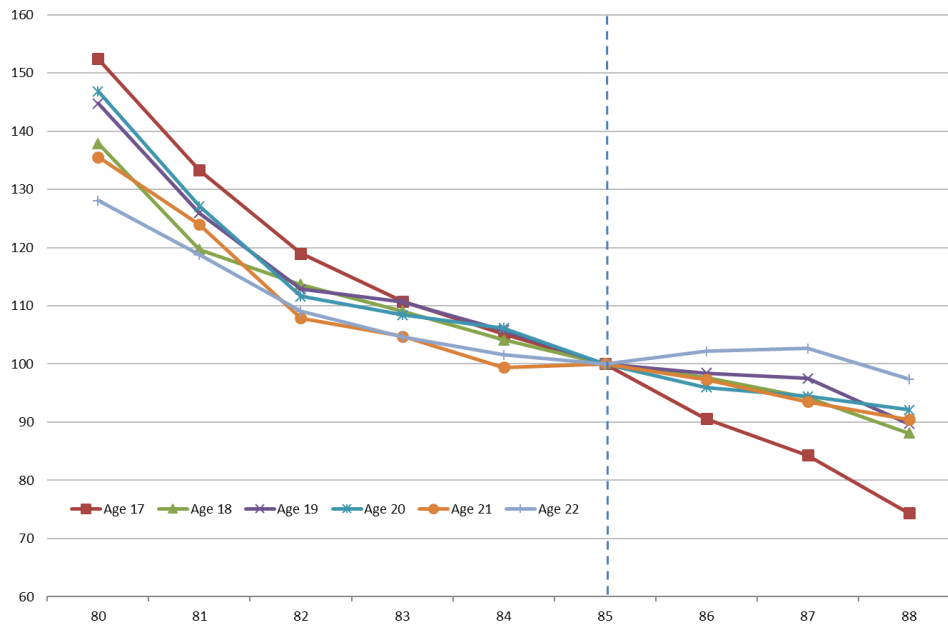


Panel B. Women younger than 21, living in provinces with vs. without clinics in 1989



Source: Birth-certificate data, Spanish National Statistical Institute and data of clinics that practiced abortions in 1989 from the Spanish Ministry of Health.

Figure 5. Annual number of marriages by age, Spain 1980-90 (1985:100)



Source: Marriage-certificate data, Spanish National Statistical Institute.

Table 1. Short-term fertility effects of abortion legalization, overall and by age

	Births	Births in logs	Births per 1,000 women
	(1)	(2)	(3)
Continuous treatment variable			
Post × Clinics per 100,000 inhab	-358.18*** (84.648)	-0.1530** (0.0587)	-0.7274*** (0.2401)
<i>21 and younger</i>			
Post × Clinics per 100,000 inhab.	-97.64*** (23.399)	-0.2005* (0.1000)	-0.7250*** (0.1955)
<i>Older than 21</i>			
Post × Clinics per 100,000 inhab	-260.53*** (65.463)	-0.1369** (0.0576)	0.0022 (0.3170)
Binary treatment variable			
Post × Any clinics in province in 1989	-134.65*** (34.336)	-0.0302 (0.0195)	-0.2803*** (0.0821)
<i>21 and younger</i>			
Post × Any clinics in province in 1989	-40.24*** (8.825)	-0.0408 (0.0335)	-0.3089*** (0.0572)
<i>Older than 21</i>			
Post × Clinics in province in 1989	-94.412*** (26.588)	-0.0236 (0.0192)	-0.0227 (0.1114)
N (months x provinces)	6,000	6,000	6,000
Calendar month dummies	Y	Y	Y
Year fixed-effects	Y	Y	Y
Province fixed-effects	Y	Y	Y

Notes: Results from estimating equation (1) using births records by month and province (60 months before and after the reform). The variable *Post* takes the value 1 from Dec. 1985 onwards and 0 otherwise. The variables *Clinics per 100,000 inhabitants* and *Clinics in province in 1989* are based on the number of clinics that reported having practiced at least one abortion in 1989, by province (source: 1989 report of voluntary pregnancy interruptions, Ministry of Health, Social Services and Equality). Standard errors clustered at province level (50 clusters). *** p<0.01, ** p<0.05, * p<0.1.

