The Power of Tubal Sterilization: Permanent Contraception, Fertility, and Female Labor Supply

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Abstract

The number of tubal sterilization procedures increased dramatically in the United States in the 1970s due to legal and technological advances, quickly becoming the most popular form of contraception among married women. This method of permanent contraception afforded women almost perfect control over the end of their fertility. This paper studies how this increase in sterilizations affected completed fertility — particularly age at *last* birth — and female labor supply. Using variation across regions and over time in sterilization rates by age, I show that women more exposed to tubal sterilization at childbirth were less likely to have a subsequent birth. The increase in tubal sterilizations between 1965 and 1985 reduced women's age at last birth by 1.6 years and the probability of childbirth after age 30 by over 25%. As women spent fewer years caring for young children following the diffusion of tubal sterilization, female labor force participation increased. I also find suggestive evidence that women were more likely to select into occupations that reward experience and tenure, consistent with the power of tubal sterilization to reduce the risk of career interruptions.

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1 Introduction

Women in the US and other developed countries experienced significant shifts in reproductive control, fertility, and labor market participation in the second half of the 20th century. Access to reproductive control through the birth control pill and abortion enabled young women to delay first birth and marriage, facilitating increases in human capital investment and improved labor market outcomes (Goldin and Katz 2002; Bailey 2006, 2009, 2010, 2012; Myers 2017). In the same period, women also gained access to a reproductive technology that controlled age at *last* birth: tubal sterilization, or more colloquially, "getting your tubes tied." This procedure became widely accessible in the 1970s, adding to women's increased reproductive control and specifically giving them control over the end of fertility. Tubal sterilization rose quickly to become the most popular contraception among married women, yet to the best of my knowledge no work in economics has studied its effect on fertility and maternal labor supply.

The prevalence of large families declined in the late 20th century, reducing the amount of time women spent with young children at home. Between 1960 and 1990, the U.S. birth rate fell from 118 to 67 per 1,000 women. This overall decline was primarily driven by a decline in third and higher-order births, from 57 to 17 births per 1,000 women (Figure 1). Women who were in their 20s in the 1960s experienced significant declines in age at *last* birth from an average age of 31 to an average age of 28 (Figure 2). As a result, the number of years that these cohorts spent with a young child (under age 5) at home declined from 10 years to 7 years on average.

Age of the youngest child is a strong predictor of female labor force participation throughout this period. Hence, the compression of childbearing years should increase female labor supply by allowing women to enter or return to the labor force sooner. Furthermore, the reliability of tubal sterilization virtually eliminates the risk of pregnancy and enables continuous attachment to the labor force, which generates incentive for women to enter occupations that reward tenure and experience.

In this paper, I study how the increase in tubal sterilizations beginning in the 1970s — driven by a combination of legal and technological advances — contributed to the reduction in fertility and increase in female labor force participation in the period. The number of tubal sterilization procedures performed in the U.S. increased dramatically in the 1970s, from around 100,000 procedures per year in 1970 to over 700,000 by 1980, becoming the most popular form of contraceptive method among married women (Figure 3).

I employ two complimentary strategies to estimate the effect of tubal sterilizations on fertility and labor supply. The first approach compares cohorts of women with differential exposure to tubal sterilizations measured by the sterilization rate in their region of birth in the year they turn 30. I estimate region-year level sterilization rates using microdata from hospital discharge surveys. I then use restricted data from the Health and Retirement Study which surveys women after their reproductive years to observe women's full fertility history. Even after controlling for various measures of access to and use of the pill and abortion, I find that exposure to tubal sterilizations — but not the pill or abortion — reduced women's age at last birth by around 1.6 years. Reassuringly, there is no correlation between tubal sterilization rates and women's age at first birth, which suggests that the results are not driven by a spurious correlation between sterilization rates and fertility in general.

My second approach considers more detailed region-by-age-group level variation in the year that a woman gives birth, again estimated using hospital discharge data. Over half of all tubal sterilization procedures occur in the same hospital stay as a birth. Even when the procedure is not performed right after birth, the decision to undergo permanent contraception should occur after giving birth to the desired number of children. Because this comparison makes use of variation in the exact timing of childbirth, it allows for comparisons across women within the same cohort and region who gave birth at different times. This within-cohort-region comparison controls for differential trends in access to health care or attitudes toward sterilization. Using data from the Census, I ask whether women more exposed to sterilization at childbirth were less likely to have a subsequent birth and more likely to be in the labor force.

I find that women who were more exposed to tubal sterilization at their second (third) birth were less likely to have a third (fourth) birth within the next five years. A back-of-the-envelope calculation shows that the increase in tubal sterilization rates between 1965 and 1985 accounts for over 12% of the decline in third births and over 6% of the decline in fourth births.

A threat to causal identification is that tubal sterilization rates may have increased faster in regions where fertility was falling faster for other reasons. For instance, faster adoption of tubal sterilizations may be due to better access to medical care and hence correlated with access to other contraceptive methods. To address this concern, I make use of a natural placebo test. Because the data suggest that women were very unlikely to get tubal sterilizations after their first birth to prevent a second birth, exposure to tubal sterilization at first birth (exposure to tubal sterilizations for women of all parity, in the year of a woman's first birth) should have no effect on the probability of a second birth. Indeed, I find that the exposure to tubal sterilization at first birth is not correlated with the probability of a second birth. This pattern of results by birth order verifies that the results for third and fourth births are not driven by general trends in fertility but is specific to tubal sterilizations.

I further validate the causal interpretation by employing a source of within-region variation in access to tubal sterilizations. Catholic hospital policy prohibits many sterilization procedures. Even without perfect enforcement, women's access to tubal sterilizations is greatly reduced at Catholic hospitals (Hill, Slusky, and Ginther 2019). I find that tubal sterilizations did not reduce the probability of third or fourth births in areas where the majority of hospital births occurred in Catholic hospitals. Tubal sterilization rates are not correlated with fertility in localities with reduced access to sterilizations, which suggests that the main results do not merely reflect regional trends in fertility.

As women have fewer children, they spend fewer years of their lives caring for young children, and should return to or join the labor force at an earlier age. I extend my identification approaches to consider labor market outcomes. I find that women more exposed to tubal sterilization at their second or third birth were more likely to be in the labor force in the 10 years after childbirth, driven by an increase in part-time work. The increase in tubal sterilizations from 1965 to 1985 led to a 1.9% increase in labor force participation following a second birth, and a 3.3% increase following a third birth. These women work more hours and were also more likely to be in occupations with high returns to experience — managers, operators, saleswomen, consistent with the reliability of tubal sterilization reducing the risk of pregnancies and career interruptions.

Tubal sterilization significantly improved women's options for contraception. Women seeking sterilizations often had unsatisfactory experiences with other forms of contraceptive. The high dosage of the pill in the early days led to serious side effects, and other methods such as the diaphragm were often unreliable. Health insurance companies were also more likely to cover tubal sterilizations than the pill (Muller 1978).[1]

The increase in tubal sterilizations was particularly important for women of lower socio-economic status. Due to the pill's high cost and physicians' preference to prescribe the pill to middle-class women, women who had tubal sterilizations were on average poorer and less educated than women who used the pill (Kluchin 2009). Furthermore, I find larger labor market effects of sterilization among less-educated women, with a larger increase in labor force participation, larger shift into occupations with high returns to experience, and larger increases in wage.

This paper contributes to the literature on the effects of contraception and abortion technologies and policies (Goldin and Katz 2002; Bailey 2006, 2009, 2010, 2012; Myers 2017). Most of these studies focus on young women's access to the birth control pill and abortion, showing that improved reproductive control led to delays in first birth and first marriage, and increases in long-duration professional education. To the best of my knowledge, this paper is the first in economics to study the effects of tubal sterilizations, a form of permanent contraception which allows women to control their age at last birth.[2] Sterilization plays an important role on its own as it is used by a different demographic of women (of lower socio-economic status) and affects a different margin of fertility (hastening the end of childbearing rather than delaying first birth) compared to other contemporary methods of reproductive control.

This paper also contributes to evidence on the labor market effects of motherhood, which finds that women with children experience lower rates of labor force participation and lower wages.

1. Muller (1978) conducted a survey of insurance coverage in 1976, which covered 37 commercial companies accounting for 45 percent of all health insurance business. Of these 37 companies, 34 covered tubal ligation, whereas only 1 covered the pill.

2. Work in sociology and history have studied the history of sterilization in the U.S., outlining the demand for contraceptive sterilization from middle-class white women (Kluchin 2009), as well as sterilization abuse against poor — especially Black and Puerto Rican — women (Roberts 1997; Briggs 2003; Schoen 2005; Kluchin 2009). Economists have also studied the determinants of receiving tubal sterilizations. Hill, Slusky, and Ginther (2019) use hospital mergers to find that tubal ligations are reduced by 31% when hospitals switch ownership to Catholic. Norberg and Pantano (2016) find that women were more likely to be sterilized after a cesarean delivery.

Rosenzweig and Wolpin (1980), Bronars and Grogger (1994), and Jacobsen, Pearce, and Rosenbloom (1999) exploit exogenous changes in family size using twin births, and find that an additional child reduced labor force participation by between 11 and 37 percentage points in the short run, with no lasting effects. Angrist and Evans (1998) uses sibling-sex composition as an instrument to find that a third birth reduces labor force participation by 12 percentage points. My estimates imply a larger effect of avoiding a third birth, which increased labor force participation by 40.4 percentage points. Contrary to twin studies, where the third child does not increase the number of childbearing years, the effect in my context should *increase* with time. Differences in labor force participation between women with and without a third birth should emerge after their second child becomes old enough to require less intensive childcare. My estimation sample includes older women and allows for comparisons over a longer time frame compared to Angrist and Evans (1998), which may explain the larger effect. Angelov, Johansson, and Lindahl (2016), Kleven, Landais, and Søgaard (2019), and Kleven et al. (2019) show that women experience immediate and persistent reductions in employment and earnings following the birth of her first child. Beyond Kleven, Landais, and Søgaard (2019), which shows that these penalties are increasing in the number of children, there is little evidence on how employment and earnings evolve when women reach the end of childbearing. I focus on how the availability of permanent contraception allows women to reduce higher order births and thus control the end of their fertility, which allows me to study whether and how women can recover from these motherhood penalties after they complete childbearing.

This paper also contributes to the literatures studying the causes of the baby boom and bust (Greenwood, Seshadri, and Vandenbroucke 2005; Albanesi and Olivetti 2016) and the increase in female labor force participation in the late 20th century (Greenwood, Seshadri, and Vandenbroucke 2005; Goldin and Olivetti 2013; Goldin 2021), proposing the rise in tubal sterilizations as a new explanation for the fall in fertility and rise in female labor supply in the period.

The remainder of the paper is organized as follows. Section 2 provides background information on tubal sterilizations. Section 3 describes the data. Section 4 discusses the empirical strategy. Sections 5 and 6 present the results. Section 7 explores heterogeneity in the results. Section 8 presents robustness checks. Section 9 concludes.

2 Background

2.1 What is Tubal Sterilization

Tubal sterilizations are surgical procedures on a women's fallopian tubes, cutting or blocking the tubes to prevent eggs from being fertilized by sperm. A reversal of the procedure requires surgery and is not always successful, hence it should be considered a form of permanent contraception.

Tubal ligations and tubal salpingectomies are two types of tubal sterilization procedures. Tubal ligation involves closing the fallopian tubes, while tubal salpingectomy involves removing them. In this paper, my definition of tubal sterilization includes both types of procedures.

2.2 Reasons for the Increase in Tubal Sterilizations

Tubal sterilization procedures increased substantially in the U.S. beginning around 1970. This rise in sterilization procedures has been attributed to three factors: (i) the development and popularization of the laparoscopic method in the late 1960s; (ii) *Hathaway v. Worcester City Hospital* in 1973 which explicitly extended reproductive freedoms to sterilization; and (iii) the creation of a comprehensive federal family planning system beginning in the late 1960s which extended medical access to low-income women (Kluchin 2009). The combination of these medical and legal advances resulted in a large increase in tubal sterilizations over the decade.

The Laparoscopic Method Laparoscopic tubal sterilization has been performed by Raoul Palmer, a French laparoscopic gynecologist, as early as 1962. In 1967, English obstetrician and gynecologist Patrick Steptoe published the first English-language textbook on laparoscopy, which resulted in revived interest in the topic in the U.S.

The laparoscopic method of tubal sterilization was safer and cheaper, making the procedure more accessible. As it is less invasive, laparoscopic tubal sterilization can be performed as an outpatient procedure. Patients can recover rapidly and return home with minimal disruptions.

Hathaway v. Worcester City Hospital Whereas many states had laws on eugenic sterilizations — which allowed for the forced sterilization of "socially undesirable" people "unfit" for reproduction, most did not have any regarding contraceptive sterilizations prior to 1973.[3] In this ambiguous legal environment, many doctors were hesitant to perform sterilization procedures. Many hospitals also had informal restrictions on sterilizations based on women's age and parity. The most popular was the 120-rule, where only women whose age times parity reached 120 were granted sterilizations. For instance a 30 year old woman could only obtain approval for sterilization after her fourth child was born.

A joint effort by the American Civil Liberties Union (ACLU), Zero Population Growth (ZPG), and the Association for Voluntary Sterilization (AVS) launched a campaign to overturn these restrictive hospital policies. This ultimately led to the landmark decision in *Hathaway v. Worcester City Hospital* in 1973, which explicitly extended reproductive freedoms to sterilization.[4]

Federal Family Planning Federally funded family planning programs began in the late 1960s in order to improve low-income women's information of and access to contraception. Bailey (2012) shows that the expansion of family planning programs between 1964 and 1973 reduced childbearing among low-income women, and reduced the fertility gap between high- and low-income women. With the spread of federal family planning, poor women increasingly entered hospitals for labor and delivery. This gave more women access to tubal sterilizations through contact with the medical system, but also led in some cases to sterilization abuse.

2.3 Trends in Sterilizations and Other Methods of Reproductive Control

Appendix Figure A.1 shows the trends in tubal sterilizations by procedure types. The adoption of the laparoscopic method in the 1970s is reflected by the rise in endoscopic ligations. Due to the popularization of the laparoscopic method, there was a shift of tubal sterilizations from inpatient to outpatient procedures beginning in around 1980 (Figure 3).

3. The only three states that did have laws on contraceptive sterilization — Connecticut, Kansas, and Utah — criminalized it.

4. This case did not arise from a woman being denied voluntary sterilization due to an age-parity rule. The plaintiff Robbie Mae Hathaway was 36 years old with 8 children, and Worcester City Hospital did not have an age-parity rule but banned the procedure altogether. Hathaway's doctors recommended contraception as they were concerned about health risks from additional pregnancies. She was not prescribed the birth control pill due to her high blood pressure, and she petitioned for a tubal ligation. Her doctors classified her sterilization as therapeutic, but the request was denied by the hospital. Nevertheless, *Hathaway v. Worcester City Hospital* resulted in the court ruling upholding women's fundamental right to control their reproduction through sterilization.

Tubal sterilization was explicitly legalized in 1973, the same year abortion was decriminalized through Roe v. Wade. Women experienced many changes in their access to reproductive control in this period, and it is crucial to consider and control for these other method. Appendix Figure A.2 compares the number of procedures for tubal sterilization to abortion. A naive comparison reflects twice as many abortions as sterilizations, however, mere counting understates the importance of sterilizations. First, tubal sterilization is permanent, whereas an abortion procedure averts only one pregnancy. Furthermore, a woman can only have one sterilization, but multiple abortions over her lifetime. According to data from the National Survey of Family Growth (NSFG), the average number of abortions among women who ever had one was 1.4. Therefore tubal sterilizations and abortions are more comparable when we consider the number of women adopting each method and the number of births averted.

Next, I use data from fertility surveys to compare the use of tubal sterilization and the pill among married women (Figure 4). The fraction of women who reported having had a tubal sterilization increased rapidly after 1970, quickly overtaking the pill in usage. In fact, tubal sterilizations became the most important method of contraception among married women by 1982 (Appendix Figure A.3).

Tubal sterilization is an important margin of reproductive control. Since the 1980s, the use of tubal sterilization has remained persistently high at round one in five married women. Hence, it is crucial to consider the role of tubal sterilization in shaping women's fertility.

2.4 Who Gets Sterilizations

Figure 5 plots the distribution of age and parity of women who had sterilizations between 1970 to 1985. The typical woman who had a tubal sterilization was aged 30 with 2 to 3 children. Compared to White women, Black women who had sterilizations were on average younger and had more children. They were more likely to be under age 30, and to have more than two children.

Women's applications for referrals for tubal sterilizations in the 1960s to early 1970s before widespread diffusion reflect women's desire for a better form of contraceptive.[5] These women

5. Data from historical records from the Association for Voluntary Sterilizations (AVS). The AVS accepted applications for referrals for female and male sterilizations, sometimes providing financial assistance for the procedures.

often had experience with multiple forms of contraceptive before resorting to sterilizations. Failure of other contraceptive methods, medical conditions preventing them from being prescribed the contraceptive pill, and debilitating side effect of the pill were common reasons cited for seeking sterilizations. The birth control pill in those early days had doses that were 5 to 15 times higher than contemporary ones, which made serious side effects more common (Tone 2001).[6] Reports of severe side effects of the pill including blood clots prompted Senate hearings in 1970 to investigate the safety of the pill. An estimated 87 percent of women between the ages of 21 and 45 followed these hearings. Even though there was no persistent impact on the total number of pill users, concerns about side effects of the pill could have led women who had completed childbearing to opt for sterilizations.

Compared to those using the birth control pill — the other reliable form of contraceptive in the late 20th century, women who had tubal sterilizations tend to be from lower socio-economic backgrounds. Survey data show that Black women and less-educated women were more likely to have had a tubal sterilization, while the use of the pill is more comparable across race education (Appendix Figures A.4 and A.5). The low rate of pill-usage among women of lower socio-economic status is likely due to the high costs of the pill, and physicians' preference to prescribe the pill to middle-class white women who were deemed responsible and intelligent enough to use it (Kluchin 2009).

2.5 Forced Sterilizations and Sterilization Abuse

In this paper, sterilization is considered a *voluntary* procedure that grants women more choice in reproductive control. Though it is not in the scope of this paper, it is important to acknowledge the forced sterilizations in U.S. history. Sociologists and historians have studied Eugenic sterilizations in the early twentieth century (Roberts 1997; Briggs 2003; Catte 2021) and neo-eugenic sterilizations which were most prevalent during the 1960s to early 1970s (Roberts 1997; Briggs 2003; Schoen 2005; Kluchin 2009).

They connected applicants with physicians in their vicinity who provided the services. The AVS at this time was based in New York, where many applicants were from.

6. The first pill the FDA approved for contraceptive purposes in 1960 contained 10 milligrams of progestin and 0.15 milligrams of synthetic estrogen. Combination pills today typically contain 10–35 micrograms of estrogen.

In the early twentieth century, many states enacted compulsory sterilization laws to perform Eugenic sterilizations. These laws were directed at those from "socially undesirable" groups — the mentally ill, epileptics, those convicted of criminal activity, and the poor. It is estimated that more than 60,000 people were sterilized under these laws.

Eugenics came under heavy criticism in the 1930s and by the 1940s it was discredited as bad science and an excuse for racial hatred. Neo-eugenics arose in its place in response to social anxieties such as the civil rights movement and the expansion of welfare, emphasizing environmental determinism instead of biological determinism, believing that poverty and illegitimacy are transmitted via culture. During this period, doctors who supported neo-eugenics sterilized women without their consent and knowledge, initially against Black women in the South and later spreading to other regions and affecting poor women of all races. Doctors also coerced patients into consenting to sterilizations in exchange for services. Sterilization abuse made national headlines in 1973, when Minnie Lee and Mary Alice Relf (aged twelve and fourteen respectively) filed suit after involuntarily undergoing tubal ligation.

3 Data

Data on Tubal Sterilizations. My data on tubal sterilizations come from a variety of sources. The main source of data is the National Hospital Discharge Survey (NHDS), which gives estimates for the total number of inpatient procedures per year. I use the public-use microdata from 1970 to 2009, which reports procedure codes and census region of the hospital, as well as demographic information about the patient.[7] I code procedures for bilateral salpingectomy and bilateral ligation as tubal sterilizations, from which I calculate the number of inpatient tubal sterilization procedures at the age-group-region level.[8] The NHDS was first administered in 1965. Microdata for the years prior to 1970 is not available, however the National Center for Health Statistics published reports in the Vital and Health Statistics Series based on the surveys in 1965 and 1968. These reports

7. The public-use dataset for 1970–1978 includes information on the census division of the hospital, and the restricted dataset for 1980 onwards includes information on the state of the hospital. I show in Section 8.2 that my results are robust to using exposure measures at the census-division-level for 1970–1978.

8. Age groups are 18–20, 21–24, 25–29, 30–34, 35–39, and 40–44.

include the estimated number of procedures on the fallopian tubes by census region.

I supplement the inpatient data from the NHDS with outpatient data to give a full and accurate measure of the trends in sterilizations. A survey administered by the American Association of Gynecologic Laparoscopists and the CDC, and another administered by the Association for Voluntary Surgical Contraception and the CDC give estimates for the number of outpatient tubal sterilizations at the region level in 1980 and 1987. As seen in Figure 3, these surveys indicate that very few sterilizations were performed in as out-patient procedures in 1980, and that the total number of sterilization procedures remained stable after reaching a peak in around 1978. The National Survey of Ambulatory Surgeries (NSAS) was administered in 1994, 1995, and 1996. From these surveys, I compute the number of outpatient tubal sterilization procedures at the age-group-region level.[9] I then make the simplifying assumption that the total number of procedures is the number of inpatient procedures until 1980, and interpolate the total number of procedures for 1981 onwards wherever data for outpatient procedures is unavailable. Finally, I compute the age-group-region level tubal sterilization rate as the total number of tubal sterilization procedures per 1,000 women, using population data from the Survey of Epidemiology and End Results (SEER).