Table 2: Short term effect on the number of marriages by region according to clinic availability, overall and by age group

	Marriages (1)	Marriages in logs (2)	Marriages per 1000 woman (3)
<i>Continuous treatment variable</i>			
Post × Clinics per 100.000 inhab.	-13.30 (59.189)	-0.1863 (0.2023)	-0.3857 (0.2481)
<i>21 and younger</i>			
Post × Clinics per 100.000 inhab.	-102.44*** (29.831)	-0.2409 (0.2338)	-0.6296*** (0.2219)
<i>Older 21</i>			
Post × Clinics per 100.000 inhab.	89.22 (65.875)	-0.0952 (0.2112)	-0.1020 (0.3085)
<i>Binary Treatment Variable</i>			
Post × Any clinics in prov. in 1989	15.91 (20.065)	-0.0170 (0.0771)	-0.0725 (0.0961)
<i>21 and younger</i>			
Post × Any clinics in prov. in 1989	-34.36*** (10.307)	-0.0233 (0.0845)	-0.1788** (0.0843)
<i>Older 21</i>			
Post × Any clinics in prov. in 1989	50.30** (22.736)	0.0214 (0.0790)	0.0554 (0.1128)
N (months x provinces)	6,000	6,000	6,000
Calendar month dummies	Y	Y	Y
Year fixed-effects	Y	Y	Y
Province fixed-effects	Y	Y	Y

Notes: Results from estimating equation (2) using marriage records by month and province. The variable *Post* takes the value 1 from August 1985 onwards and 0 otherwise. The variable Clinics per 100,000 inhabitants is based on the number of clinics that reported having practiced at least one abortion in 1989, by province (source: 1989 report of voluntary pregnancy interruptions, Ministry of Health, Social Services and Equality). Standard errors clustered at province level (50 clusters). *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Short-term effect on school enrolment and labor force participation, by region according to clinic availability

	In education (1)	In the labor force (2)
Continuous treatment variable		
Treated × Clinics per 100,000 inhab.	0.0648 (0.0584)	-0.0945 (0.0765)
Binary treatment variable		
Treated × Any clinics in province in 1989	0.0007 (0.0228)	-0.0201 (0.0318)
N	128,675	128,675
Cohort fixed-effects	Y	Y
Year fixed-effects	Y	Y
Province fixed-effects	Y	Y

Note: Results from estimating equation (3) using LFS data (second quarter) from 1986 to 1990 and the cohorts included are those born between 1955 and 1974. The variable Clinics per 100,000 inhabitants is a continuous variable based on the number of clinics that reported having practiced at least one abortion in 1989, by province, per 100,000 inhabitants in that province (source: 1989 report of voluntary pregnancy interruptions, Ministry of Health, Social Services and Equality). The variable Clinics in province in 1989 is a dummy variable that captures the existence of clinics that reported having practiced at least one abortion in 1989, by province. Treated cohorts are those born between 1965 and 1974 so that they are aged 21 or younger at the time of the reform. Standard errors clustered by province.

Table 4. Effects of abortion legalization on completed fertility

	Average number of births by...				Age at first birth
	age 18	age 21	age 34	age 44	
	(1)	(2)	(3)	(4)	(5)
A. Birth records					
Continuous treatment variable					
Treated × Clinics per 100,000 inhab.	-0.0453*** (0.0101)	-0.1490*** (0.0353)	-0.1278 (0.0791)	-0.0695 (0.0955)	
Binary treatment variable					
Treated × Any clinics in province in 1989	-0.0178*** (0.0028)	-0.0616*** (0.0104)	-0.0736** (0.0298)	-0.0627 (0.0390)	
Mean dep. var.	0.050	0.198	1.294	1.551	
Province fixed-effects	Y	Y	Y	Y	
Cohort fixed-effects	Y	Y	Y	Y	
Observations	950	1000	1000	980	
B. Fertility Surveys					
Continuous Treatment Variable					
Treated × Clinics per 100,000 inhab	-0.0405 (0.0372)	-0.1117 (0.0757)	0.0324 (0.1788)	0.2023 (0.1858)	1.9019** (0.8981)
Binary Treatment Variable					
Treated × Clinics in province in 1989	-0.0284** (0.0137)	-0.0626*** (0.0218)	-0.0545 (0.0730)	0.0255 (0.0767)	0.7062* (0.4059)
Mean dep. var.	0.053	0.191	1.355	1.461	27.49
Province fixed-effects	Y	Y	Y	Y	Y
Survey fixed-effects	Y	Y	Y	Y	Y
Cohort fixed-effects	Y	Y	Y	Y	Y
Observations	17,717	16,636	10,772	5,618	6,086