Data on Fertility and Labor Market Outcomes. For my first set of analyses, I obtain fertility data from the restricted Health and Retirement Surveys (HRS). The HRS is a longitudinal panel study of Americans aged 51 and older. As women were surveyed after their reproductive years, I observe their full fertility history and their age at the birth of each child. The HRS also reports demographic information, and the restricted data reports respondents' state of birth.

My second identification strategy makes use of fertility and labor market data from the 1980 and 1990 Census. I use the number of children ever born to a women and her family roster to infer the birth order of each child in the household, which is used to compute the women's fertility history.[10] I also use information on labor force participation in the previous year, usual hours of

9. The NSAS was conducted again in 2006, but the public-use dataset does not contain geographic information.

10. In the 1980 and 1990 Census, women report the number of children ever born to them, whether or not the children were living in the household. The mother-child links in the Census data links women to all her children in living in the household, including biological children as well as stepchildren and adopted children. If the number of children ever born to a woman is equal to the number of linked children in the household, I assume all children are biological and assign birth order according to the children's age. If the number of children ever born exceeds the number of linked children in the household, I assume that the oldest biological children have left the household, and assign birth order to the remaining children according to their age. If the number of children ever born is less than

work, occupation, and wage. Compared to the HRS data, the Census has less accurate measures of fertility, but has the advantage of a much larger sample and more comprehensive labor market measures during women's reproductive years.

Other Data I rely on additional sources of data in my analysis. To control for access to and use of the pill and abortion, I use legal coding for young women's access to the pill and abortion from Myers (2017). Data on the number of abortion procedures at the age-group-state level is from the Centers for Disease Control and Prevention (CDC)'s Abortion Surveillance reports, which I use to compute abortion rates. I also use the 1980 American Hospital Association Annual Survey to identify hospital locations and Catholic-affiliations.

Several supplementary reports and surveys are used to illustrate trends in tubal sterilizations, abortions, and other contraceptive methods. I use the CDC's Surgical Sterilization Surveillance reports to supplement data on laparoscopic sterilizations, which did not have a distinct procedure code in the NHDS prior to 1977. Additional data on abortion procedures is obtained from the Alan Guttmacher Institute (AGI). Survey data from the Growth of American Families Series (GAF), the National Fertility Study (NFS), and the National Survey of Family Growth (NSFG) are used to show trends in contraceptive methods.

4 Empirical Method

To estimate the effect of tubal sterilizations on fertility and female labor supply, I make use of two complementary strategies. The first approach compares cohorts of women by their exposure to tubal sterilizations — measured by the tubal sterilization rate in their region of birth the year they turn 30 — to examine its effect on age at last birth. The second identification strategy exploits within-cohort variation in the exact timing of childbirth, comparing women with differential exposure to tubal sterilizations in the year they give birth to estimate effects on subsequent births and labor market outcomes.

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the number of linked children in the household, I assume the youngest children in the household are the woman's biological children and assign birth order to them according to their age. I show in Section 8.3 that my results are robust to excluding women in the second and third category.

4.1 Effect on Age at Last Birth

Women who were in their 20s in the 1960s experienced a large decrease in age at last birth (Figure 2). These women saw significant changes in their access to reproductive control throughout their reproductive years. The FDA approved the pill for contraceptive purposes in 1960, and married women across the U.S. gained legal access to the pill in 1965 though *Griswold v. Connecticut*. They then gained legal access to abortion in 1973 through *Roe V. Wade*, the same year when the legal status of tubal sterilization was explicitly confirmed through *Hathaway v. Connecticut*. I examine the role of tubal sterilizations in reducing women's age at last birth in this period of change.

To estimate the effect of tubal sterilizations on age at last birth, I compare cohorts of women with differential exposure to tubal sterilizations measured by the tubal sterilization rate in her region of birth in the year she turns 30. Specifically, I estimate the following regression:

$$Y_{isc} = \beta SterilizationRate_{r,c+30} + \delta C_{sc} + \gamma X_i + \lambda_s + \lambda_c + \varepsilon_{isc}, \tag{1}$$

where Y_{isc} is the age at last birth for individual i born in state s in year c, or an indicator variable for individual i giving birth after age 30; $SterilizationRate_{r,c+30}$ is the tubal sterilization rate in census region r in year $c + 30$; C_{sc} are various controls for the access to and use of the pill and abortion for an individual born in state s in year c; X_i are demographic controls for age, race, and education; and λ_s and λ_c are state and cohort fixed effects. The regression is run on the sample of women born between 1920 and 1965, and standard errors are clustered at the state level.

The coefficient of interest is β, which estimates the effect of an increase in tubal sterilization of 1 per 1,000 women on outcome Y.

Variation in tubal sterilization rates comes from the differential rate of adoption across census regions (Figure 6). One concern is that tubal sterilization rates were adopted faster in regions with improved access to other forms of reproductive control. I first observe that regions with rapid adoption of tubal sterilizations differ from those which adopted abortions quickly (Appendix Figure A.6). To formally address this concern, I control for women's access to the pill and abortion as minors and as adults. Women can use the pill and abortion to delay, space, or avoid childbirth, hence it is not clear *a priori* whether they would lead to an increase or decrease in women's age at last birth. While access to the pill and abortion as minors could have delayed first and thus subsequent births (Goldin and Katz 2002; Bailey 2006, 2009; Myers 2017), women could also use these methods to avoid higher-order births as adults which would reduce age at last birth. I control for access to the pill and abortion as minors by the fraction of years between ages 14–20 when a woman had legal access to these methods, and for access as adults by the fraction of years between ages 21–30 when she had legal access. To ease comparison across the relative effects of tubal sterilization, the pill, and abortion, I construct alternative measures to control for usage of — as opposed to access to — the pill and abortion in adulthood.[11]

To estimate the effect of sterilization on age at last birth, sterilization rate at age 30 must capture the variation in exposure to sterilization reliably. I select age 30 as the relevant year as it is the mean age of women who had a tubal sterilization between 1970 and 1985 (Figure 5a). Appendix B discusses the sensitivity of these estimates to the choice of age of exposure.

To interpret β as a causal effect, the identifying assumption is that sterilization rates are exogenous conditional on the controls. A threat to this assumption could be that tubal sterilizations were adopted faster in regions where women also began childbearing earlier during the baby boom. In this case, a fall in the age at last birth may merely reflect a shift to earlier childbearing.

To address this concern, I run a placebo test for tubal sterilization's effect on age at *first* birth. I follow the specification in Myers (2017) which estimates the effects of access to the pill and abortion as minors on births in or before age 18, and add as a regressor the exposure to tubal sterilization at age 30 as in Equation 1. The regression specification is as follows:

$$\begin{aligned} Birth18_{isc} = {} & \beta_{t\ell} SterilizationRate_{r,c+30} + \beta_{pl} PillLegal_{sc} + \beta_{pa} PillAccess_{sc} \\ & + \beta_{al} AbortionLegal_{sc} + \beta_{aa} AbortionAccess_{sc} + \gamma X_i + \lambda_s + \lambda_y + \lambda_{sxy} + \varepsilon_{isy}, \quad (2) \end{aligned}$$

where $Birth18_{isc}$ is an indicator variable for individual i born in state s in year c having a childbirth in or before age 18; $PillLegal_{sc}$ measures the fraction of years between age 14 and 17 in which the

11. Abortion rate is constructed as the number of abortion procedures per 1,000 women at the age-group-state-level. Pill usage rate is constructed as the number of women using the pill per 1,000 women at the age-group-region-level.

pill was legal in state s but individual i born in year c could not consent to its use as a minor, $PillAccess_{sc}$ where the pill was legal and individual i could consent as a minor, $AbortionLegal_{sc}$ where abortion was legal but individual i could not consent as a minor, and $AbortionAccess_{sc}$ where abortion was legal and individual i could consent as a minor; and λ_{sxy} are linear state trends. The regression is run on the sample of women born between 1935 and 1958, and standard errors are clustered at the state level.

The coefficient of interest here is the coefficient on exposure to tubal sterilization $\beta_{t\ell}$. This measure of exposure is defined in the year women turn 30, hence it cannot causally affect teenage childbearing. Hence, this regression tests for selection in sterilization exposure — whether tubal sterilization was adopted faster in regions with differential trends in fertility.

4.2 Effect on Third or Fourth Births and Labor Market Outcomes

My second identification strategy makes use of the rich variation in tubal sterilizations to incorporate within-cohort comparisons, which allows me to control for cohort-level changes in fertility and labor market outcomes arising from other social, political or economic factors.

The decision to undergo permanent contraception should be made after women have their desired number of children. In fact, over half of all tubal sterilization procedures occur in the same hospital stay as a childbirth. I compare women with differential exposure to tubal sterilization rates in the year of their second or third birth. I ask whether more exposed women were less likely to have a subsequent birth within the next five years, and how their labor market outcomes are affected within the next ten years.

My regression specification takes the following form:

$$Y_{ijas} = \beta_j SterilizationRate_{ar,t(j-1)} + \delta C_{sr,t(j-1)} + \gamma X_i + \lambda_s + \lambda_{t(j-1)} + \varepsilon_{ias}, \tag{3}$$

where Y_{ijas} is an outcome variable for individual i in state s who was in age group a at her $(j-1)$th birth; $SterilizationRate_{ar,t(j-1)}$ is the tubal sterilization rate for age group a in census region r in the year person i has her $(j-1)$th birth; $C_{sr,t(j-1)}$ are controls for the use of the pill and abortion; X_i are demographic controls for age, race, and education; and λ_s and $\lambda_{t(j-1)}$ are state and year fixed effects. The regression for fertility outcomes is run on the sample of women who had their $(j-1)$ birth at ages 18–44 in years 1970–1985, and who is observed at least five years after that birth. The regression for labor market outcomes is run on the sample of women who had their $(j-1)$ birth at ages 18–44 in years 1970–1985, and who is observed within ten years of that birth.

The coefficients of interest are β_j, which estimate the effect of a increase of tubal sterilizations by 1 per 1,000 women at the birth of the $(j-1)$th child on outcome Y.

To interpret the coefficients β_j as the causal effect of sterilization on fertility, the age-group-region level sterilization rates must be exogenous conditional on the controls. One concern with this identifying assumption may be that adoption of tubal sterilization is driven by improved access to family planning services, which led to better access to other forms of reproductive control not captured by the pill and abortion controls.

I address this concern with a natural placebo test. Data from the NSFG show that women are unlikely to have a tubal sterilization after their first birth to prevent a second birth (Figure 5b). This feature is specific to tubal sterilizations as a permanent method of contraception, in contrast to other forms of reproductive control which affects births of all parity. This leads to the prediction that tubal sterilization rates at first birth — the rate of all tubal sterilizations regardless of parity in the year a woman has her first birth — should have a very weak effect on the probability of a second birth.

5 Fertility Results

5.1 Age at Last Birth

I first consider the effects of tubal sterilizations on age at last birth. Age at last birth is an important but overlooked metric, as it captures when women complete fertility and can transition from childbearing to work outside the household. A decrease in age at last birth indicates that women have longer uninterrupted time in the labor market following childbearing.

Columns (1)–(2) of Table 1 reports the results from estimating Equation 1 with age at last birth as the dependent variable. Tubal sterilization rates increased by almost 10 per 1,000 women over this period, from 1.71 in 1965 to 11.70 in 1985. The point estimate of -0.1607 in column (1) then implies a fall in age at last birth by 1.6 years. The result is robust to controlling for access to and use of the pill and abortion. Furthermore, while exposure to tubal sterilization rates is estimated to have reduced age at last birth, the various measures of exposure to the pill and abortion do not show a similar effect. If anything, they led to an *increase* in the age at last birth. This result is not surprising, as the effect of the pill and abortion on age at last birth is ambiguous. Use of the pill and abortion to avoid high-order births can decrease age at last birth, but women using these methods to space childbirths could also led to an increase in age at last birth. Furthermore, access to reproductive control as a minor delays the onset of childbearing, all else equal increasing age at last birth.

Age at last birth is defined only for women who have at least one child. To take into account potential selection into childbearing, I use an indicator for a woman giving birth at or after age 30 as an alternative dependent variable. The results are reported in column (3)–(4) of Table 1 and show that women more exposed to tubal sterilization at age 30 were less likely to have a child after age 30. The point estimates in columns (3)–(4) imply that the increase in tubal sterilization rates between 1965 to 1985 reduces the probability of birth after age 30 by over 25%.

Column (5) of Table 1 reports the results from estimating the effect of tubal sterilizations on age at first birth following Equation 2. While the regression is underpowered to replicate the results in Myers (2017), the point estimate on tubal sterilization rate is zero, which suggests there was no selection in the adoption of tubal sterilizations by teen childbearing.

5.2 Third and Fourth Births

Women more exposed to tubal sterilization at birth should be more likely to be sterilized and hence less likely to have a subsequent birth. Figure 7 plots the coefficients on tubal sterilization rate from estimating Equation 6, where the dependent variable is the indicator variable for having a subsequent birth within five years. Coefficients on abortion rates and other details are reported in Appendix Table A.1. The results show that women more exposed to tubal sterilization at their second or third birth were less likely to have a third or fourth birth within the next five years.

Moreover, as predicted, exposure to tubal sterilization at first birth had no effect on the probability of a second birth.

With an increase in tubal sterilization rates of 10 per 1,000 women, the point estimates imply a 9.4% decrease in third births and a 9.5% decrease in fourth births between 1965 and 1985. As the dependent variable measures the probability of a subsequent birth within five years, it understates the role of tubal sterilization in reducing lifetime fertility.

This pattern of results by parity gives confidence that the regressions capture the causal effect of tubal sterilizations. As exposure to sterilizations at first birth is not correlated with the probability of second births, it is not the case that fertility in general was declining more rapidly in regions with larger increases in sterilizations.

A back-of-the-envelope calculation suggests that tubal sterilizations accounted for at least 12% of the decline in third births and 6% of the decline in fourth births over this period. The tubal sterilization rate increased by $11.70 - 1.71 = 9.99$ per 1,000 women between 1965 and 1985. The point estimate of -0.339 then implies a $9.99 \times -0.339 = 3.39$ percentage point decrease in the probability of a third birth within five years of a second birth. With a rate of 23.18 second births per 1,000 women in 1970, the total reduction in third births is $23.18 \times 3.39/100 = 0.79$ per 1,000 women. Third births fell from $16.46 - 10.32 = 6.14$ per 1,000 women over this period. Thus, the increase in tubal sterilizations can explain $0.79/6.14 = 12.9\%$ of the decline in third births. Analogously, the probability of a fourth birth within five years of the third birth decreased by $9.99 \times -0.273 = 2.73$ percentage points, implying a total reduction in fourth births by $16.46 \times 2.73/100 = 0.45$ per 1,000 women. Fourth births over this period declined by $10.59 - 3.79 = 6.80$ per 1,000 women, hence the increase in tubal sterilizations explains $0.45/6.80 = 6.6\%$ of the decline in fourth births.

Figure 7 also shows the fertility results for subsamples by age groups. The pattern of results by parity holds across age groups, with the strongest effects on third and fourth births for those age groups where women were more likely to undergo sterilization.

5.3 Within-Region Variation: Catholic Hospitals

To further validate that the results are not driven by regional trends unrelated to tubal sterilizations, I use a source of within-region variation in sterilization access. Catholic hospital policy prohibits many contraceptive procedures. In fact, the United States Conference of Catholic Bishops explicitly forbid sterilizations in Catholic health care institutes (USCCB 2009). Hence, women in areas where most hospitals are Catholic would have had reduced access to sterilizations. I use the 1980 American Hospital Association Annual Survey to classify hospitals that were Church-owned and did not identify another denomination in its name as Catholic. I then identify Public Use Microdata Areas (PUMAs)[12] where more than half of all hospitals were Catholic, weighed by the number of births in the hospital in the reporting year. The main analysis is repeated for the subset of areas where over half of all births occured in Catholic hospitals.

If Catholic women resided in areas with a high proportion of Catholic hospitals, and they did not get tubal sterilizations for religious reasons, this specification may confound the low demand for sterilizations from Catholic women with low supply of sterilizations from Catholic hospitals. While Catholic women were less likely to have tubal sterilizations than non-Catholic women, the trends in adoption were similar between the two groups (Appendix Figure A.7). Women in areas where most hospitals were Catholic would have had reduced access to tubal sterilizations, hence exposure to tubal sterilization (measured at the region level) should have a much weaker effect on outcome Y.

Figure 8 plots the results for the full sample, the subset of PUMAs where less than half of hospital births were in Catholic hospitals, and the subset of PUMAs where more than half of hospital births were in a Catholic hospital.[13] Details are presented in Appendix Table A.2. Over 95% of areas have mostly non-Catholic hospitals, and the main results are robust to these areas. When considering only areas with mostly Catholic hospitals, women more exposed to tubal sterilization were still less likely to have a third birth. However, there is no effect on fourth births, and the expected pattern by birth order is no longer observed.

12. I use consistent PUMAs (CONSPUMA), which identifies the smallest geographic areas consistently defined across the Census years used.

13. The two subsamples do not add up to the full sample, as a small number of PUMAs have no matched hospitals.

In these areas where women have restricted access to tubal sterilizations, I do not find that exposure to tubal sterilization negatively affected third and fourth births. This is consistent with the main results reflecting a causal effect of the increase in tubal sterilizations. There does not appear to be other region-level factors which drive these patterns in areas with reduced access to sterilizations.

6 Labor Market Results

6.1 Participation

Tubal sterilization is an extremely reliable form of contraceptive method. While the birth control pill boasts similarly high effectiveness at over 99%, this high effectiveness is conditional on perfect use. When accounting for mistakes in use, the first-year failure rate of the pill is estimated to increase to 9%. Sterilization procedures stand out as a one-off, permanent procedure, which may have important implications for women's participation in the labor market. First, the high level of effectiveness reduces accidental pregnancies, and is important in reducing women's age at last birth. This in turn leads women to spend fewer years of their lives taking care of young children, allowing them to transition to work outside the household. Moreover, as the reliability of tubal sterilization eliminates the *risk* of pregnancy and career interruptions, women may be more inclined to enter occupations that reward experience and tenure.

I estimate whether women more exposed to sterilizations during childbirth were more likely to participate in the labor force. Figure 9 plots the coefficients on tubal sterilization rate from estimating Equation 6 using labor force participation, full-time participation (40 or more usual hours of work per week), part-time participation (less than 40 usual hours of work per week), and usual hours per week as the dependent variable, for exposure at women's first, second, and third births respectively. The coefficients on abortion rate and other details are reported in Appendix Table A.3. I observe women's labor force participation only in census years, whereas women's first, second, and third births can be identified in any year before that. Thus, I restrict the estimation sample to women who were observed within ten years after the relevant birth. The coefficients should thus be interpreted as the average effect on labor force participation over the ten years following childbirth.

The results show that women more exposed to tubal sterilization at their second or third births were more likely to be in the labor force within the next 10 years. The effect is driven by an increase in part-time work. The point estimates imply that the increase in tubal sterilization rates by 9.99 per 1,000 women between 1965 and 1985 increased labor force participation by 1.37 percentage points (2.2%) in the ten years following a second birth, and 2.11 percentage points (3.6%) in the ten years following a third birth. Tubal sterilization also increased hours worked by 0.3 hours per week (a 1.5% increase) following a second birth and 0.5 hours per week (a 2.6% increase) following a third birth. As expected, tubal sterilization rates at first birth had no effect on labor force participation or hours.

A Wald-type estimate implies that avoiding a third birth increases labor force participation by $(0.137/0.339) \times 100 = 40.4$ percentage points. Exploiting twin births, Rosenzweig and Wolpin (1980), Bronars and Grogger (1994), and Jacobsen, Pearce, and Rosenbloom (1999) find that an additional birth reduced female labor force participation by between 11 and 37 percentage points in the short run, and that the effects disappear in around four years. However, we may expect labor market effects to *increase* over time if the additional birth is not due to a twin pregnancy. Women with young children tend to have low participation rates which increase as their youngest child ages. Differences in participation between women with two and three children should then emerge and increase as the second child grows up, when women with only two children can divert their attention to the labor market, whereas women with three children still has a young child to take care of.

Using the same-sex instrument, Angrist and Evans (1998) find that a third birth reduced the probability a woman worked for pay by 12 percentage points in 1980 and 9.2 percentage points in 1990, a much smaller effect than my estimates. There may be two reason for the disparity between their estimates and mine. Firstly, in order to observe women whose children are still in the household, their estimation sample included women aged 21–35.[14] My estimation sample includes

14. Their estimation sample included women aged 21–35 with two or more children except for women whose second child is less than a year old.

women aged 18–44 at their second birth and whose labor force participation is observed 1–10 years after that. As labor market effects are expected to increase over time, my sample of older women and longer time frame may explain part of the discrepancy between the results. In fact, I show in Section 8.3 that labor market effects are indeed smaller when restricting my sample to consider labor force participation within five years of childbirth. A second reason is that my estimates may overstate the labor market effects of a third birth if the increasing popularity of tubal sterilization had indirect effects, for instance if the option of a tubal sterilization in the future and the reduction in *risk* of pregnancy improves attachment to the labor force.

6.2 Occupation and Wage

Next, I turn to occupation and wage outcomes. To estimate whether tubal sterilizations induced women to select into occupations with high returns to tenure and experience, I classify occupations into high and low returns to experience. I estimate the following regression:

$$\log(Wage_i) = \beta_0 + \sum_{o=1}^{n} \beta_o Age_i \times \mathbb{1}\{Occupation_i = o\}, \tag{4}$$

where $Wage_i$ is individual i's wage income; Age_i is individual i's age; and $\mathbb{1}\{Occupation_i = o\}$ are dummy variables for each two-digit 1950 occupation codes for the previous year. This equation is estimated on the sample of all individuals in the 1980 and 1990 Census who were in the labor force and did not report zero earnings.