Notes: Results from estimating equation (4) over the average number of births per woman to a cohort and province at 18 years old (Column 1), 21 years old (Column 2), and so on, and over the age at first birth (Column 5). In panel A, the average number of births per woman in a cohort and province was calculated as the total number of births by cohort and province (based on birth records between 1975 and 2018) divided by the size of the cohort by province in 1981 (based on female population by age and province in 1981, source: 1981 Population and Housing Census). Results in Panel B are based on microdata of the 1985, 1999, 2006 and 2018 Spanish Fertility Surveys (source: Spanish National Statistical Institute and Spanish Center for Sociological Research (2006)). Sample: 1955-1974 cohorts; in panel B we restrict the sample to women aged 18, 21, 34 and 44 years in columns 1 to 4 respectively, and to older 50 at the time of the interview in column 5. “Treated” cohorts are those born between 1965 and 1974, so that they are aged 21 or younger at the time of the reform. Robust standard errors clustered at province level (50 clusters) in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5. Long-term effects of abortion legalization on family formation, educational attainment, and labor market outcomes

Panel A. Educational attainment

	High school or more	High school	College
Continuous treatment var.			
Treated × Clinics per 100,000 inhab.	0.0403** (0.0198)	0.0311** (0.0145)	-0.0065 (0.0177)
Binary treatment var.			
Treated × Any clinics in prov. in 1989	0.0121 (0.0072)	0.0064 (0.0049)	-0.0004 (0.0079)
Province fixed effects	Y	Y	Y
Cohort fixed effects	Y	Y	Y
Year fixed effects	Y	Y	Y
N	674,708	674,708	674,708

Panel B. Marriage and divorce

	Married	Divorced or separated
Continuous treatment var.		
Treated × Clinics per 100,000 inhab.	-0.0079 (0.0194)	-0.0175** (0.0076)
Binary treatment var.		
Treated × Any clinics in province in 1989	-0.0005 (0.0077)	-0.0091*** (0.0026)
Province fixed effects	Y	Y
Cohort fixed effects	Y	Y
Year fixed effects	Y	Y
N	674,708	674,708

Panel C. Labor market outcomes

	Active	Working	Unemployed	Log earnings
Continuous treatment var.				
Treated × Clinics per 100,000 inhab.	0.0000 (0.0166)	0.0041 (0.0153)	0.0035 (0.0189)	0.0254 (0.0414)
Binary treatment var.				
Treated × Any clinics in province in 1989	0.0063 (0.0080)	0.0048 (0.0066)	-0.0007 (0.0060)	0.0189 (0.0129)
Province fixed effects	Y	Y	Y	Y
Cohort fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
N	674,708	674,708	674,708	889,430

Notes: Results from estimating equation (3) using labor force survey data (2nd quarter) from 1992 to 2018. Each coefficient comes from a different regression. Cohorts included are those

born between 1955 and 1974. The wage equation is estimated with Social Security data. The variable *Clinics per 100,000 inhabitants* is a continuous variable based on the number of clinics that reported having practiced at least one abortion in 1989, by province, per 100,000 inhabitants in that province (source: 1989 report of voluntary pregnancy interruptions, Ministry of Health, Social Services and Equality). The variable *Clinics in province in 1989* is a dummy variable that captures the presence of clinics that reported having practiced at least one abortion in 1989, by province. Treated cohorts are those born between 1965 and 1974 so that they were aged 21 or younger at the time of the reform. Standard errors (in parentheses) are clustered by province (50 clusters). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6. Long-term effects of abortion legalization on women's wellbeing

	Have a chronic illness?	How often... do you feel tense?	do you feel with low morale?	do you feel depressed?	do you feel calm?	do you feel happy?	Degree of satisfaction with your life
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Continuous treatment variable							
Treated × Clinic per 100,000 inhab.	-0.0898 (0.0573)	-0.4297** (0.1890)	-0.2481 (0.1737)	-0.3483* (0.1912)	0.4517*** (0.1429)	0.1997 (0.1405)	0.6692*** (0.1971)
Binary Treatment Variable							
Treated × Any clinics in province in 1989	-0.0454* (0.0250)	-0.1689** (0.0753)	-0.1496** (0.0630)	-0.1737*** (0.0636)	0.1855** (0.0709)	0.1318** (0.0582)	0.2120** (0.0954)
Dep. var. mean	0.291	2.752	2.042	2.153	3.301	3.663	6.893
Province fixed-effects	Y	Y	Y	Y	Y	Y	Y
Cohort fixed-effects	Y	Y	Y	Y	Y	Y	Y
Observations	4,546	4,472	4,471	4,471	4,472	4,464	4,464

Notes: Results from estimating equation (3) based on the 2013 wave of the Spanish Survey on Income and Living Conditions (SILC). The dependent variable in column (1) is an indicator variable which take the value 1 if the woman answers she has a chronic illness. The dependent variables in columns (2) to (6) ranges from 1 to 5 where 1 means never and 5 means always. The dependent variable in column (7) ranges from 1 to 10 where 1 means not satisfied and 10 means completely satisfied. Sample: women born in Spain in 1955-1974. Treated cohorts are those born between 1965 and 1974 (aged 21 or younger at the time of the reform). Sstandard errors clustered at province level (50 clusters). *** p<0.01, ** p<0.05, * p<0.1

Appendix

Table A1. Short-term fertility effects by region and clinic availability. Alternative measure of clinic availability (births in logs)

	All	21 and younger	Older than 21
A. Using distance to the nearest province with at least one clinic			
Post × Distance	0.0004*** (0.0001)	0.0006** (0.0003)	0.0004*** (0.0001)
B. Using the absolute number of clinics			
Post × N. of clinics	-0.0026 (0.0046)	-0.0091** (0.0040)	-0.0019 (0.0046)
N (months x provinces)	6,000	6,000	6,000
Calendar month dummies	Y	Y	Y
Year fixed-effects	Y	Y	Y
Province fixed-effects	Y	Y	Y

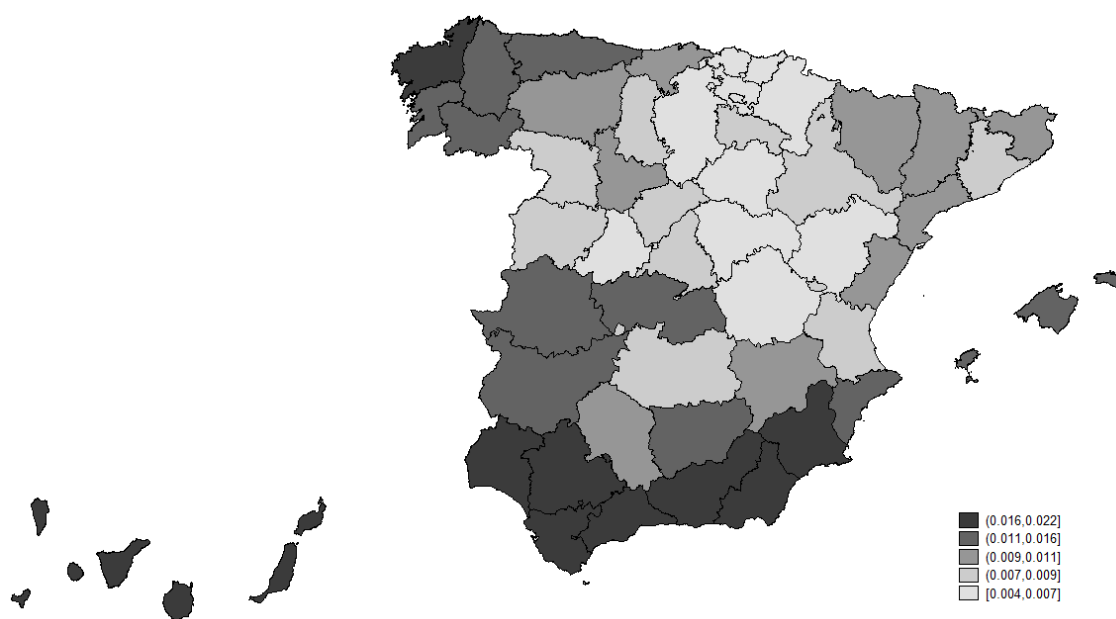
Notes: Results from estimating equation (2) using births records by month and province (60 months before and after the reform). The variable *Post* takes the value 1 from Dec 1985 onwards and 0 otherwise. In panel A, the variable *Distance* is the distance (in km) to the nearest province with at least one clinic that practiced abortions in 1989 (geodetic distance). In panel B, the variable *Nclinics* is the absolute number of clinics that practiced abortions in 1989 in province *p*. Standard errors clustered at province level (50 clusters). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A2. Short-term fertility effects by region and clinic availability, controlling for demand factors