The equation above estimates the age-earnings profile for each occupation group, where the single parameter β_o captures the percent increase in wage by age. I classify occupations as having high return to experience if β_o is above the median.[15]

Figure 10 plots the results for occupation and wage outcomes, coefficients on abortion rates and other details are reported in Appendix Table A.3. To keep the estimation sample consistent while labor force participation increased, the indicator variable for a woman being in a high-returns-to-experience occupation takes value 1 if she was in an occupation with above median returns to

15. The most common high-returns occupations held by women in this period were "clerical and kindred workers", "operative and kindred workers", "teachers", "salesmen and sales clerks", and "attendants, hospital and other".

experience, and 0 if she was in a low returns to experience occupation *or* if she was not in the labor force. Similarly, the inverse hyperbolic since transformation is used for wage income to account for women reporting zero wages.

The results show that women more exposed to tubal sterilization at their third births were more likely to be in occupations with above-median returns to experience in the following 10 years, driven by an increase in women working in occupations such as operatives, managers, and saleswomen. The point estimate suggest that women were 0.32 percentage points (0.8%) and 1.14 percentage points (2.8%) more likely to be in such occupations in the ten years following her second and third births respectively. Exposure to tubal sterilization at second and third births also increased wages. An increase in sterilization rate by 9.99 per 1,000 women increases wage by 16.5% in the ten years following a second birth, and 20.1% following a third birth. Women more exposed to tubal sterilization at first birth also had higher wages in the following ten years, but the effect is much smaller at 7.2%.

6.3 Within-Region Variation: Catholic Hospitals

Again, I make use of within-region variation to verify the results above are not driven by other region-level trends. I repeat the analysis for the subsample of PUMAs where most births occurred in Catholic hospitals. The labor force participation results are in Figure 11 and the occupation and wage results are in Figure 12. Details are reported in Table A.4. Reassuringly, exposure to tubal sterilizations is not correlated with any of the labor market outcomes in these areas with restricted access to sterilizations. This is as expected, since I find no fertility effects in these areas. The absence of labor market effects here also gives further confidence that the main labor market effects are driven by the decline in fertility.

7 Heterogeneity

Access to and use of tubal sterilization differed across race and socio-economic status. In this section, I study whether and how exposure to sterilization differentially affected these groups of women.

7.1 Heterogeneity by Race

Women gained access to tubal sterilizations in the 1970s through medical and legal advances. However, not all women benefited from this development equally. While women — primarily White women — who were denied voluntary sterilization procedures fought for their reproductive freedoms, low-income women — especially Black women — faced a different battle against sterilization abuse. Some women from low socio-economic backgrounds certainly seeked tubal sterilizations voluntarily, but they also faced the risk of being sterilized without their knowledge of consent, or being coerced into consenting to the procedure under distress during labor (Kluchin 2009).

Studying the main results by race can offer insights into how the rise in tubal sterilizations affected women differentially. I impute sterilization rates for White and Black women separately, and study how own-race sterilization rates affected fertility and labor market outcomes.

Figure 13 plots the main results for White and Black women respectively, details are reported in Appendix Tables A.5 and A.6. The results show that exposure to tubal sterilization reduces third and fourth births for both groups. As there is a smaller sample of Black women in the hospital discharge data, tubal sterilization rates for Black women may be estimated with larger measurement error, such that the coefficients in the regressions for Black women may be attenuated toward zero The point estimates suggest that exposure to tubal sterilization reduced third and fourth births to a lesser extent among Black women compared to White women. This may be due to two reasons. First, tubal sterilization rates were higher among Black women throughout this period, hence the same increase in the *number* of women sterilized per 1,000 implies a small percentage increase in exposure to sterilization. Second, Black women who had tubal sterilizations were less likely to have done so after their second or third birth, and more likely to have had four or more children (Figure 5b). Hence, the effect of tubal sterilization in reducing third and fourth births is weaker. For Black women, exposure to tubal sterilization at first birth also reduces the probability of a second birth. This may reflect the effect of sterilization abuse, which resulted in the sterilization of Black women with only one child.[16]

16. Nial Ruth Cox was an eighteen year old with a ten-week-old daughter when she was sterilized in 1965. She lived with her eight siblings and her mother, who were supported by welfare. Her welfare caseworker had threatened to take away their welfare benefits if she did not get sterilized temporarily. The physician informed her that the procedure

The effects on labor force participation is similar for Black and White women. With smaller fertility effects, this implies that the effect of an additional child on labor force participation is larger among Black women, consistent with the findings in Rosenzweig and Wolpin (1980).

The increase in overall participation is driven by an increase in full-time participation among Black women, compared to part-time participation among White women. At baseline, Black women were more than twice as likely to be in full-time work than part-time work, compared to a more even split among White women. Black women's high rate of full-time employment may explain the different in results. Black women also experienced larger increases in hours worked, in employment in a high-returns-to-experience occupation, and in wage.

7.2 Heterogeneity by Education

Next, I look at how tubal sterilizations differentially affected more and less educated women. Women with at most a high school education have higher rates of sterilization than women with at least some college education (Figure A.5). Whereas Goldin and Katz (2002) find that access to the birth control pill led to an increase in age at first marriage and increased investments in professional careers among college-educated women, tubal sterilization may be particularly important for *less* educated women.

In order to distinguish between differences across education and differences across race, I compare White women with at most a high school education to White women with at least some college education. Figure 14 reports the results for these subsamples respectively. Details are presented in Appendix Tables A.7 and A.8, and results by education for women of all races are reported in Appendix Tables A.9 and A.10. As the NHDS does not report patients' education, I use sterilization rates for White women of all levels of education.

Exposure to tubal sterilization had similar fertility effects among the two groups of women, but labor market effects are larger for less educated women who had lower rates of participation at baseline. The increase in hours worked, employment in high-returns-to-experience occupations, and wage all seem to be driven by less educated women. This may be because less educated women

would be temporary, and her mother consented to the procedure. She sterilization procedure was permanent.

have less resources for childcare, such that additional children imposes a larger demand on their time, which disrupts their entry or return to the labor force.

8 Robustness of Main Results

8.1 Split-Sample IV

Tubal sterilization rates are calculated for each region-age-year cell using survey data. Some cells may have small sample sizes, such that measurement error in sterilization rates may result in attenuation bias. I address this concern by using the split-sample instrumental variables approach (Angrist and Krueger 1995). I divide the inpatient and outpatient discharge surveys into two random samples denoted 1 and 2, and use tubal sterilization rates calculated from sample 2 to instrument for tubal sterilization rates calculated using sample 1. This implies the following first-stage regression:

$$SterilizationRate^{1}_{ar,t(j-1)} = \pi_j SterilizationRate^{2}_{ar,t(j-1)} + \rho C_{sr,t(j-1)} + \theta X_i + \lambda_s + \lambda_{t(j-1)} + \eta_{ias}, \quad (5)$$

and the second stage regression:

$$Y_{ijas} = \beta^{IV}_j \widehat{SterilizationRate}^{1}_{ar,t(j-1)} + \delta C_{sr,t(j-1)} + \gamma X_i + \lambda_s + \lambda_{t(j-1)} + \varepsilon_{ias}, \quad (6)$$

which replaces the sterilization rate estimated with the full sample $SterilizationRate_{ae,t(j-1)}$ with the fitted values from the first stage.

The results in Appendix Table A.11 show that the main fertility and labor market results did not appear to suffer from attenuation bias. The results are robust to using the split-sample instrumental variables approach.

8.2 Robustness to Alternative Measures of Sterilization Rates

In this section, I consider alternative measures of sterilization rates.

First, I show that the main results are robust to using variation at a finer geographic level.

Microdata for the National Hospital Discharge Survey from 1970-1978 reports census divisions in addition to census regions, allowing for more precise measures of tubal sterilization rates. To facilitate comparison, I reproduce the main results using region-level variation in 1970-1978, along with division-level variation in 1970-1978. Appendix Tables A.12 and A.13 show that the main results are robust to using age-group-division level variation.

Next, I show the results from using a composite measure of female sterilization which includes hysterectomies. Appendix Table A.14 shows that including hysterectomies does not change the results drastically compared to the measure that only considers tubal sterilizations. The main difference is that exposure to this more comprehensive measure of sterilization at first birth also reduced the probability of a second birth. Women who had hysterectomies were less likely to have done so for contraceptive purposes than women who had tubal sterilizations (Appendix Figure A.8). This could explain why the results here do not confirm to the pattern by parity expected from exposure to contraception.

8.3 Robustness to Alternative Samples and Definitions

To measure exposure to sterilization rates by parity, I used information on children in the household and women's total number of live births to impute the birth order of each child in the Census data. When the number of children in the household is not equal to the number of live births, I made simplifying assumptions to infer birth order. In Appendix Table A.15, I show that my results are robust to only considering the subsample of women for whom the imputation did not rely on such imputations.

The labor market results in the main analysis measures the average effects over the ten years after childbirth. In Table A.16, I show results restricting the estimation sample to measure average effects over five years after childbirth. As expected, the labor market effects are smaller in the short run. Even women who had a tubal sterilization still has a young child under five in the household, such that the labor market impacts of an additional birth is limited.

I also consider alternative definitions for full- and part-time work, occupations with high returns to experience, and wage. The results are reported in Appendix Table A.17. Columns (1)–(2) show that the increase in labor force participation is driven by an increase in part-time work even when defining full-time employment as at least 35 hours of work per week, as opposed to 40 hours. Column (3) shows that the occupation result is robust to classifying 3-digit 1950 occupation codes by returns to experience, as opposed to 2-digit codes in the main analysis. In column (4), the outcome variable is an indicator for a woman with above median wages. This specification does not rely on the inverse hyperbolic sine transformation to address observation with zero wages. The results show similar patterns of wage increase as in the main analysis.

Lastly, the results in Table 1 on age at last birth relies on women's exposure to sterilization at age 30, the average age of women who had sterilizations during this period. In Appendix B, I discuss the sensitivity of the estimates to this choice of age of exposure.

9 Conclusion

This paper examines the increase in use of tubal sterilizations in the 1970s, and its effects on fertility and female labor supply. As a method of permanent contraception, tubal sterilization allowed women to control the end of their fertility almost perfectly. The reliability of sterilizations essentially eliminated the risk of accidental pregnancies for women who have completed their families, allowing them to return to the labor force sooner and to work in occupations that reward continuous attachment to the labor force.

To estimate the effect of tubal sterilization on fertility, I first compare women across cohorts and regions with differential exposure to tubal sterilizations at age 30. I find that the increase in tubal sterilizations between 1965 and 1985 reduced women's age at last birth by 1.6 years. This fall in age at last birth reflects a compression in the number of years women spend taking care of young children, such that they can transition sooner to work outside the household. Furthermore, while women can use the birth control pill or abortion to delay and space births, the reduction in age at *last* birth is a feature of tubal sterilization as a form of *permanent* contraception.

Using the exact timing of women's births and variation in sterilization at the region-age level in that year, I then compare women more versus less exposed to tubal sterilization at childbirth. I find that tubal sterilization reduced the likelihood that women have a third (fourth) birth within five years of her second (third) birth, with the increase in sterilization between 1965 and 1985 accounting for over 12% (5%) of the decline in third (fourth) births. Women more exposed to sterilization at their second or third births were more likely to participate in the labor force within the next ten years, driven by an increase in part-time participation. Exposure at second birth also increases the probability that women are in an occupation with above-median returns to experience, consistent with sterilization reducing in the risk of career interruptions. Importantly, I find that exposure to tubal sterilization at a woman's first birth has no effect on the probability of a second birth, or her labor market outcomes. This pattern by parity gives confidence that the results reflect the causal effect of tubal sterilizations, as opposed to capturing general trends in fertility.

Kleven, Landais, and Søgaard (2019) and Kleven et al. (2019) and others have shown that women experience a large and persistent penalty in the labor market upon motherhood. My results suggest that this persistence diminishes as women complete childbearing. The decision not to have additional children and the assurance afford by the reliability of permanent contraception allows women to return to the labor force, and to recover — at least partially — from the child penalty.

A large literature in economics studies the effects of the birth control pill on a variety of outcomes. While the pill was important for young women in reducing the inception of childbearing, its reign as the most popular form of contraception among *married* women was short-lived. Tubal sterilization became the preferred method among married women in around 1980, and its popularity remains even today. Thus, it is important to consider its role in shaping women's decisions and outcomes. The power of tubal sterilization was particularly relevant for women of lower socio-economic status, who both used sterilization at higher rates and reaped greater benefits from its use.

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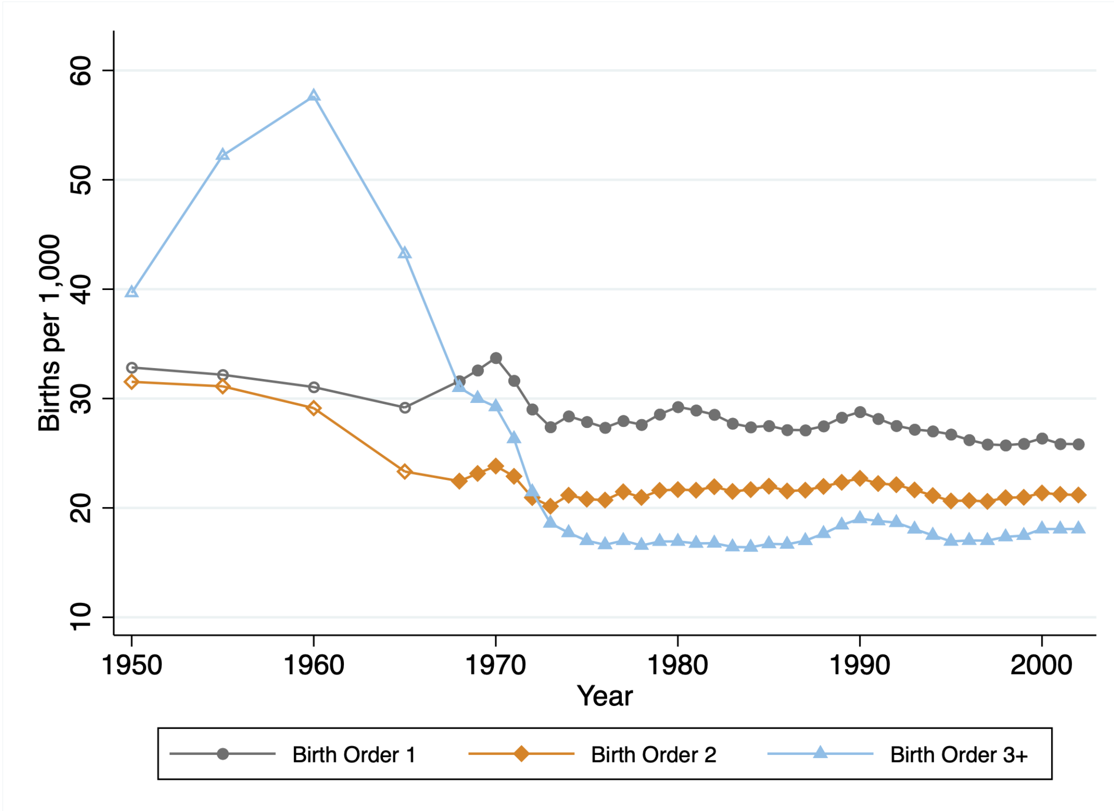
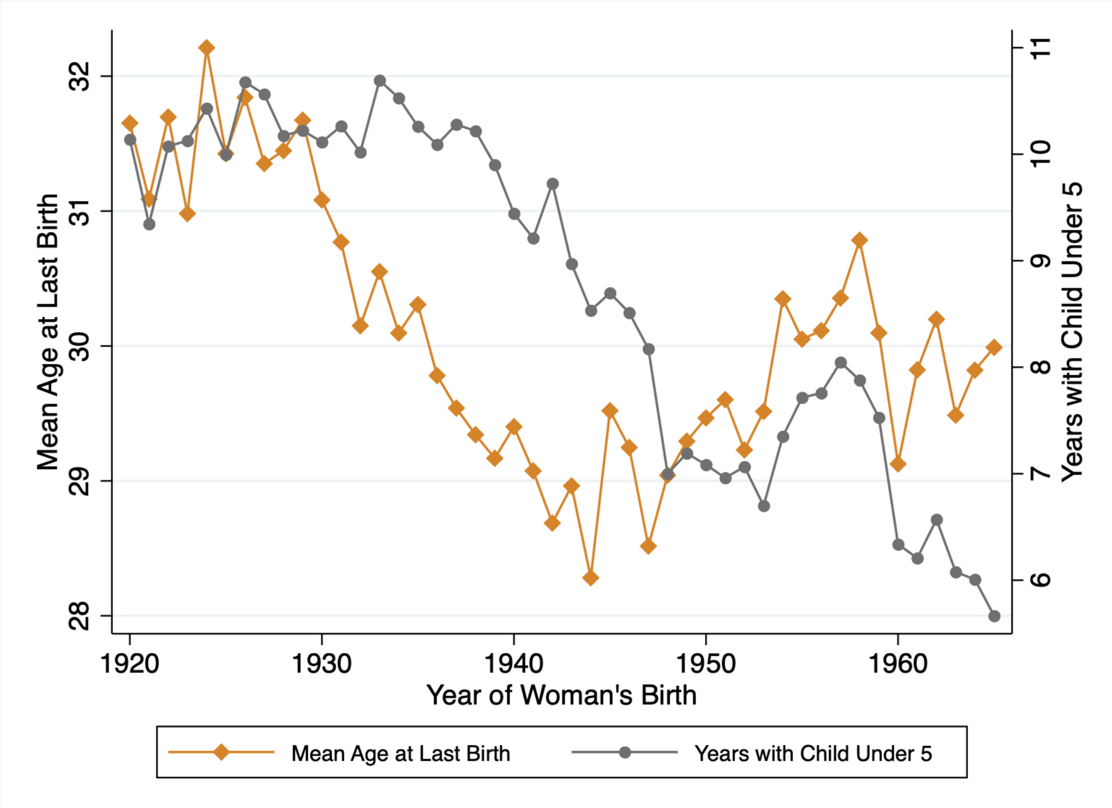
Figure 1: Trend in Birth Rates by Birth Order



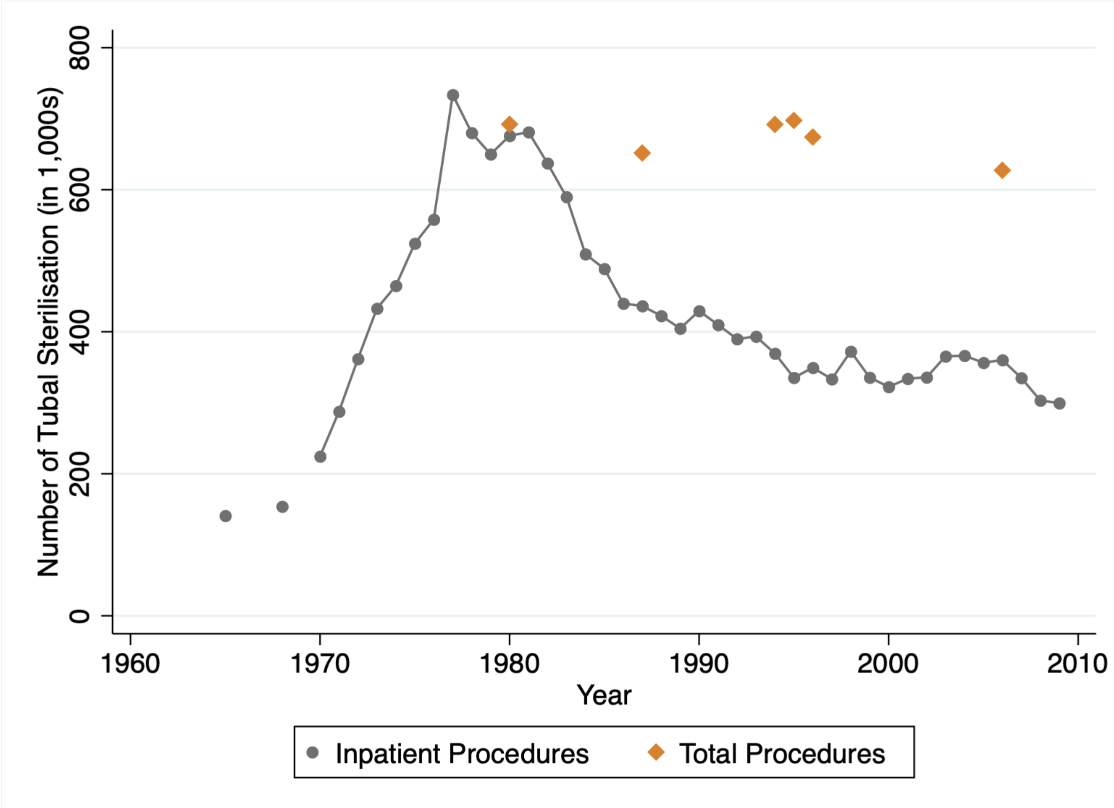
Note: Data on number of births by birth order from NCHS. Population data from NHGIS and SEER. Birth rates are calculated as number of births per 1,000 women aged 15–44. Alaska, Hawaii, and Massachusetts are excluded due to data availability. Data for Alaska and Hawaii is not available for the earlier years, and Massachusetts did not consistently report births by birth order.

Figure 2: Age at Last Birth and Years with Child Under 5



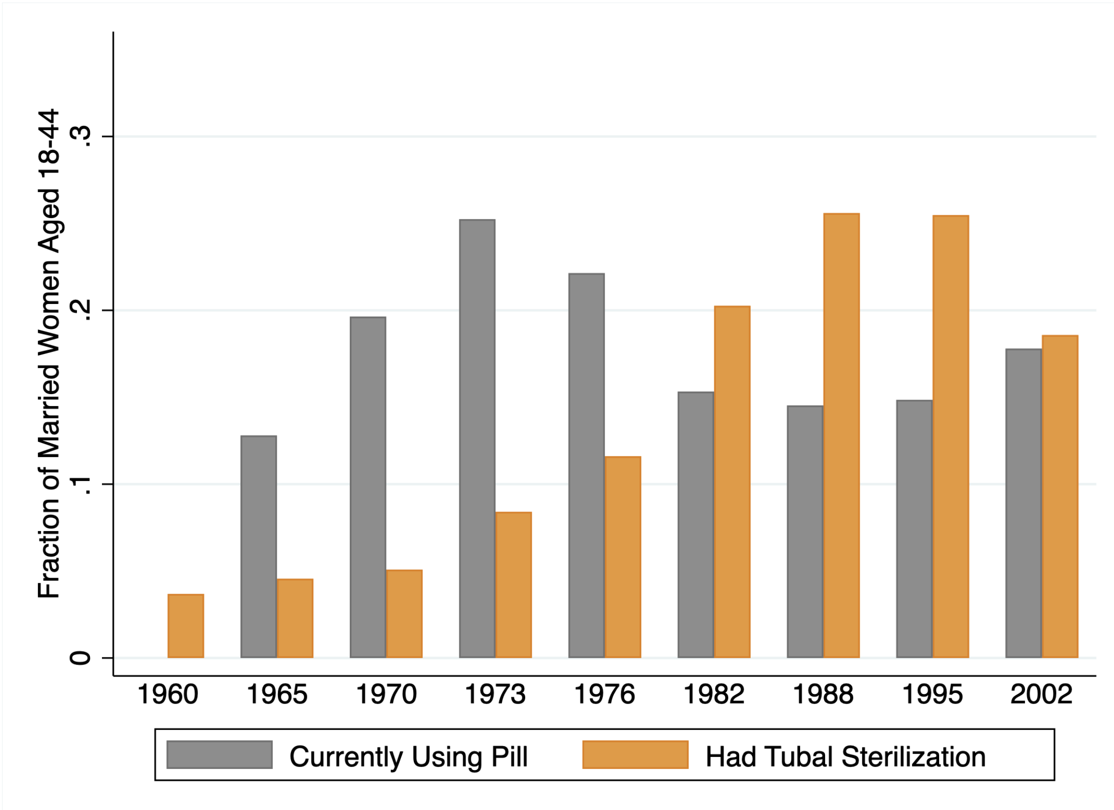
Note: Data from the Health and Retirement Study. Orange diamonds plot for each cohort of women the mean age at last birth conditional on any births. Age at last birth is imputed as the birth year of a woman's youngest child. Grey dots plot for each cohort of women the mean years women have a child under the age of 5, as imputed from women's fertility history. Women with no children are included in the sample as zeros.

Figure 3: Trends in Tubal Sterilizations in the U.S.



Note: Inpatient data from the National Hospital Discharge Surveys. Totals are the sum of inpatient and outpatient data, taken from the National Survey of Ambulatory Surgery 1994–1996 and 2006, and CDC surveys 1980, 1987. Data from 1970 onwards include procedure codes for bilateral tubal salpingectomy and bilateral tubal ligation; data in 1965 and 1968 are for any operation on the fallopian tubes.

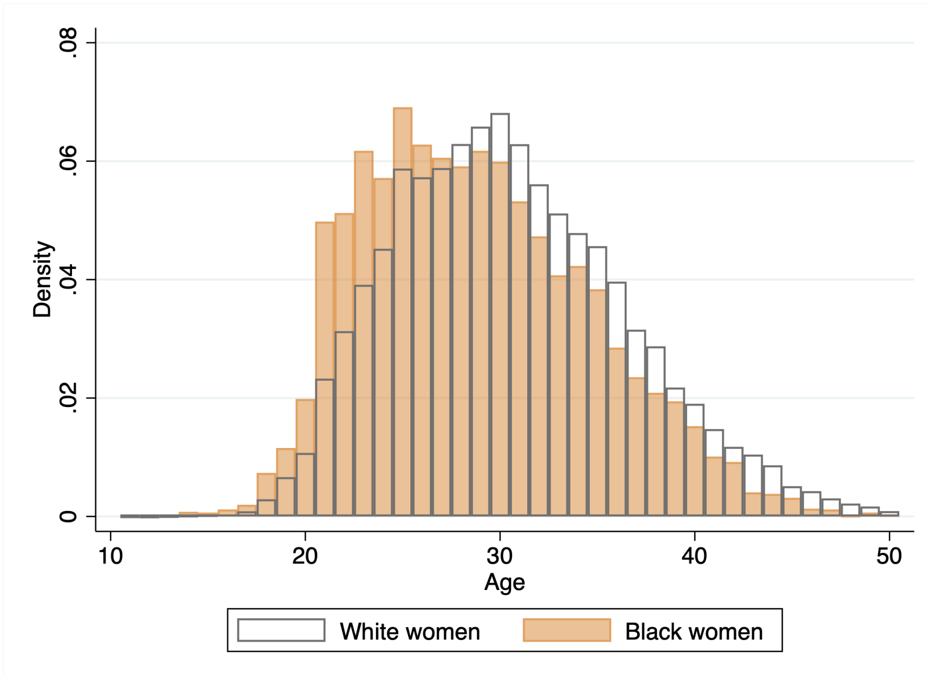
Figure 4: Use of Tubal Sterilization and the Pill among Ever-Married Women



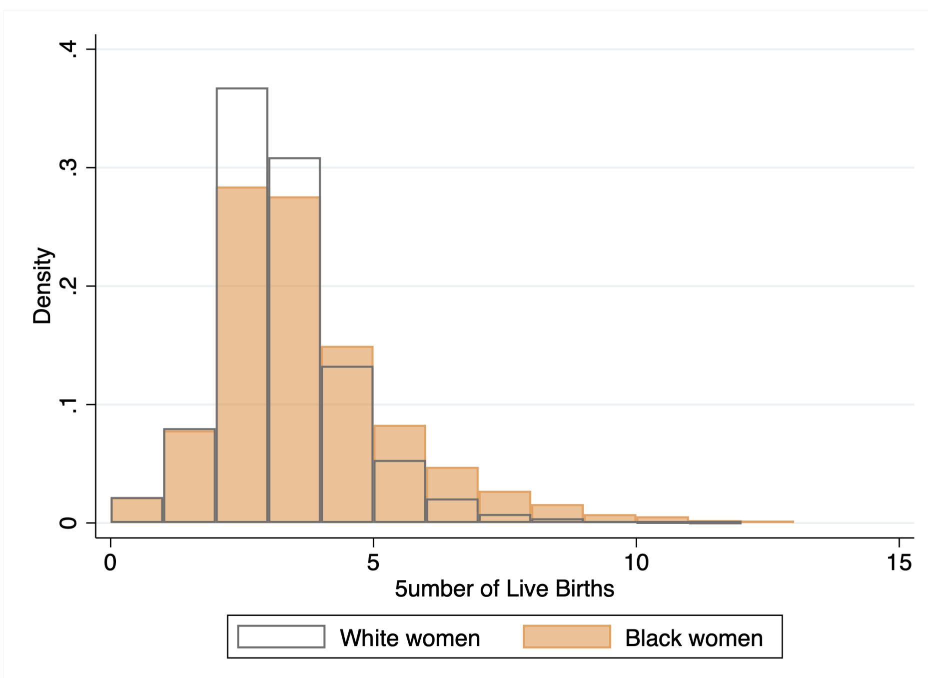
Note: 1960 data from the Growth of American Families Series; 1965, 1970 data from the National Fertility Surveys; data 1976 onwards from the National Survey of Family Growth. Sample includes all married women ages 18-44.

Figure 5: Tubal Sterilizations by Age

(a) Tubal Sterilizations by Age

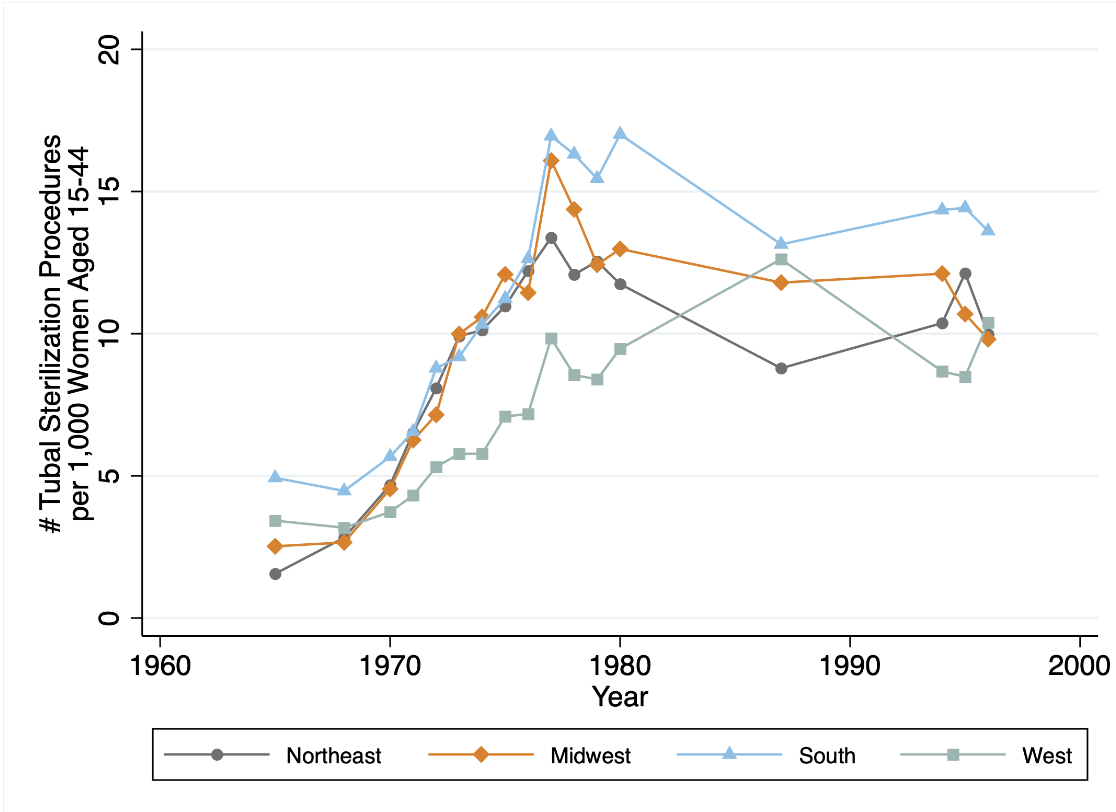


(b) Tubal Sterilizations by Parity



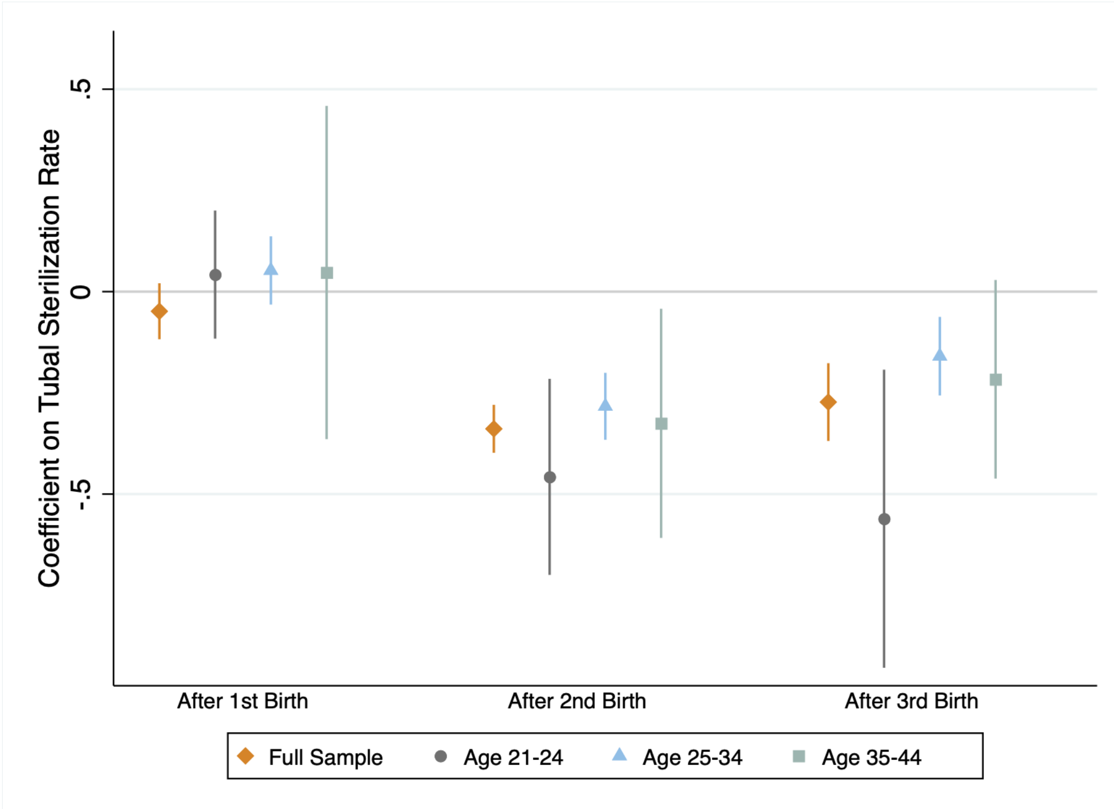
Note: Data in Panel (a) from the National Hospital Discharge Surveys. Sample includes all women who had a tubal sterilization between 1970–1985. Data in Panel (b) from the National Survey of Family Growth. Sample includes all women who report having had a tubal sterilization between 1970–1985.

Figure 6: Tubal Sterilization Rates by Census Region



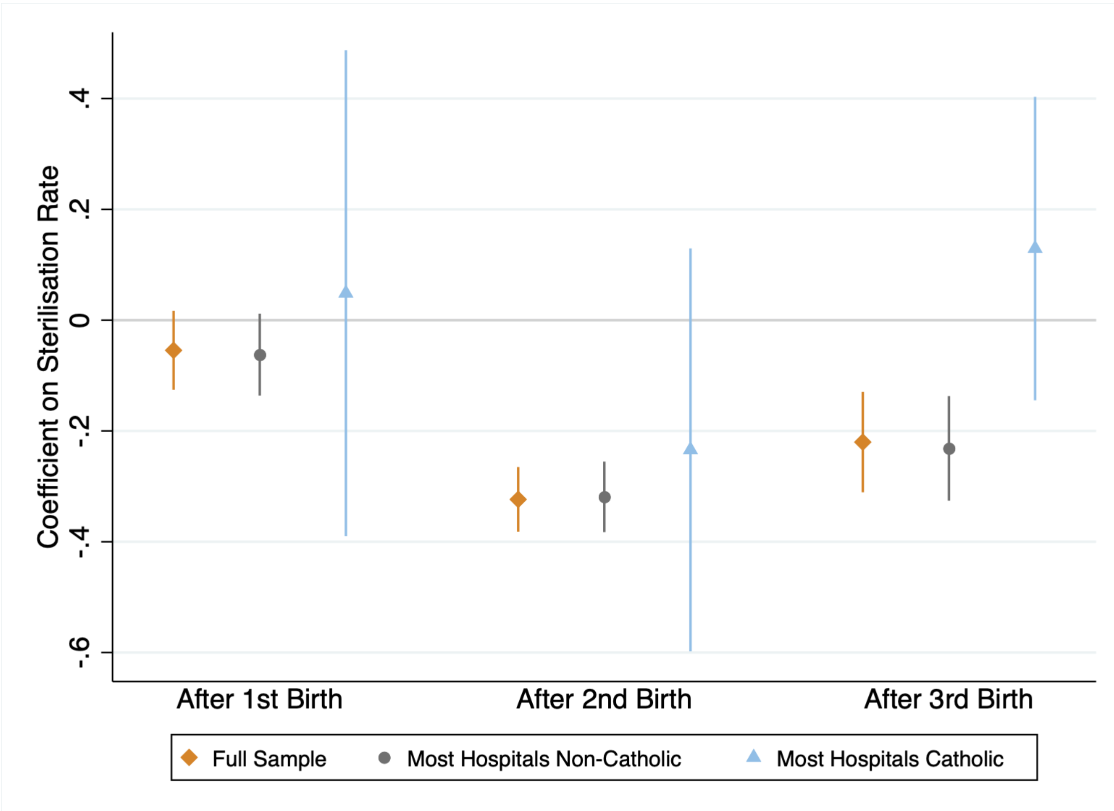
Note: Tubal sterilization rate is defined as the number of tubal sterilization procedures per 1,000 women aged 15–44. Tubal sterilization procedures include inpatient and outpatient procedures for all operations on the fallopian tubes in 1965 and 1968, and for bilateral salpingectomy and bilateral ligation from 1970 onwards. Data from the National Hospital Discharge Surveys, the National Survey of Ambulatory Surgeries, and CDC surveys.

Figure 7: Effect of Exposure to Sterilization Rate on Subsequent Fertility



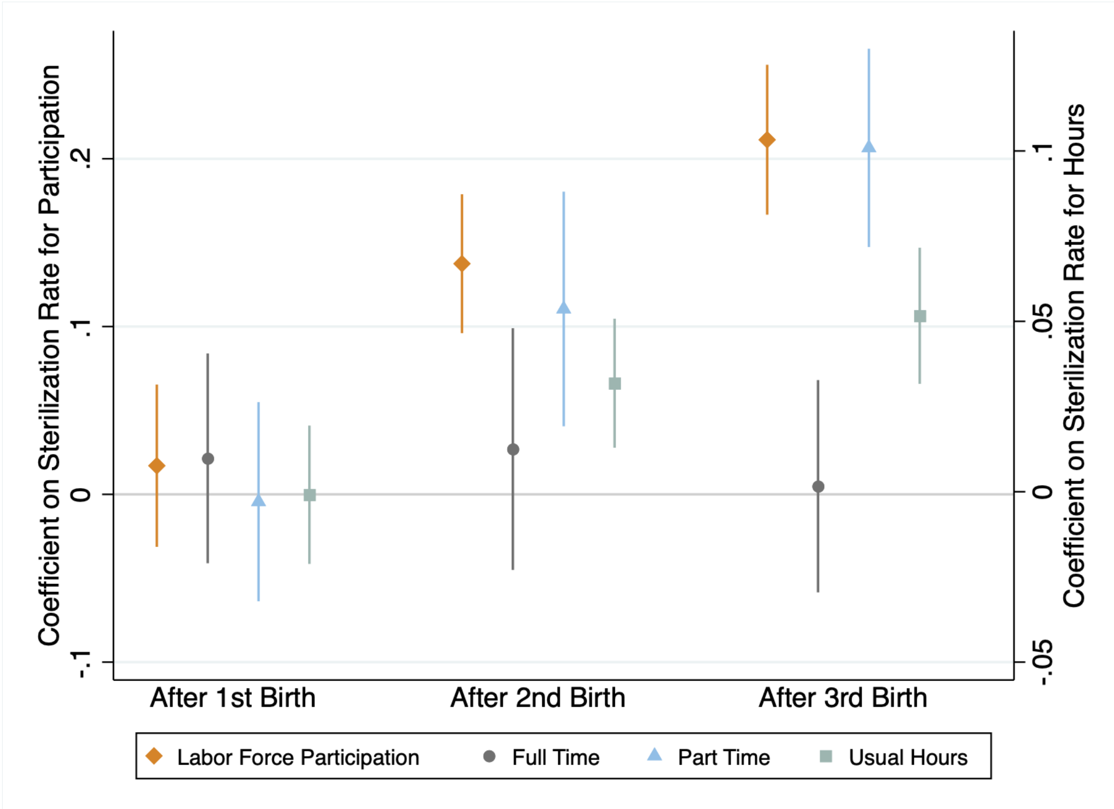
Note: The dependent variables are measures of whether a woman had another birth within 5 years of her 1st, 2nd, or 3rd birth, multiplied by 100. The figure plots the coefficients on sterilization rate from estimating Equation (3). Sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44 (in orange), ages 21–24 (in gray), ages 25–34 (in blue), or ages 35–44 (in green), and was surveyed at least 5 years after the birth. Standard errors are clustered at the state level.

Figure 8: Effect of Exposure to Sterilization Rate on Subsequent Fertility, by Religious Affiliation of Local Hospitals



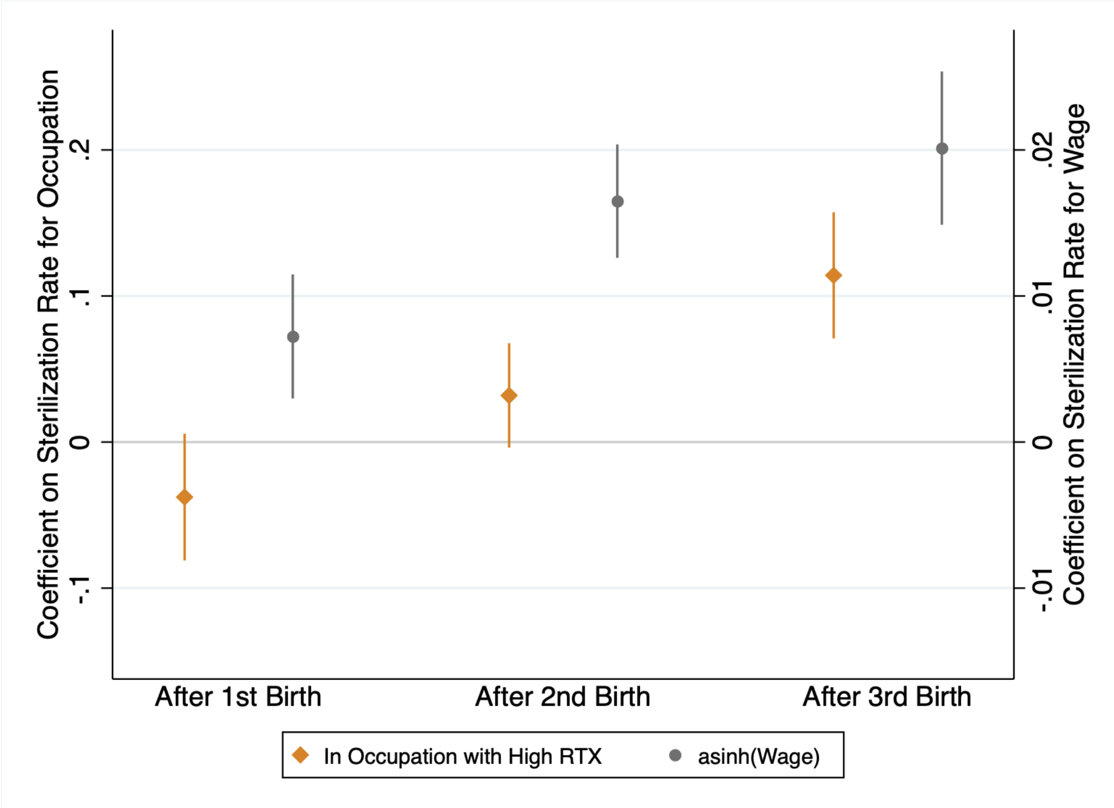
Note: The dependent variables are measures of whether a woman had another birth within 5 years of her 1st, 2nd, or 3rd birth, multiplied by 100. The figure plots the coefficients on sterilization rate from estimating Equation (3). Sample includes all women (in orange), women in PUMAs where over half of hospital births occurred in non-Catholic hospitals (in gray), and women in PUMAs where over half of hospital births occurred in Catholic hospitals (in blue), who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth. The two subsamples do not add up to the full sample, as a small number of PUMAs have no hospitals. Standard errors are clustered at the state level.