	<i>Births</i>	<i>Births in logs</i>	<i>Births per 1,000 women</i>
A. Baseline			
Post ×Clinics per 100,000 inhab	-358.18*** (84.6488)	-0.1530** (0.0587)	-0.7274*** (0.2401)
B. Controlling for birth rates among young women			
Post ×Clinics per 100,000 inhab.	-354.62*** (93.304)	-0.1752*** (0.0575)	-0.5300** (0.2362)
Post ×Births<18	-567.1982 (3,822.2615)	3.5486* (1.8691)	-31.5056*** (7.6297)
Post ×Clinics per 100,000 inhab.	-322.20*** (95.559)	-0.1688*** (0.0550)	-0.5497** (0.2178)
Post ×Births<21,unmarried	-14,685.16* (8,277.54)	6.4539 (4.5645)	-72.5445*** (15.6052)
C. Controlling for religiosity			
Post ×Clinics per 100,000 inhab.	-257.65** (96.64)	-0.2032*** (0.0581)	-0.5296** (0.2617)
Post ×Fraction of Practicing Catholics	207.94* (120.855)	-0.1040* (0.0585)	0.4091 (0.2904)
N (months ×provinces)	6,000	6,000	6,000
Calendar month dummies	Y	Y	Y
Year fixed-effects	Y	Y	Y
Province fixed-effects	Y	Y	Y

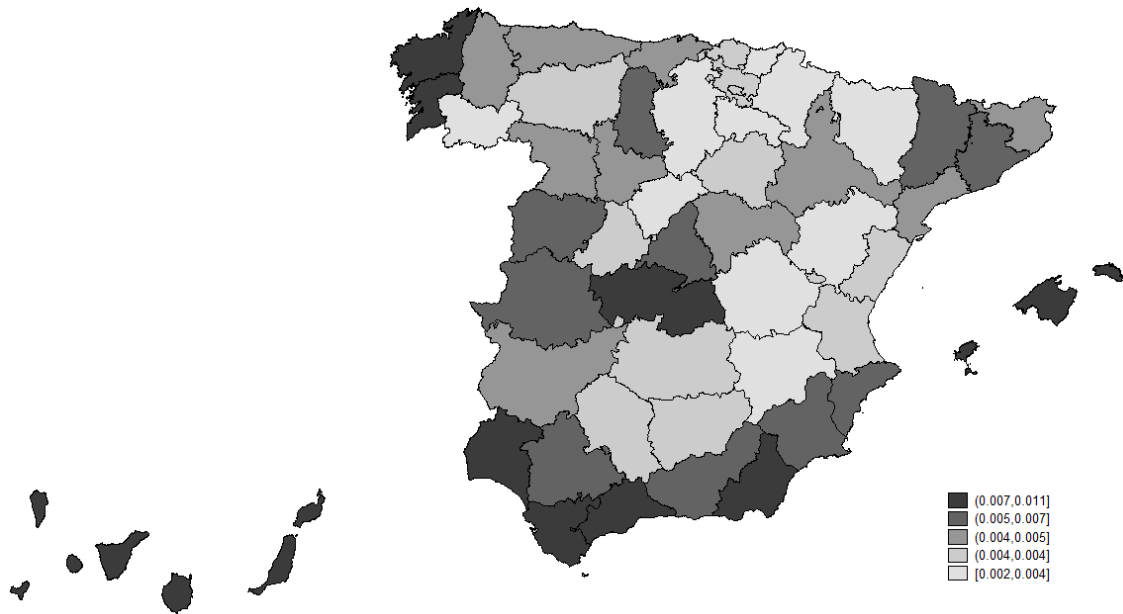
Notes: Results from estimating equation (2) using births records by month and province (60 months before and after the reform). The variable *Post* takes the value 1 from Dec 1985 onwards and 0 otherwise. Standard errors clustered at province level (50 clusters). *** p<0.01, ** p<0.05, * p<0.