Figure 9: Effect of Exposure to Sterilization Rate on Labor Force Participation



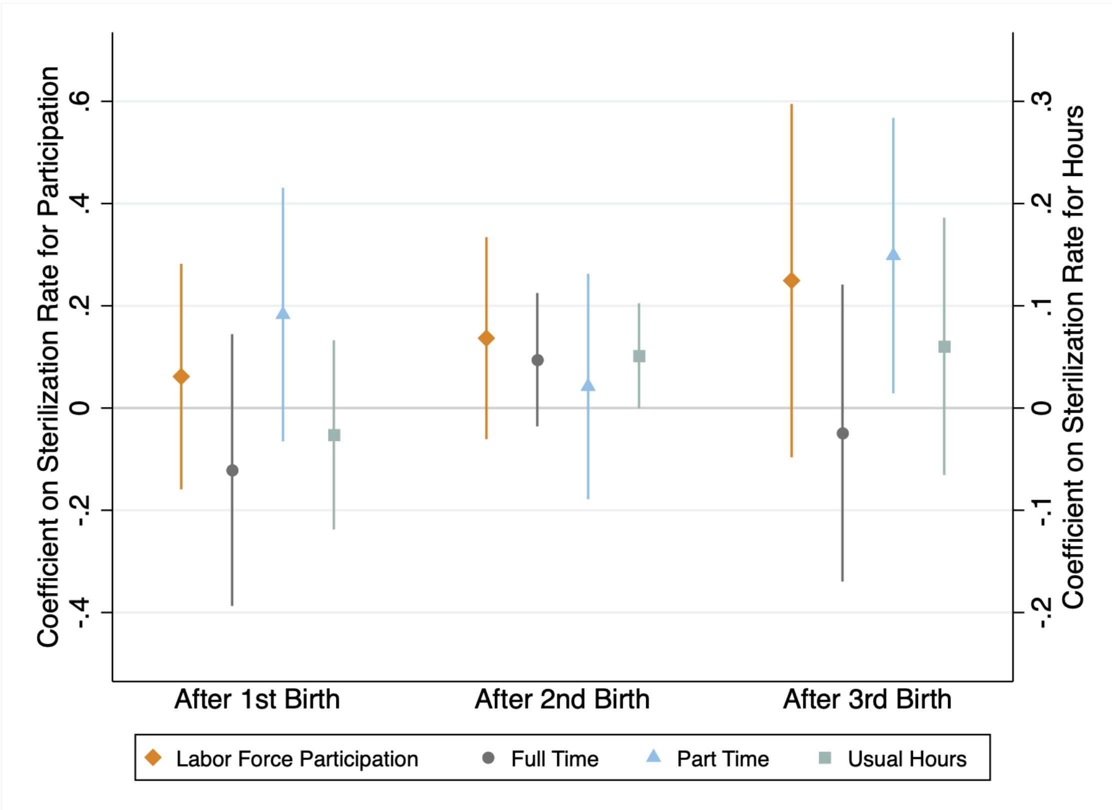
Note: The dependent variables are measures of whether a woman was in the labor force (in orange), in the labor force with at least 40 hours of usual work per week (in gray), in the labor force with less than 40 hours of usual work per week (in blue), and her usual hours of work per week (in green). The indicator variables for labor force participation, full-time participation, and part-time participation are multiplied by 100. The figure plots the coefficients on sterilization rate from estimating Equation (3). Sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed in the ten years after the birth. Standard errors are clustered at the state level.

Figure 10: Effect of Exposure to Sterilization Rate on Wage and Occupations



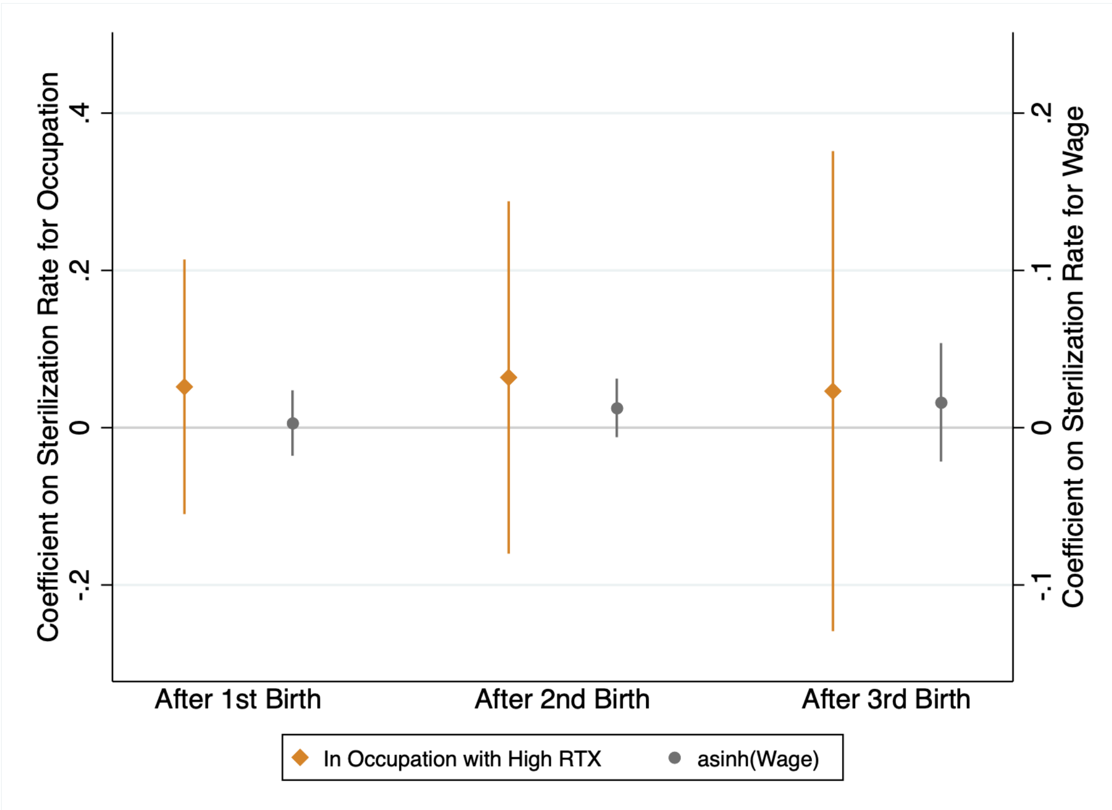
Note: The dependent variable is a measure of whether a woman was in an occupation with above median returns to experience (in orange), and the inverse hyperbolic sine transformation of wage income (in gray). The indicator variables for being in an occupation with high returns to experience is multiplied by 100. The figure plots the coefficients on sterilization rate from estimating Equation (3). Sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed in the ten years after the birth. Standard errors are clustered at the state level.

Figure 11: Effect of Exposure to Sterilization Rate on Labor Force Participation, Areas where Most Hospitals are Catholic



Note: The dependent variables are measures of whether a woman was in the labor force (in orange), in the labor force with at least 40 hours of usual work per week (in gray), in the labor force with less than 40 hours of usual work per week (in blue), and her usual hours of work per week (in green). The indicator variables for labor force participation, full-time participation, and part-time participation are multiplied by 100. The figure plots the coefficients on sterilization rate from estimating Equation (3). Sample includes all women in PUMAs where over half of hospital births occurred in Catholic hospitals, who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth. Standard errors are clustered at the state level.

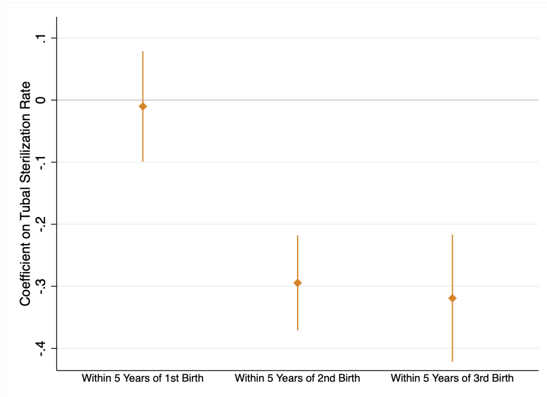
Figure 12: Effect of Exposure to Sterilization Rate on Wage and Occupations, Areas where Most Hospitals are Catholic



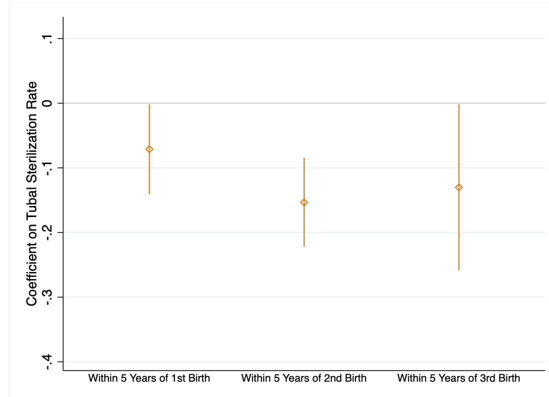
Note: The figures plot the coefficients on sterilization rate from estimating Equation (3). The dependent variables are measures of whether a woman had another birth within 5 years of her 1st, 2nd, or 3rd birth ((a) and (b)), whether she was in the labor force ((c) and (d), in orange), in the labor force with at least 40 hours of usual work per week ((c) and (d), in gray), in the labor force with less than 40 hours of usual work per week ((c) and (d), in blue), her usual hours of work per week ((c) and (d), in green), whether she was in an occupation with above median returns to experience ((e) and (f), in orange), and the inverse hyperbolic sine transformation of wage income ((e) and (f), in gray). All indicator variables are multiplied by 100. The sample includes all women in PUMAs where over half of hospital births occured in Catholic hospitals, who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth. Standard errors are clustered at the state level.

Figure 13: Effect of Exposure to Sterilization Rate, by Race

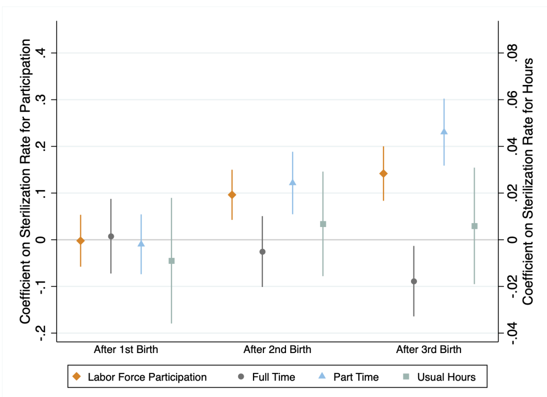
(a) Fertility, White Women



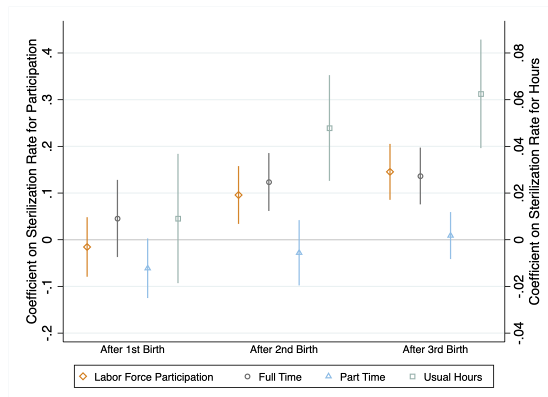
(b) Fertility, Black Women



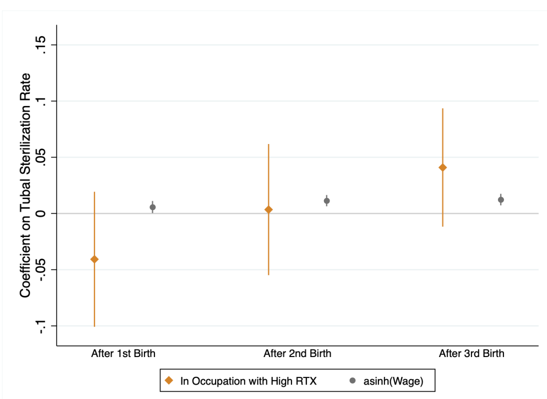
(c) Participation and Hours, White Women



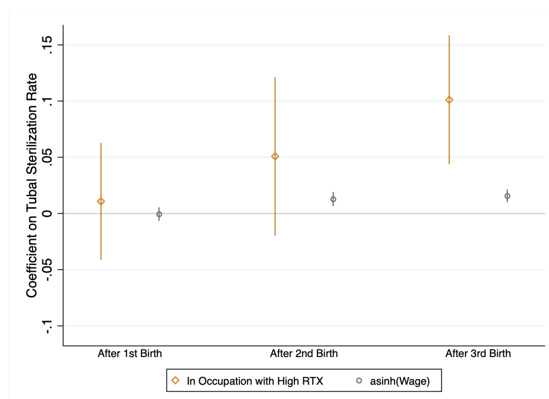
(d) Participation and Hours, Black Women



(e) Occupation and Wage, White Women



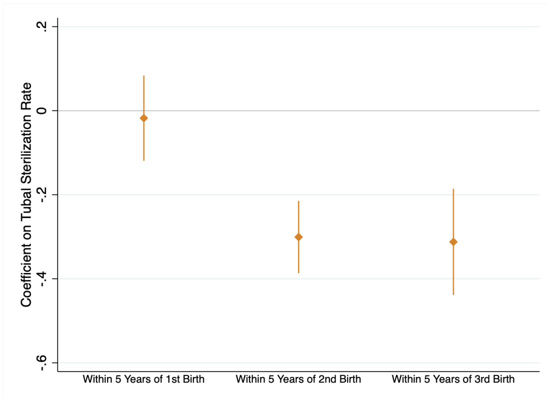
(f) Occupation and Wage, Black Women



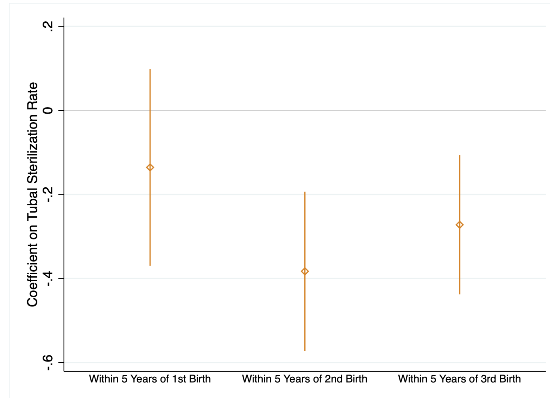
Note: The dependent variables are measures of whether a woman was in the labor force (in orange), in the labor force with at least 40 hours of usual work per week (in gray), in the labor force with less than 40 hours of usual work per week (in blue), and her usual hours of work per week (in green). The indicator variables for labor force participation, full-time participation, and part-time participation are multiplied by 100. The figure plots the coefficients on sterilization rate from estimating Equation (3). The sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44 and was surveyed at least 5 years after the birth ((a) and (b)), or all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed in the ten years after the birth (c) to (f). Standard errors are clustered at the state level.

Figure 14: Effect of Exposure to Sterilization Rate, by Education

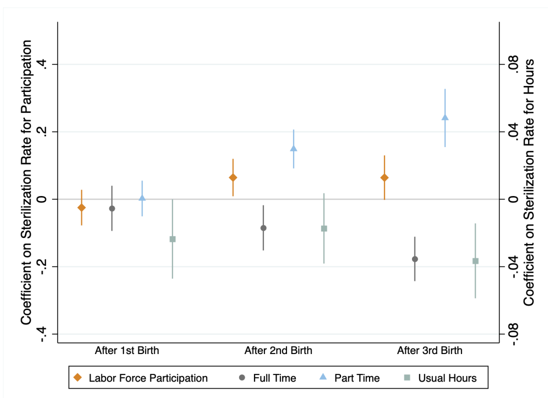
(a) Fertility, Some College



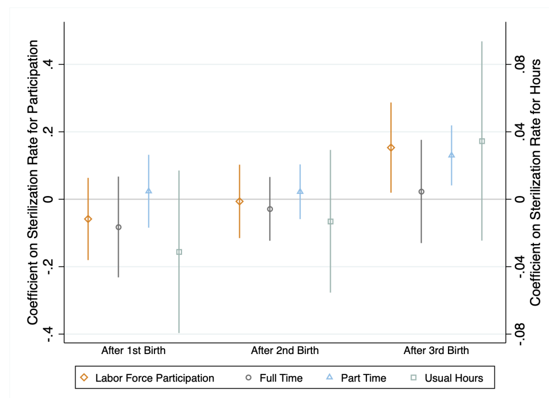
(b) Fertility, High School



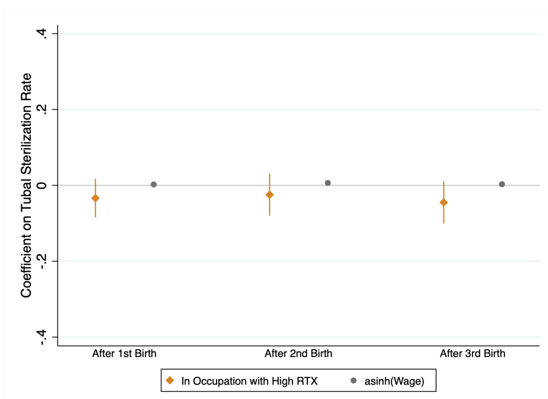
(c) Participation and Hours, Some College



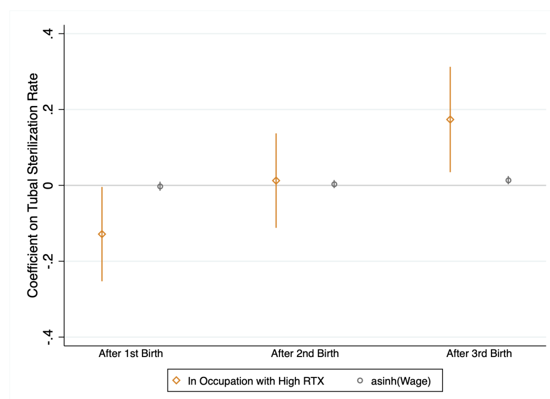
(d) Participation and Hours, High School



(e) Occupation and Wage, Some College



(f) Occupation and Wage, High School



Note: The dependent variables are measures of whether a woman was in the labor force (in orange), in the labor force with at least 40 hours of usual work per week (in gray), in the labor force with less than 40 hours of usual work per week (in blue), and her usual hours of work per week (in green). The indicator variables for labor force participation, full-time participation, and part-time participation are multiplied by 100. The figure plots the coefficients on sterilization rate from estimating Equation (3). The sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44 and was surveyed at least 5 years after the birth ((a) and (b)), or all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed in the ten years after the birth (c) to (f). Standard errors are clustered at the state level.

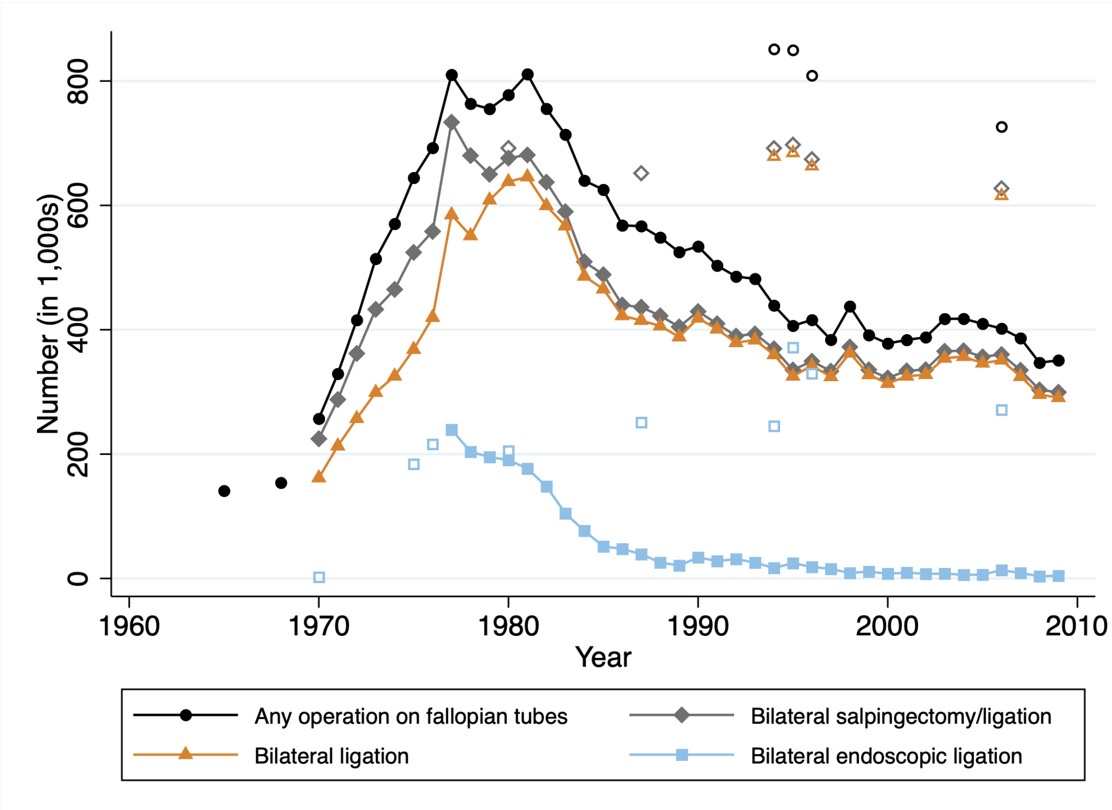
Table 1: Effect of Exposure to Sterilization Rate on Age at First and Last Birth

	Age at Last Birth	Age at Last Birth	Birth after 30	Birth after 30	Birth before 18
	(1)	(2)	(3)	(4)	(5)
Tubal Sterilization Rate at Age 30	-0.1607**	-0.1551***	-1.1801**	-0.9905	-0.0078
	(0.0667)	(0.0538)	(0.5246)	(0.6031)	(0.5003)
Pill Legal Ages 21-30	0.1920		0.1853		
	(0.7574)		(5.4392)		
Abortion Legal Ages 21-30	0.3947		-11.7455		
	(1.9058)		(11.6678)		
Abortion Rate at Age 30		0.0204***		0.1230**	
		(0.0058)		(0.0532)	
Pill Usage at Age 30		-0.0021		-0.0158	
		(0.0051)		(0.0457)	
Abortion Legal Ages 14-20	0.4804	0.4174	-3.7415	-4.1607	
	(0.8518)	(0.8993)	(5.2053)	(5.3452)	
Abortion Access Ages 14-20	-0.6262	-0.6944	-6.5157	-6.4039	
	(1.0345)	(1.0640)	(6.1369)	(6.2364)	
Pill Legal Ages 14-20	2.0767***	1.5389**	1.4883	0.7446	
	(0.7353)	(0.7147)	(5.2331)	(5.4237)	
Pill Access Ages 14-20	3.2944***	2.7677***	9.8910	9.2142	
	(0.8409)	(0.8291)	(6.8636)	(6.5429)	
Abortion Legal Ages 14-17					-2.2240
					(2.4009)
Abortion Access Ages 14-17					-0.1737
					(4.1486)
Pill Legal Ages 14-17					1.7114
					(3.8562)
Pill Access Ages 14-17					5.8392
					(4.7190)
Observations	10,974	10,974	12,179	12,179	6,612
Mean Dependent Variable	30.11	30.11	40.22	40.22	9.13
State and Cohort FE	Yes	Yes	Yes	Yes	Yes
Race and Ethnicity Controls	Yes	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes	No
State Linear Time Trends	No	No	No	No	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. Columns (1)–(4) report the coefficients from estimating Equation (1), and column (5) coefficients from estimating Equation (2. "Age at Last Birth" is the age of a woman in the year her youngest child was born; "Birth after 30" is an indicator variable for a woman giving birth between ages 31–55; and "Birth before 18' is an indicator variable" for a woman giving birth before age 18. All indicator variables are multiplied by 100. The sample in columns (1)–(2) includes all women born between 1920–1965 with at least 1 birth; for columns (3)–(4) all women born between 1920–1965; and for column (5) all women born between 1935–1958. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

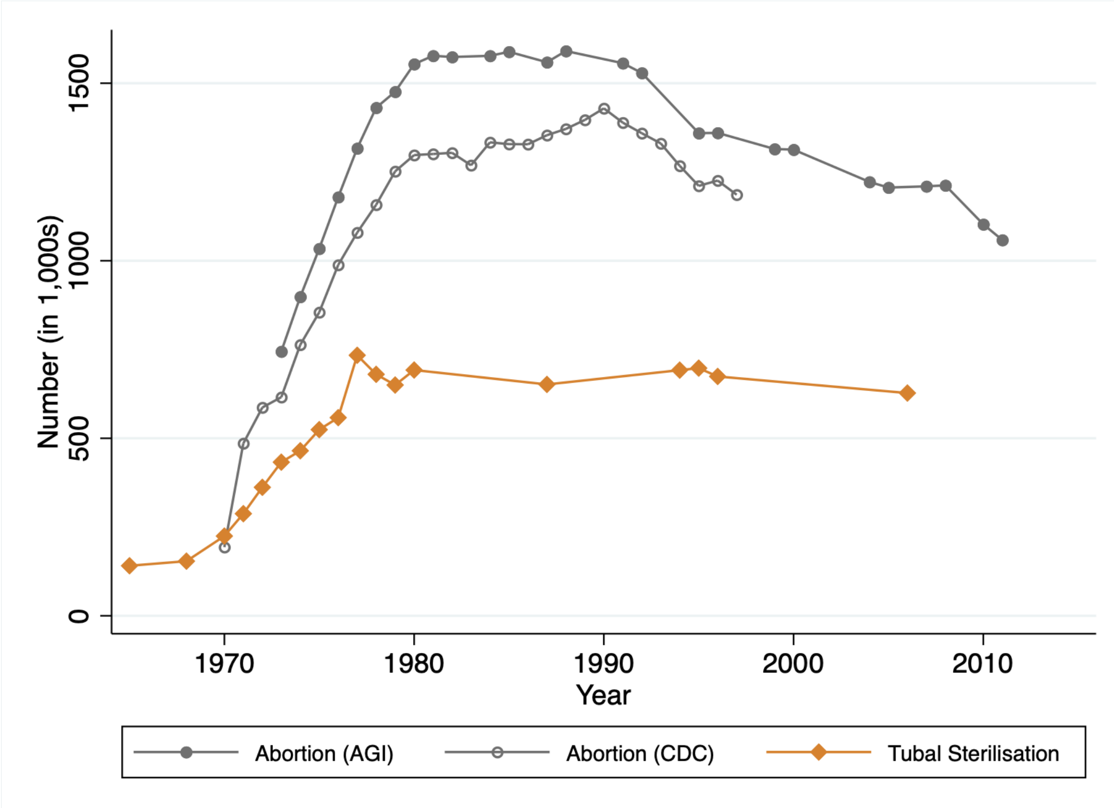
A Supplementary Figures and Tables

Figure A.1: Trends in Tubal Sterilizations by Procedure Type



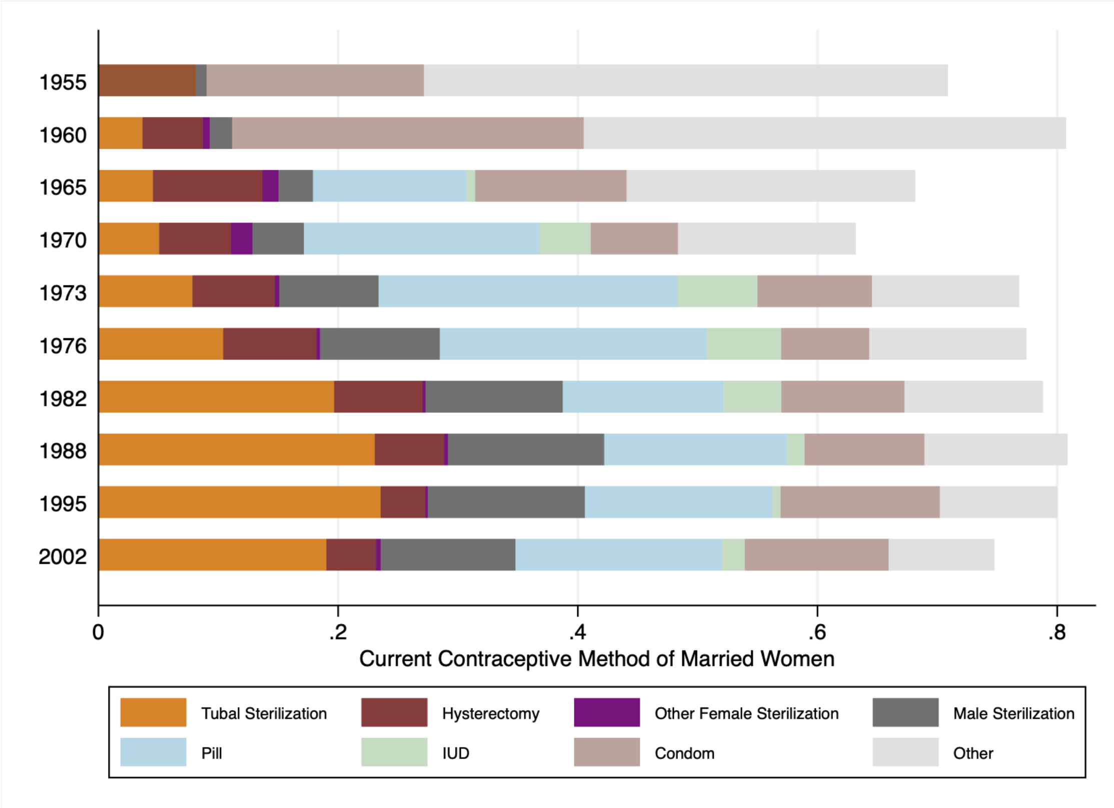
Note: Solid markers indicate data from the National Hospital Discharge Surveys. Hollow markers indicate data from CDC Surgical Sterilization Surveillance reports for 1970, 1975 and 1976, CDC surveys for 1980 and 1987, and the National Survey of Ambulatory Surgeries for 1994–1996 and 2006.

Figure A.2: Trends in Tubal Sterilizations and Abortions



Note: Tubal sterilizations are the total inpatient and outpatient procedures for all operations on the fallopian tubes in 1965 and 1968, and for bilateral salpingectomy and bilateral ligation from 1970 onwards. Inpatient data from the National Hospital Discharge Surveys. Outpatient data from the National Survey of Ambulatory Surgeries and CDC surveys. Abortion data are from the Alan Guttmacher Institute (AGI) and CDC Abortion Surveillance reports.

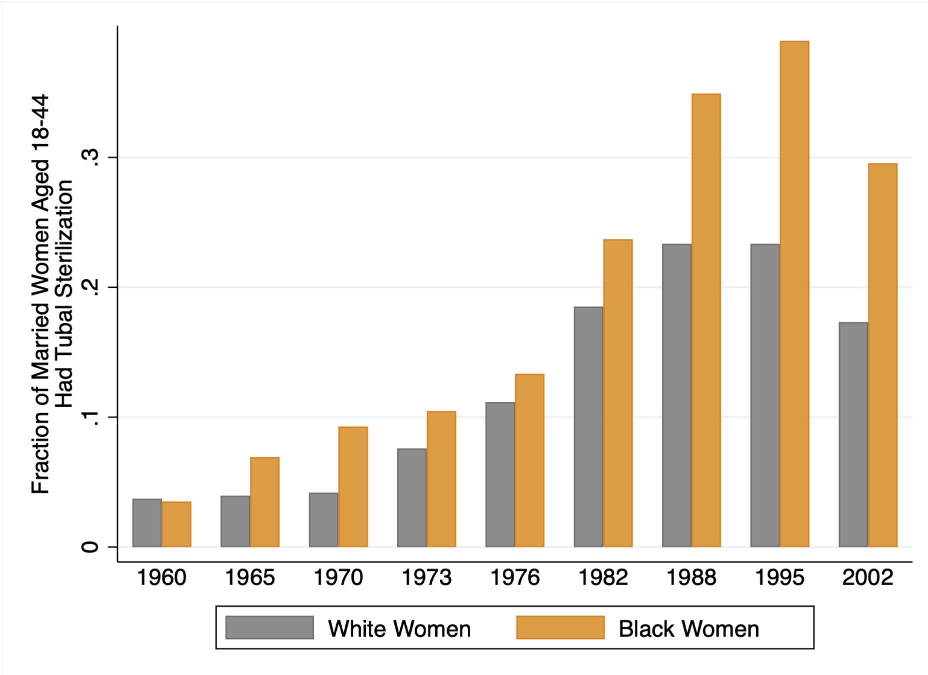
Figure A.3: Contraceptive Methods of Ever-Married Women



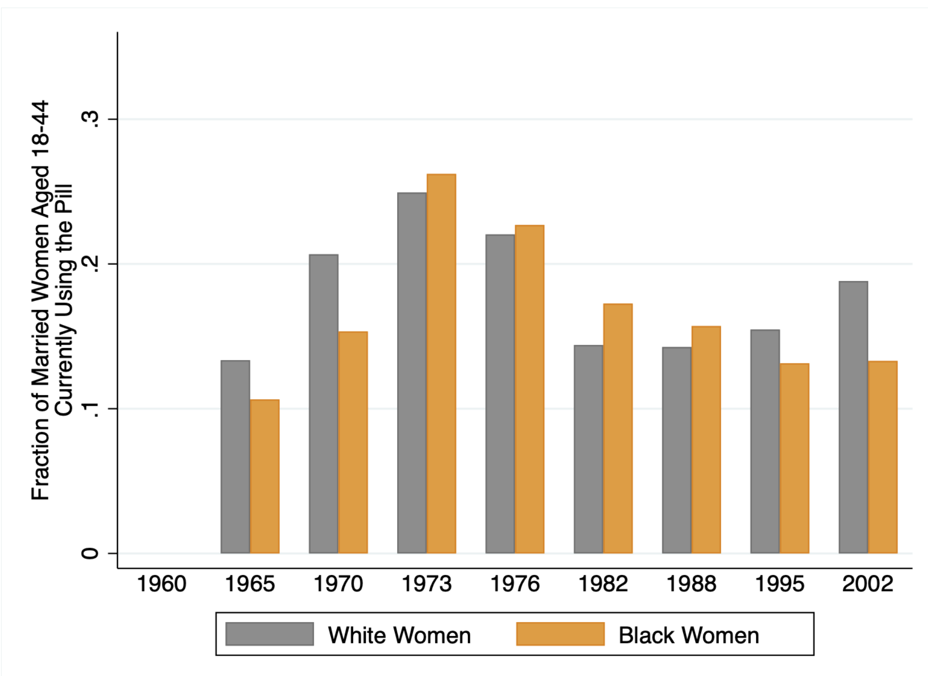
Note: 1955, 1960 data from the Growth of American Families Series; 1965, 1970 data from the National Fertility Surveys; data 1976 onwards from the National Survey of Family Growth. Data from 1955 did not distinguish types of female sterilizations. "Other" methods include rhythm, abstinence, withdrawal, diaphragm, douche, jelly, suppository, foam and sponge. The omitted fraction of women did not use any contraceptive and were not sterilized. Sample includes all married women ages 18-40 in 1955 and ages 18-44 in all other survey years.

Figure A.4: Use of Tubal Sterilization and the Pill among Ever-Married Women, by Race

(a) Tubal Sterilization



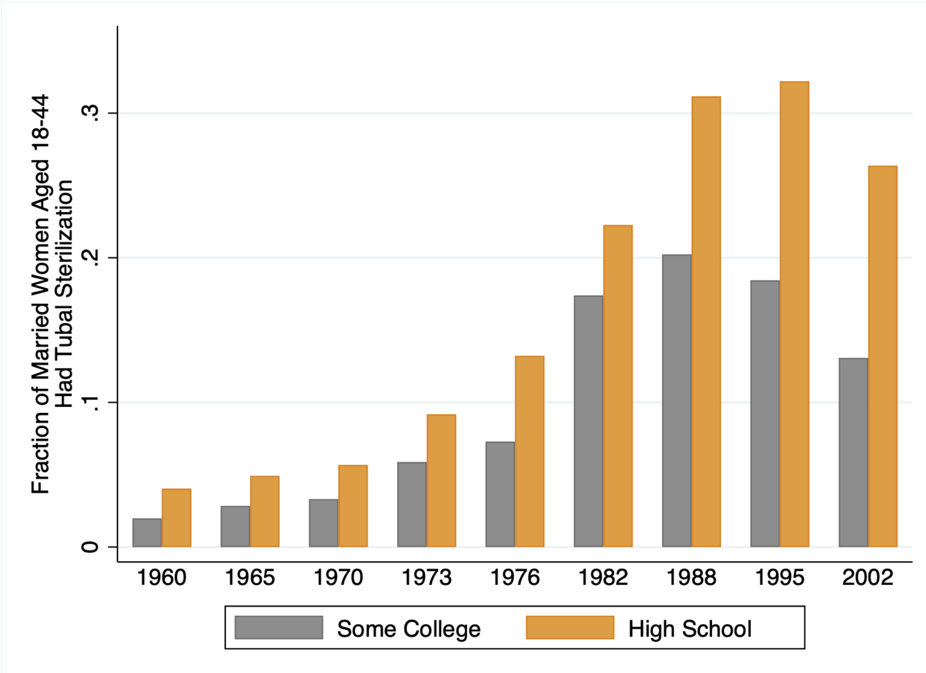
(b) Pill



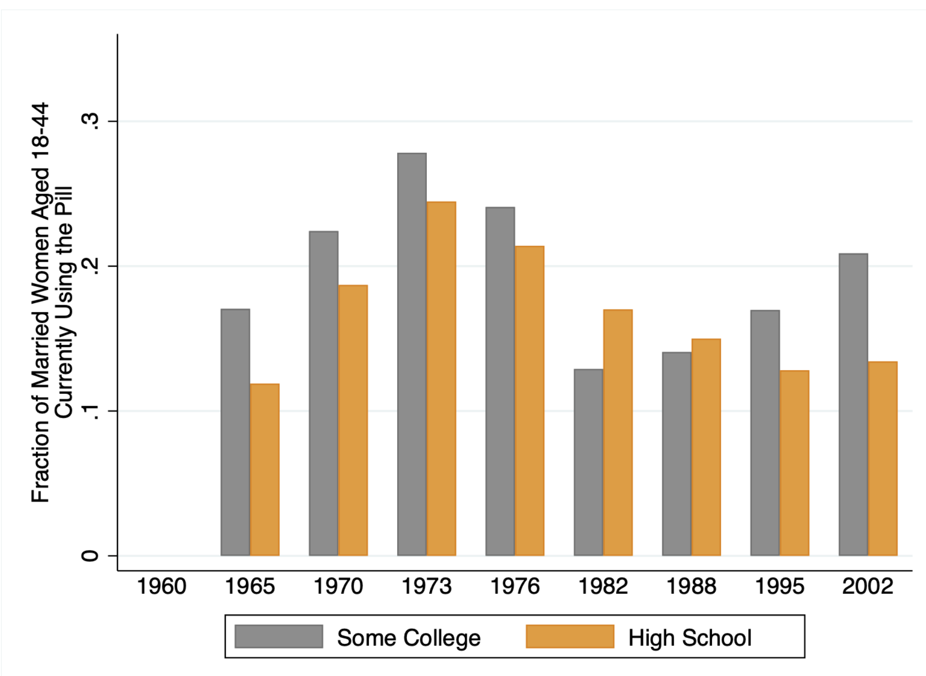
Note: 1960 data from the Growth of American Families Series; 1965, 1970 data from the National Fertility Surveys; data 1976 onwards from the National Survey of Family Growth. Sample includes all married women ages 18-44.

Figure A.5: Use of Tubal Sterilization and the Pill among Ever-Married Women, by Education

(a) Tubal Sterilization

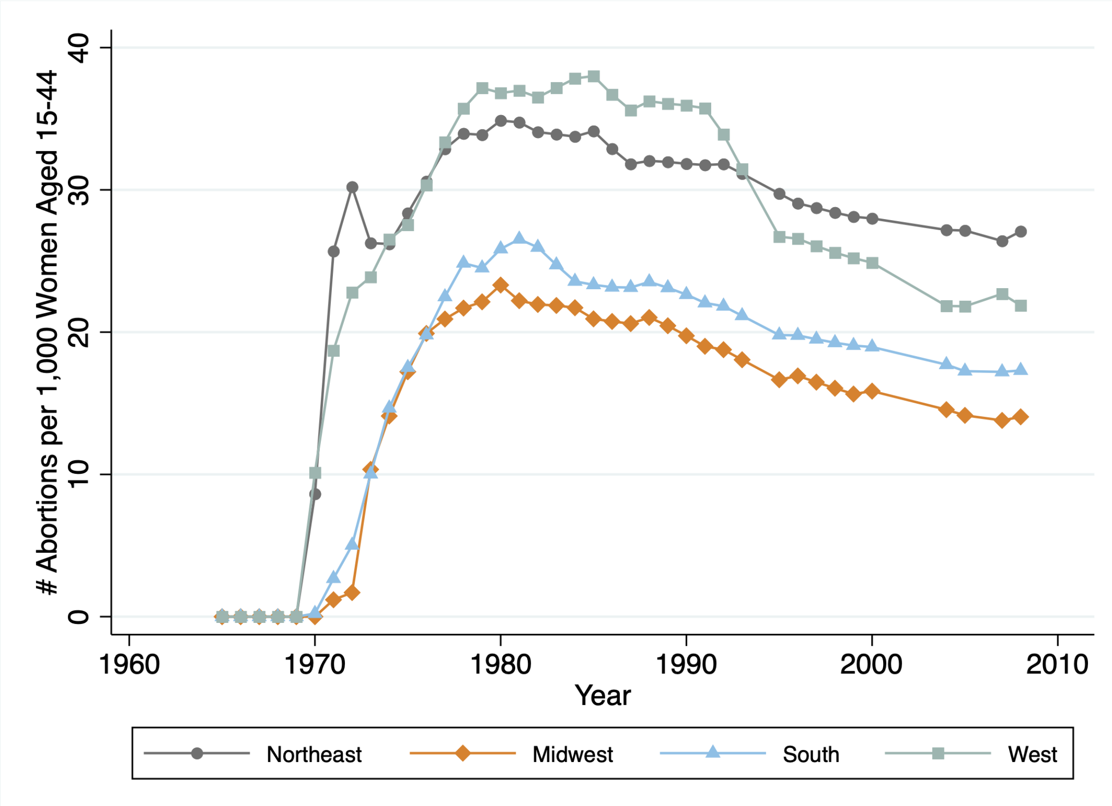


(b) Pill



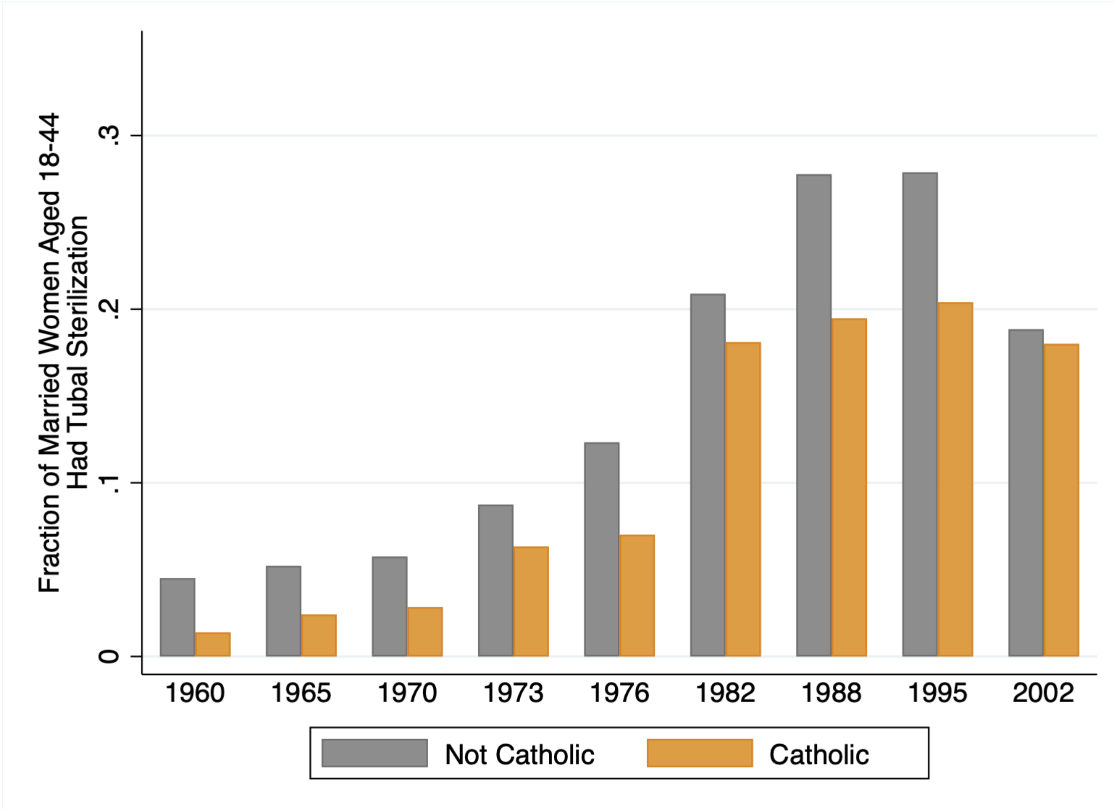
Note: 1960 data from the Growth of American Families Series; 1965, 1970 data from the National Fertility Surveys; data 1976 onwards from the National Survey of Family Growth. Sample includes all married women ages 18-44. "High School" denotes women with at most a high school education, and "Some College" denotes women with at least some college education.