Figure A1. Province variation in birth rates to women 18 and younger in 1984.



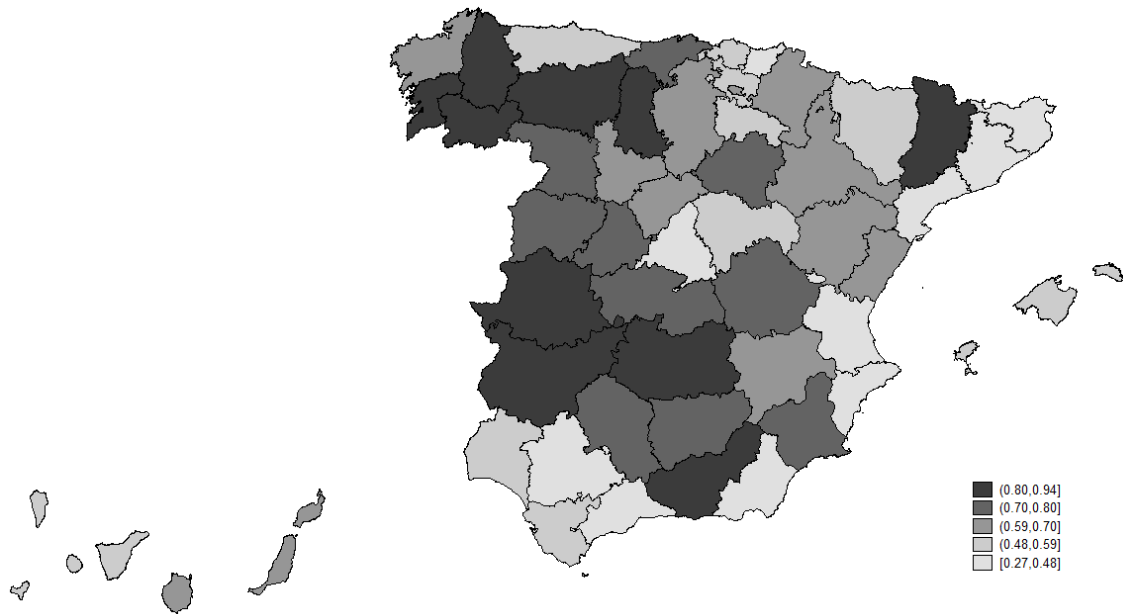
Notes: Authors' calculations based on birth-certificate data and female population data in 1984 (Source: Spanish National Statistical Institute). Birth rates to women 18 and younger in 1984 are defined as the number of births of mothers aged 18 or less per province in 1984 divided by female population of 15-19 years old per province.

Figure A2. Province variation in birth rates to unmarried women 21 or younger in 1984.



Notes: Authors' calculations based on birth-certificate data and female population data in 1984 (Source: Spanish National Statistical Institute). Birth rates to unmarried women 21 and younger in 1984 are defined as the number of births of unmarried mothers aged 21 or less per province in 1984 divided by female population of 15-19 years old per province.

Figure A3. Province variation in the fraction of women aged between 15-49 practicing Catholics in 1985



Source: 1985 Fertility Survey microdata, Spanish National Statistical Institute. Practicing catholic are those who actually practice the religion, for example, going to Mass every Sunday. Answers from the 1985 FS are missing for 7 provinces (Avila, Guadalajara, Huelva, Lleida, Segovia, Soria and Teruel) due to lack of enough sample size to be representative of the population of interest. To estimate the religiosity of these missing provinces we follow the multiple imputation methodology suggested by Rubin (1987) and regress the catholic practicing rate by province on a group of other indicators for the same or around years.