Figure A.6: Abortion Rates by Census Region



Note: Abortion rate is defined as the number of abortion procedures per 1,000 women aged 15–44. Data for 1970–1972 from the CDC Abortion Surveillance reports, and data for 1973 onwards from the Alan Guttmacher Institute.

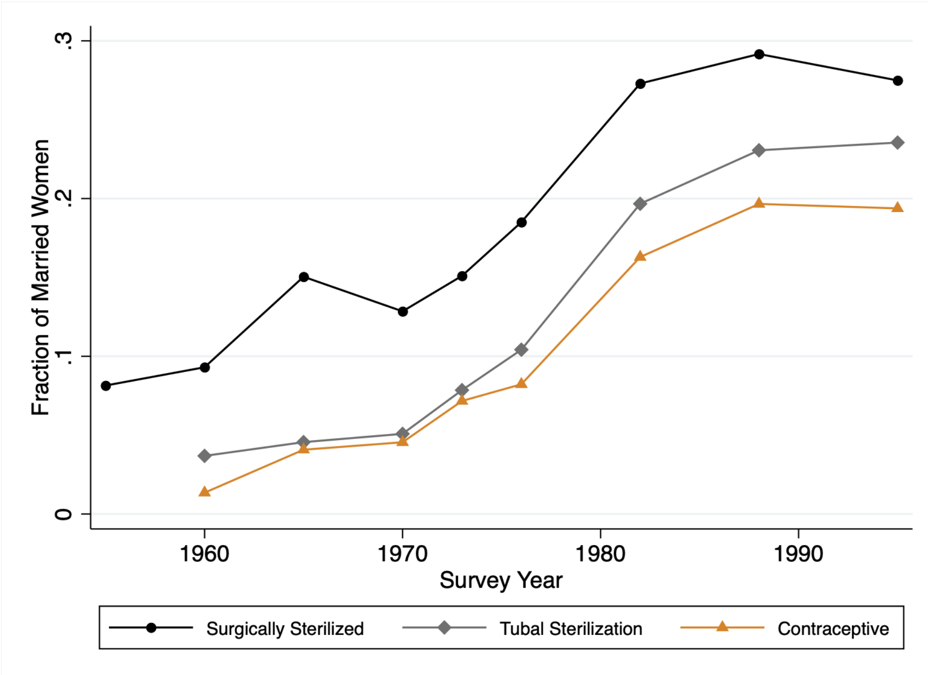
Figure A.7: Fraction of Married Women That Had Tubal Sterilization, Catholics and Non-Catholics



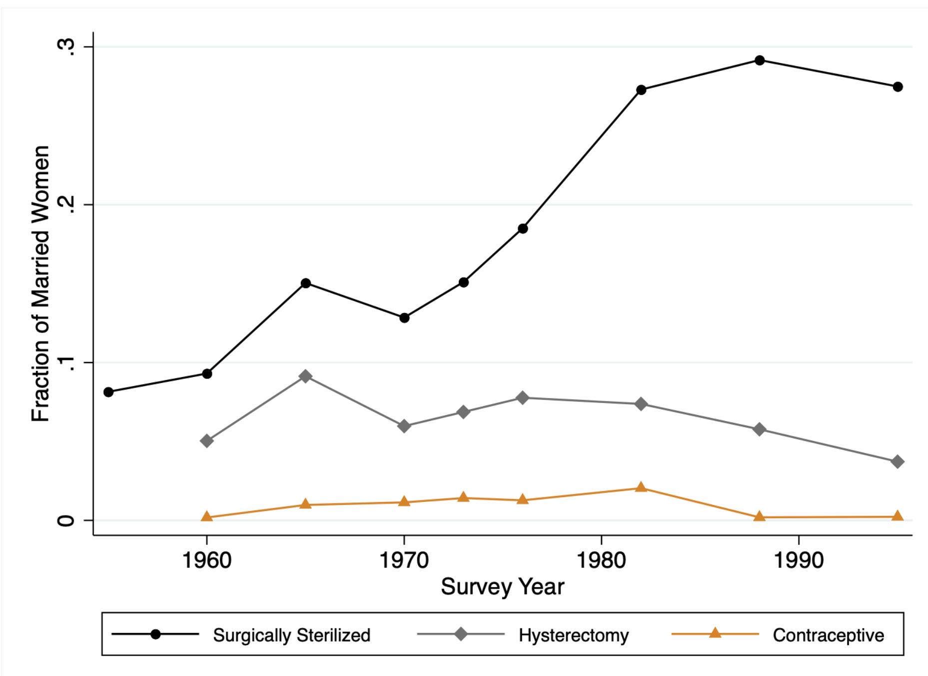
Note: 1960 data from the Growth of American Families Series; 1965, 1970 data from the National Fertility Surveys; data 1976 onwards from the National Survey of Family Growth. Sample includes all married women ages 18-44.

Figure A.8: Fraction of Sterilization Procedures for Contraceptive Purposes

(a) Tubal Sterilizations



(b) Hysterectomies



Note: 1955, 1960 data from the Growth of American Families Series; 1965, 1970 data from the National Fertility Surveys; data 1976 onwards from the National Survey of Family Growth. Sample includes all married women ages 18-40 in 1955 and ages 18-44 in all other survey years. The figure plots the fraction of women who reported having had a surgical sterilization procedure (in black), specifically a tubal sterilization or hysterectomy (in gray), and having had the procedure at least partly for contraceptive purposes.

Table A.1: Effect of Exposure to Sterilization Rate on Subsequent Fertility

	Full Sample	Age 18-20	Age 21-24	Age 25-34	Age 35-44
	(1)	(2)	(3)	(4)	(5)
	P(4th birth within 5 years of 3rd birth)				
# Tubal Sterilizations/1,000 Women	-0.273***	-0.779	-0.561***	-0.159***	-0.216*
	(0.049)	(1.151)	(0.188)	(0.050)	(0.125)
# Abortions/1,000 Women	-0.00238	0.0189	0.0284*	0.0130	0.00950
	(0.016)	(0.035)	(0.015)	(0.021)	(0.050)
Observations	457,585	20,012	94,735	303,261	39,577
Mean Dependent Variable	28.78	51.29	39.78	25.83	13.54
	P(3rd birth within 5 years of 2nd birth)				
# Tubal Sterilization/1,000 Women	-0.339***	0.283	-0.458***	-0.283***	-0.325**
	(0.030)	(0.434)	(0.123)	(0.042)	(0.144)
# Abortions/1,000 Women	0.0218***	0.0266**	0.0216**	0.0461***	-0.00956
	(0.008)	(0.013)	(0.010)	(0.011)	(0.046)
Observations	935,391	93,794	297,667	507,255	36,675
Mean Dependent Variable	36.25	53.02	42.34	31.04	16.55
	P(2nd birth within 5 years of 1st birth)				
# Tubal Sterilization/1,000 Women	-0.0485	0.00146	0.0421	0.0523	0.0471
	(0.035)	(0.271)	(0.081)	(0.043)	(0.210)
# Abortions/1,000 Women	-0.0140	0.0164*	0.0251**	0.000429	0.281**
	(0.015)	(0.009)	(0.011)	(0.022)	(0.130)
Observations	1,094,064	279,845	400,823	390,737	22,659
Mean Dependent Variable	66.20	66.35	68.76	65.37	33.67
State and Year (of Previous Birth) FE	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes

Clustered standard errors in parentheses

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

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). The dependent variables are measures of whether a woman had another birth within 5 years of her 1st, 2nd, or 3rd birth, multiplied by 100. Column (1) considers the full sample which includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth. The second to fifth columns include age subsamples as specified in the column labels. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.2: Effect of Exposure to Sterilization Rate on Subsequent Fertility, by Religious Affiliation of Local Hospitals

	Full Sample (1)	Most Hospitals Non-Catholic (2)	Most Hospitals Catholic (3)
	P(4th birth within 5 years of 3rd birth)		
# Tubal Sterilisation/1,000 Women	-0.273***	-0.286***	0.100
	(0.049)	(0.052)	(0.171)
# Abortions/1,000 Women	-0.00238	-0.00278	0.0168
	(0.016)	(0.016)	(0.038)
Observations	457,585	425,647	16,761
Mean Dependent Variable	28.78	28.70	28.75
	P(3rd birth within 5 years of 2nd birth)		
# Tubal Sterilisation/1,000 Women	-0.339***	-0.332***	-0.225
	(0.030)	(0.032)	(0.163)
# Abortions/1,000 Women	0.0218***	0.0211***	0.0154
	(0.008)	(0.008)	(0.037)
Observations	935,391	870,460	34,203
Mean Dependent Variable	36.25	36.13	38.01
	P(2nd birth within 5 years of 1st birth)		
# Tubal Sterilisation/1,000 Women	-0.0485	-0.0538	0.0169
	(0.035)	(0.039)	(0.215)
# Abortions/1,000 Women	-0.0140	-0.0117	-0.0520***
	(0.015)	(0.015)	(0.017)
R^2	0.038	0.037	0.044
Observations	1,094,064	1,017,170	40,023
Mean Dependent Variable	66.20	66.12	69.17
State and Year (of Previous Birth) FE	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). The dependent variables are measures of whether a woman had another birth within 5 years of her 1st, 2nd, or 3rd birth, multiplied by 100. Column (1) considers the full sample which includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth. Column (2) considers the subsample of PUMAs where over half of hospital births occurred in non-Catholic hospitals, and column (3) considers the subsample of PUMAs where over half of hospital births occured in Catholic hospitals. The two subsamples do not add up to the full sample, as a small number of PUMAs have no hospitals. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.3: Effect of Exposure to Sterilization Rate on Labor Market Outcomes

	LFP	Full Time	Part Time	Hours	High RTX	asinh(Wage)
	(1)	(2)	(3)	(4)	(5)	(6)
	After 3rd Birth					
# Tubal Sterilisations/1,000 Women	0.211***	0.00484	0.206***	0.0516***	0.114***	0.0201***
	(0.023)	(0.032)	(0.030)	(0.010)	(0.022)	(0.003)
# Abortions/1,000 Women	-0.105***	-0.0548***	-0.0506***	-0.0348***	-0.0921***	-0.00996***
	(0.027)	(0.019)	(0.012)	(0.010)	(0.020)	(0.002)
R^2	0.079	0.055	0.041	0.074	0.036	0.102
Observations	395,983	395,983	395,983	395,983	395,983	395,983
Mean Dependent Variable	59.08	32.34	26.74	19.92	40.61	4.99
	After 2nd Birth					
# Tubal Sterilisations/1,000 Women	0.137***	0.0270	0.110***	0.0318***	0.0319*	0.0165***
	(0.021)	(0.037)	(0.036)	(0.010)	(0.018)	(0.002)
# Abortions/1,000 Women	-0.0936***	-0.0518***	-0.0418***	-0.0327***	-0.0542***	-0.00850***
	(0.019)	(0.015)	(0.008)	(0.007)	(0.010)	(0.002)
R^2	0.074	0.057	0.037	0.074	0.034	0.101
Observations	822,263	822,263	822,263	822,263	822,263	822,263
Mean Dependent Variable	62.67	34.56	28.10	21.14	41.66	5.38
	After 1st Birth					
# Tubal Sterilisations/1,000 Women	0.0171	0.0214	-0.00438	-0.000881	-0.0377*	0.00723***
	(0.025)	(0.032)	(0.030)	(0.010)	(0.022)	(0.002)
# Abortions/1,000 Women	-0.0834***	-0.0545***	-0.0289***	-0.0316***	-0.0501***	-0.00731***
	(0.015)	(0.015)	(0.005)	(0.006)	(0.008)	(0.002)
R^2	0.060	0.052	0.032	0.062	0.030	0.084
Observations	954,206	954,206	954,206	954,206	954,206	954,206
Mean Dependent Variable	64.11	36.57	27.55	21.84	41.85	5.55
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. This table reports the coefficients from estimating Equation (3). "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. The sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed within 10 years after the birth. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.4: Effect of Exposure to Sterilization Rate on Labor Market Outcomes, Areas where Most Hospitals are Catholic

	LFP	Full Time	Part Time	Hours	RTX p50	asinh(Wage)
	(1)	(2)	(3)	(4)	(5)	(6)
	After 3rd Birth					
# Tubal Sterilisations/1,000 Women	0.204	-0.0473	0.251*	0.0526	0.0123	0.0126
	(0.145)	(0.152)	(0.133)	(0.062)	(0.155)	(0.015)
# Abortions/1,000 Women	-0.00700	-0.0217	0.0147	-0.00515	0.0596	-0.00589
	(0.068)	(0.039)	(0.046)	(0.021)	(0.046)	(0.007)
Observations	14,741	14,741	14,741	14,741	14,741	14,741
Mean Dependent Variable	58.41	32.61	25.80	18.70	38.68	5.00
	After 2nd Birth					
# Tubal Sterilisations/1,000 Women	0.123	0.0705	0.0525	0.0437	0.0722	0.0108
	(0.086)	(0.070)	(0.105)	(0.028)	(0.113)	(0.008)
# Abortions/1,000 Women	-0.0638	-0.0178	-0.0459	-0.0168	-0.0234	-0.00534
	(0.068)	(0.054)	(0.029)	(0.025)	(0.047)	(0.007)
Observations	30,147	30,147	30,147	30,147	30,147	30,147
Mean Dependent Variable	61.78	35.09	26.69	19.79	39.99	5.41
	After 1st Birth					
# Tubal Sterilisations/1,000 Women	0.0417	-0.0993	0.141	-0.0243	0.0859	0.00239
	(0.096)	(0.122)	(0.114)	(0.042)	(0.075)	(0.009)
# Abortions/1,000 Women	-0.0972*	-0.107***	0.00961	-0.0372**	-0.00835	-0.00944*
	(0.048)	(0.033)	(0.028)	(0.016)	(0.029)	(0.005)
Observations	35,038	35,038	35,038	35,038	35,038	35,038
Mean Dependent Variable	63.61	37.79	25.82	20.67	40.39	5.63
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. The sample includes all women in PUMAs where over half of hospital births occured in Catholic hospitals, who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed within 10 years after the birth. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.5: Effect of Exposure to Sterilization Rate (White Women Only)

	Birth (1)	LFP (2)	Full Time (3)	Part Time (4)	Hours (5)	RTX p50 (6)	asinh(Wage) (7)
	After 3rd Birth						
# Tubal Sterilisations/1,000 Women	-0.319***	0.142***	-0.0887**	0.230***	0.00594	0.0409	0.0124***
	(0.052)	(0.030)	(0.038)	(0.037)	(0.013)	(0.027)	(0.003)
# Abortions/1,000 Women	-0.000389	-0.0830**	-0.0347**	-0.0483**	-0.0255**	-0.0691***	-0.00883***
	(0.027)	(0.034)	(0.016)	(0.021)	(0.011)	(0.023)	(0.003)
Observations	363,376	317,255	317,255	317,255	317,255	317,255	317,255
Mean Dependent Variable	26.34	58.31	29.71	28.59	19.16	38.83	4.99
	After 2nd Birth						
# Tubal Sterilisations/1,000 Women	-0.294***	0.0963***	-0.0253	0.122***	0.00680	0.00346	0.0114***
	(0.039)	(0.027)	(0.039)	(0.034)	(0.011)	(0.030)	(0.003)
# Abortions/1,000 Women	0.0289***	-0.0848***	-0.0413***	-0.0436***	-0.0280***	-0.0455***	-0.00816***
	(0.007)	(0.021)	(0.013)	(0.011)	(0.008)	(0.013)	(0.002)
Observations	773,017	685,331	685,331	685,331	685,331	685,331	685,331
Mean Dependent Variable	34.68	61.94	32.17	29.77	20.41	40.20	5.40
	After 1st Birth						
# Tubal Sterilisations/1,000 Women	-0.0101	-0.00214	0.00760	-0.00974	-0.00897	-0.0407	0.00573**
	(0.045)	(0.028)	(0.041)	(0.033)	(0.014)	(0.031)	(0.003)
# Abortions/1,000 Women	-0.0140	-0.0848***	-0.0529***	-0.0319***	-0.0304***	-0.0446***	-0.00805***
	(0.021)	(0.016)	(0.015)	(0.006)	(0.006)	(0.009)	(0.002)
Observations	909,289	803,715	803,715	803,715	803,715	803,715	803,715
Mean Dependent Variable	67.64	63.33	34.37	28.96	21.14	40.49	5.58
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). "Birth" is an indicator variable for a woman having another birth within 5 years; "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. Tubal sterilization rate is defined as the number of tubal sterilization procedures for White women per 1,000 White women at the region and age-group. The sample includes all White women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth (column 1) or within 10 years after the birth (columns 2–7). Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.6: Effect of Exposure to Sterilization Rate (Black Women Only)

	Birth	LFP	Full Time	Part Time	Hours	RTX p50	asinh(Wage)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	After 3rd Birth						
# Tubal Sterilisations/1,000 Women	-0.130*	0.145***	0.137***	0.00891	0.0625***	0.101***	0.0157***
	(0.065)	(0.031)	(0.031)	(0.026)	(0.012)	(0.029)	(0.003)
# Abortions/1,000 Women	0.0183	-0.0948**	-0.0485	-0.0463	-0.0339**	-0.0776***	-0.00917**
	(0.019)	(0.037)	(0.033)	(0.035)	(0.015)	(0.024)	(0.004)
Observations	57,295	52,825	52,825	52,825	52,825	52,825	52,825
Mean Dependent Variable	36.38	63.82	43.32	20.50	23.38	49.41	5.89
	After 2nd Birth						
# Tubal Sterilisations/1,000 Women	-0.153***	0.0958***	0.124***	-0.0279	0.0479***	0.0508	0.0128***
	(0.035)	(0.032)	(0.032)	(0.036)	(0.012)	(0.036)	(0.003)
# Abortions/1,000 Women	0.00711	-0.0850**	-0.0591**	-0.0258	-0.0356**	-0.0425***	-0.00911**
	(0.017)	(0.035)	(0.026)	(0.019)	(0.014)	(0.014)	(0.003)
Observations	96,472	88,547	88,547	88,547	88,547	88,547	88,547
Mean Dependent Variable	41.46	68.66	47.75	20.91	25.49	51.44	6.44
	After 1st Birth						
# Tubal Sterilisations/1,000 Women	-0.0712*	-0.0155	0.0456	-0.0611*	0.00910	0.0108	-0.000514
	(0.036)	(0.033)	(0.042)	(0.033)	(0.014)	(0.026)	(0.003)
# Abortions/1,000 Women	-0.00312	-0.0453	-0.0288	-0.0166	-0.0208	-0.0313*	-0.00445
	(0.007)	(0.032)	(0.026)	(0.014)	(0.014)	(0.018)	(0.003)
Observations	108,601	95,785	95,785	95,785	95,785	95,785	95,785
Mean Dependent Variable	53.64	71.44	50.02	21.42	26.66	52.16	6.73
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered Standard errors in parentheses

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

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). "Birth" is an indicator variable for a woman having another birth within 5 years; "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. Tubal sterilization rate is defined as the number of tubal sterilization procedures for Black women per 1,000 Black women at the region and age-group. The sample includes all Black women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth (column 1) or within 10 years after the birth (columns 2–7). Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.7: Effect of Exposure to Sterilization Rate (White Women with At Least Some College Education Only)

	Birth (1)	LFP (2)	Full Time (3)	Part Time (4)	Hours (5)	RTX p50 (6)	asinh(Wage) (7)
				After 3rd Birth			
# Tubal Sterilisations/1,000 Women	-0.312***	0.0640*	-0.177***	0.241***	-0.0365***	-0.0448	0.00363
	(0.065)	(0.034)	(0.034)	(0.044)	(0.011)	(0.028)	(0.003)
# Abortions/1,000 Women	0.0238	-0.0745*	-0.0309*	-0.0437	-0.0228*	-0.0606**	-0.00823**
	(0.024)	(0.040)	(0.018)	(0.028)	(0.012)	(0.025)	(0.003)
Observations	295,716	250,816	250,816	250,816	250,816	250,816	250,816
Mean Dependent Variable	24.54	61.58	30.06	31.51	19.92	39.05	5.28
				After 2nd Birth			
# Tubal Sterilisations/1,000 Women	-0.301***	0.0644**	-0.0847**	0.149***	-0.0173	-0.0246	0.00694**
	(0.044)	(0.028)	(0.034)	(0.029)	(0.011)	(0.028)	(0.003)
# Abortions/1,000 Women	0.0399***	-0.0738***	-0.0346***	-0.0392***	-0.0240***	-0.0309***	-0.00707***
	(0.006)	(0.019)	(0.011)	(0.013)	(0.007)	(0.011)	(0.002)
Observations	672,732	582,242	582,242	582,242	582,242	582,242	582,242
Mean Dependent Variable	33.21	64.41	32.63	31.78	21.03	40.35	5.63
				After 1st Birth			
# Tubal Sterilisations/1,000 Women	-0.0177	-0.0248	-0.0270	0.00221	-0.0236*	-0.0336	0.00284
	(0.052)	(0.027)	(0.034)	(0.027)	(0.012)	(0.026)	(0.003)
# Abortions/1,000 Women	-0.0106	-0.0797***	-0.0540***	-0.0257***	-0.0295***	-0.0382***	-0.00773***
	(0.021)	(0.015)	(0.014)	(0.005)	(0.006)	(0.008)	(0.002)
Observations	817,792	709,437	709,437	709,437	709,437	709,437	709,437
Mean Dependent Variable	67.66	65.31	34.92	30.39	21.66	40.57	5.78
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (6). "Birth" is an indicator variable for a woman having another birth within 5 years; "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. Tubal sterilization rate is defined as the number of tubal sterilization procedures for White women per 1,000 White women at the region and age-group. The sample includes all White women with at least a college education who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth (column 1) or within 10 years after the birth (columns 2–7). Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.8: Effect of Exposure to Sterilization Rate (White Women with At Most a High School Education Only)

	Birth	LFP	Full Time	Part Time	Hours	RTX p50	asinh(Wage)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				After 3rd Birth			
# Tubal Sterilisations/1,000 Women	-0.272***	0.153**	0.0231	0.130***	0.0346	0.174**	0.0138**
	(0.084)	(0.068)	(0.078)	(0.045)	(0.030)	(0.071)	(0.006)
# Abortions/1,000 Women	-0.0258	-0.0547**	-0.0389**	-0.0159	-0.0199*	-0.0555**	-0.00497***
	(0.028)	(0.024)	(0.019)	(0.019)	(0.010)	(0.023)	(0.002)
Observations	67,660	66,439	66,439	66,439	66,439	66,439	66,439
Mean Dependent Variable	34.13	46.10	28.41	17.69	16.32	38.02	3.88
				After 2nd Birth			
# Tubal Sterilisations/1,000 Women	-0.383***	-0.00637	-0.0286	0.0222	-0.0131	0.0126	0.00343
	(0.097)	(0.056)	(0.048)	(0.041)	(0.022)	(0.064)	(0.005)
# Abortions/1,000 Women	0.00548	-0.103***	-0.0791***	-0.0238	-0.0404***	-0.0928***	-0.00964***
	(0.019)	(0.032)	(0.020)	(0.019)	(0.012)	(0.032)	(0.003)
Observations	100,285	103,089	103,089	103,089	103,089	103,089	103,089
Mean Dependent Variable	44.45	48.07	29.61	18.46	16.99	39.40	4.07
				After 1st Birth			
# Tubal Sterilisations/1,000 Women	-0.136	-0.0585	-0.0822	0.0238	-0.0312	-0.128**	-0.00221
	(0.120)	(0.062)	(0.076)	(0.055)	(0.025)	(0.063)	(0.006)
# Abortions/1,000 Women	-0.0207	-0.0911***	-0.0479***	-0.0432**	-0.0290***	-0.0703***	-0.00715***
	(0.014)	(0.027)	(0.017)	(0.018)	(0.008)	(0.024)	(0.002)
Observations	91,497	94,278	94,278	94,278	94,278	94,278	94,278
Mean Dependent Variable	67.45	48.46	30.26	18.20	17.20	39.91	4.10
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. This table reports the coefficients from estimating Equation (6). "Birth" is an indicator variable for a woman having another birth within 5 years; "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. Tubal sterilization rate is defined as the number of tubal sterilization procedures for White women per 1,000 White women at the region and age-group. The sample includes all White women with less than a high school education who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth (column 1) or within 10 years after the birth (columns 2–7). Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.9: Effect of Exposure to Sterilization Rate (Women with At Least Some College Education Only)

	Birth (1)	LFP (2)	Full Time (3)	Part Time (4)	Hours (5)	RTX p50 (6)	asinh(Wage) (7)
	After 3rd Birth						
# Tubal Sterilisations/1,000 Women	-0.197**	0.0431	-0.167***	0.210***	-0.0506***	0.0148	0.000437
	(0.091)	(0.057)	(0.051)	(0.062)	(0.018)	(0.044)	(0.005)
# Abortions/1,000 Women	0.00858	-0.0420	-0.0187	-0.0233	-0.0129	-0.0335	-0.00534
	(0.032)	(0.046)	(0.020)	(0.038)	(0.014)	(0.030)	(0.004)
Observations	139,323	112,906	112,906	112,906	112,906	112,906	112,906
Mean Dependent Variable	24.97	66.22	30.95	35.26	20.99	39.15	5.76
	After 2nd Birth						
# Tubal Sterilisations/1,000 Women	-0.240***	0.000178	-0.139***	0.140***	-0.0481***	0.0185	-0.000204
	(0.050)	(0.031)	(0.028)	(0.031)	(0.011)	(0.031)	(0.003)
# Abortions/1,000 Women	0.0340***	-0.0541**	0.000566	-0.0546**	-0.0150**	-0.00454	-0.00470**
	(0.011)	(0.020)	(0.018)	(0.027)	(0.006)	(0.012)	(0.002)
Observations	346,434	284,403	284,403	284,403	284,403	284,403	284,403
Mean Dependent Variable	33.13	68.88	33.55	35.33	22.07	40.86	6.10
	After 1st Birth						
# Tubal Sterilisations/1,000 Women	-0.0233	-0.126***	-0.164***	0.0379	-0.0771***	-0.0227	-0.0105***
	(0.049)	(0.025)	(0.040)	(0.033)	(0.013)	(0.031)	(0.003)
# Abortions/1,000 Women	-0.00643	-0.0548***	-0.0341***	-0.0208**	-0.0206***	-0.00698	-0.00560***
	(0.019)	(0.012)	(0.011)	(0.009)	(0.005)	(0.007)	(0.002)
Observations	437,240	361,228	361,228	361,228	361,228	361,228	361,228
Mean Dependent Variable	69.02	69.42	35.48	33.94	22.55	40.75	6.21
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). "Birth" is an indicator variable for a woman having another birth within 5 years; "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. The sample includes all women with at least some college education who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth (column 1) or within 10 years after the birth (columns 2–7). Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.10: Effect of Exposure to Sterilization Rate (Women with At Most High School Education Only)

	Birth	LFP	Full Time	Part Time	Hours	RTX p50	asinh(Wage)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	After 3rd Birth						
# Tubal Sterilisations/1,000 Women	-0.182***	0.0910**	-0.0961**	0.187***	-0.00797	0.0440	0.00546
	(0.047)	(0.038)	(0.042)	(0.037)	(0.015)	(0.030)	(0.003)
# Abortions/1,000 Women	0.00608	-0.0738**	-0.0302	-0.0436**	-0.0222**	-0.0712***	-0.00770***
	(0.021)	(0.033)	(0.019)	(0.018)	(0.011)	(0.025)	(0.003)
Observations	224,053	204,349	204,349	204,349	204,349	204,349	204,349
Mean Dependent Variable	27.21	53.90	29.02	24.88	18.14	38.65	4.55
	After 2nd Birth						
# Tubal Sterilisations/1,000 Women	-0.293***	0.0730*	-0.00625	0.0792**	0.00462	-0.0145	0.00795**
	(0.050)	(0.037)	(0.042)	(0.035)	(0.014)	(0.037)	(0.003)
# Abortions/1,000 Women	0.0295***	-0.0801***	-0.0553**	-0.0248***	-0.0281**	-0.0598***	-0.00783***
	(0.008)	(0.028)	(0.022)	(0.009)	(0.011)	(0.019)	(0.003)
Observations	426,583	400,928	400,928	400,928	400,928	400,928	400,928
Mean Dependent Variable	35.96	56.96	31.18	25.78	19.22	39.73	4.89
	After 1st Birth						
# Tubal Sterilisations/1,000 Women	-0.165***	0.0987***	0.0843*	0.0145	0.0321*	-0.0131	0.0142***
	(0.053)	(0.037)	(0.042)	(0.037)	(0.016)	(0.034)	(0.004)
# Abortions/1,000 Women	-0.00848	-0.0842***	-0.0612**	-0.0230***	-0.0300***	-0.0620***	-0.00783***
	(0.009)	(0.027)	(0.025)	(0.008)	(0.010)	(0.019)	(0.003)
Observations	472,049	442,487	442,487	442,487	442,487	442,487	442,487
Mean Dependent Variable	66.32	58.29	33.46	24.84	19.97	40.27	5.06
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. This table reports the coefficients from estimating Equation (3). "Birth" is an indicator variable for a woman having another birth within 5 years; "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. The sample includes all women with no more than a high school education who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth (column 1) or within 10 years after the birth (columns 2–7). Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.11: Effect of Exposure to Sterilization Rate on Labor Market Outcomes, Split-Sample IV

	Birth	LFP	Full Time	Part Time	Hours	High RTX	asinh(Wage)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	After 3rd Birth						
# Tubal Sterilisations/1,000 Women	-0.220***	0.194***	0.0146	0.180***	0.0498***	0.106***	0.0180***
	(0.046)	(0.030)	(0.032)	(0.031)	(0.012)	(0.022)	(0.003)
# Abortions/1,000 Women	-0.000497	-0.108***	-0.0546***	-0.0533***	-0.0354***	-0.0934***	-0.0106***
	(0.015)	(0.028)	(0.020)	(0.013)	(0.010)	(0.021)	(0.002)
R^2	0.000	0.001	0.000	0.000	0.000	0.000	0.001
Observations	457,585	395,983	395,983	395,983	395,983	395,983	395,983
Mean Dependent Variable	28.78	59.08	32.34	26.74	19.92	40.61	5.13
	After 2nd Birth						
# Tubal Sterilisations/1,000 Women	-0.324***	0.122***	0.0393	0.0824**	0.0304***	0.0211	0.0150***
	(0.030)	(0.025)	(0.034)	(0.035)	(0.009)	(0.019)	(0.002)
# Abortions/1,000 Women	0.0238***	-0.0949***	-0.0519***	-0.0429***	-0.0329***	-0.0546***	-0.00906***
	(0.008)	(0.020)	(0.015)	(0.008)	(0.008)	(0.010)	(0.002)
R^2	0.000	0.001	0.000	0.000	0.001	0.000	0.001
Observations	935,391	822,263	822,263	822,263	822,263	822,263	822,263
Mean Dependent Variable	36.25	62.67	34.56	28.10	21.14	41.66	5.53
	After 1st Birth						
# Tubal Sterilisations/1,000 Women	-0.0544	0.0224	0.0344	-0.0120	0.00354	-0.0330	0.00819***
	(0.036)	(0.027)	(0.030)	(0.031)	(0.010)	(0.022)	(0.002)
# Abortions/1,000 Women	-0.0137	-0.0835***	-0.0546***	-0.0289***	-0.0316***	-0.0499***	-0.00784***
	(0.015)	(0.015)	(0.015)	(0.005)	(0.006)	(0.008)	(0.002)
R^2	0.000	0.001	0.000	0.000	0.001	0.000	0.001
Observations	1,094,064	954,206	954,206	954,206	954,206	954,206	954,206
Mean Dependent Variable	66.20	64.11	36.57	27.55	21.84	41.85	5.71
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (6). "Birth" is an indicator variable for a woman having another birth within 5 years; "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. The sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth (column 1) or within 10 years after the birth (columns 2–7). Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.12: Effect of Exposure to Sterilization Rate on Fertility (Region- and Division-Level Variation)

	Region 1970–1985 (1)	Region 1970–1978 (2)	Division 1970–1978 (3)
	P(4th birth within 5 years of 3rd birth)		
# Tubal Sterilizations/1,000 Women	-0.273***	-0.222***	-0.118**
	(0.049)	(0.056)	(0.046)
# Abortions/1,000 Women	-0.00238	-0.000604	-0.000362
	(0.016)	(0.016)	(0.017)
Observations	457,585	302,514	302,514
ymean			
	P(3rd birth within 5 years of 2nd birth)		
# Tubal Sterilization/1,000 Women	-0.339***	-0.303***	-0.173***
	(0.030)	(0.035)	(0.031)
# Abortions/1,000 Women	0.0218***	0.00596	0.00530
	(0.008)	(0.009)	(0.010)
Observations	935,391	604,603	604,603
ymean			
	P(2nd birth within 5 years of 1st birth)		
# Tubal Sterilization/1,000 Women	-0.0485	-0.00773	-0.0287
	(0.035)	(0.053)	(0.037)
# Abortions/1,000 Women	-0.0140	-0.00999	-0.00998
	(0.015)	(0.014)	(0.014)
Observations	1,094,064	709,560	709,560
ymean			
State and Year (of Previous Birth) FE	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). The dependent variables are measures of whether a woman had another birth within 5 years of her 1st, 2nd, or 3rd birth, multiplied by 100. Column (1) considers tubal sterilization rates at the region and age-group level for the years 1970–1985, for the sample which includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth. Column (2) considers tubal sterilization rates at the region and age-group level and column (3) at the division and age-group level for the years 1970–1978, for the sample which includes all women who had a 1st, 2nd, or 3rd birth between 1970–1978 at ages 18–44, and was surveyed at least 5 years after the birth. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.13: Effect of Exposure to Sterilization Rate on Labor Market Outcomes (Division-Level Variation)

	LFP	Full Time	Part Time	Hours	RTX p50	asinh(Wage)
	(1)	(2)	(3)	(4)	(5)	(6)
	After 3rd Birth					
# Tubal Sterilisations/1,000 Women	0.140***	-0.0184	0.159***	0.0229*	0.0779***	0.0114***
	(0.027)	(0.039)	(0.029)	(0.013)	(0.025)	(0.003)
# Abortions/1,000 Women	-0.0273**	-0.0292**	0.00188	-0.00942**	-0.0393***	-0.00298**
	(0.013)	(0.011)	(0.010)	(0.004)	(0.011)	(0.001)
Observations	213,742	213,742	213,742	213,742	213,742	213,742
Mean Dependent Variable	51.54	32.17	19.37	17.04	36.15	4.31
	After 2nd Birth					
# Tubal Sterilisations/1,000 Women	0.0418	-0.0328	0.0745***	-0.00751	0.00935	0.00409
	(0.029)	(0.031)	(0.027)	(0.011)	(0.029)	(0.003)
# Abortions/1,000 Women	-0.0136*	-0.0305***	0.0168**	-0.00949***	-0.0139*	-0.00165**
	(0.007)	(0.007)	(0.007)	(0.003)	(0.008)	(0.001)
Observations	432,587	432,587	432,587	432,587	432,587	432,587
Mean Dependent Variable	55.12	34.67	20.46	18.16	37.58	4.67
	After 1st Birth					
# Tubal Sterilisations/1,000 Women	-0.0203	0.0201	-0.0404**	-0.00301	-0.0431	0.000735
	(0.037)	(0.039)	(0.017)	(0.015)	(0.029)	(0.003)
# Abortions/1,000 Women	-0.0460***	-0.0595***	0.0135**	-0.0229***	-0.0350***	-0.00482***
	(0.009)	(0.012)	(0.005)	(0.004)	(0.006)	(0.001)
Observations	504,780	504,780	504,780	504,780	504,780	504,780
Mean Dependent Variable	57.92	38.14	19.78	19.40	39.01	4.98
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. Tubal sterilization rates are at the division and age-group level, for the sample which includes all women who had a 1st, 2nd, or 3rd birth between 1970–1978 at ages 18–44, and was surveyed within 10 years after the birth. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.14: Effect of Exposure to Sterilization Rate (Tubal Sterilizations and Hysterectomies)

	Birth (1)	LFP (2)	Full Time (3)	Part Time (4)	Hours (5)	RTX p50 (6)	asinh(Wage) (7)
				After 3rd Birth			
# Sterilizations/1,000 Women	-0.203***	0.137***	0.0116	0.125***	0.0330***	0.0861***	0.0132***
	(0.042)	(0.016)	(0.025)	(0.024)	(0.007)	(0.016)	(0.002)
# Abortions/1,000 Women	0.00554	-0.111***	-0.0549***	-0.0565***	-0.0363***	-0.0951***	-0.0109***
	(0.017)	(0.025)	(0.020)	(0.011)	(0.009)	(0.020)	(0.002)
Observations	457,585	395,983	395,983	395,983	395,983	395,983	395,983
Mean Dependent Variable	28.78	59.08	32.34	26.74	19.92	40.61	5.13
				After 2nd Birth			
# Sterilizations/1,000 Women	-0.259***	0.0988***	0.0480	0.0508*	0.0298***	0.0398**	0.0118***
	(0.028)	(0.020)	(0.029)	(0.028)	(0.008)	(0.018)	(0.002)
# Abortions/1,000 Women	0.0300***	-0.0960***	-0.0523***	-0.0437***	-0.0332***	-0.0548***	-0.00920***
	(0.009)	(0.018)	(0.015)	(0.007)	(0.007)	(0.010)	(0.002)
Observations	935,391	822,263	822,263	822,263	822,263	822,263	822,263
Mean Dependent Variable	36.25	62.67	34.56	28.10	21.14	41.66	5.53
				After 1st Birth			
# Sterilizations/1,000 Women	-0.129***	0.0149	0.0365	-0.0216	0.00414	-0.00904	0.00583***
	(0.033)	(0.023)	(0.027)	(0.025)	(0.009)	(0.020)	(0.002)
# Abortions/1,000 Women	-0.00927	-0.0835***	-0.0548***	-0.0287***	-0.0316***	-0.0499***	-0.00786***
	(0.015)	(0.015)	(0.015)	(0.005)	(0.006)	(0.008)	(0.002)
Observations	1,094,064	954,206	954,206	954,206	954,206	954,206	954,206
Mean Dependent Variable	66.20	64.11	36.57	27.55	21.84	41.85	5.71
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). "Birth" is an indicator variable for a woman having another birth within 5 years; "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. Sterilization rates measure the number of tubal sterilizations and hysterectomies per 1,000 women. The sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth (column 1) or within 10 years after the birth (columns 2–7). Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.15: Effect of Exposure to Sterilization Rate (Sample of Women whose Number of Live Births Equals the Number of Children in her Household)

	Birth (1)	LFP (2)	Full Time (3)	Part Time (4)	Hours (5)	RTX p50 (6)	asinh(Wage) (7)
	After 3rd Birth						
# Tubal Sterilisations/1,000 Women	-0.214***	0.220***	0.00870	0.211***	0.0535***	0.130***	0.0221***
	(0.055)	(0.029)	(0.036)	(0.039)	(0.011)	(0.025)	(0.003)
# Abortions/1,000 Women	0.00674	-0.101***	-0.0526***	-0.0479***	-0.0329***	-0.0911***	-0.00958***
	(0.018)	(0.030)	(0.019)	(0.015)	(0.011)	(0.023)	(0.002)
Observations	258,700	303,614	303,614	303,614	303,614	303,614	303,614
Mean Dependent Variable	29.11	57.74	30.42	27.32	19.15	39.78	4.98
	After 2nd Birth						
# Tubal Sterilisations/1,000 Women	-0.316***	0.126***	0.0203	0.106***	0.0275***	0.0204	0.0151***
	(0.028)	(0.022)	(0.037)	(0.036)	(0.010)	(0.018)	(0.002)
# Abortions/1,000 Women	0.0294***	-0.0953***	-0.0529***	-0.0424***	-0.0336***	-0.0557***	-0.00915***
	(0.008)	(0.021)	(0.016)	(0.008)	(0.008)	(0.011)	(0.002)
Observations	729,422	733,808	733,808	733,808	733,808	733,808	733,808
Mean Dependent Variable	35.98	62.36	33.80	28.56	20.87	41.42	5.49
	After 1st Birth						
# Tubal Sterilisations/1,000 Women	-0.0574*	0.00807	0.0116	-0.00351	-0.00553	-0.0470**	0.00597**
	(0.033)	(0.025)	(0.035)	(0.033)	(0.011)	(0.023)	(0.002)
# Abortions/1,000 Women	-0.00549	-0.0829***	-0.0525***	-0.0304***	-0.0309***	-0.0508***	-0.00779***
	(0.013)	(0.016)	(0.015)	(0.005)	(0.006)	(0.008)	(0.002)
Observations	1,043,530	911,595	911,595	911,595	911,595	911,595	911,595
Mean Dependent Variable	66.99	64.05	36.40	27.65	21.78	41.80	5.70
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). "Birth" is an indicator variable for a woman having another birth within 5 years; "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. The sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed at least 5 years after the birth (column 1) or within 10 years after the birth (columns 2–7), and whose reported number of live births is equal to the number of own children in her household. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.16: Effect of Exposure to Sterilization Rate on Labor Market Outcomes Within 5 Years of Childbirth

	LFP	Full Time	Part Time	Hours	High RTX	asinh(Wage)
	(1)	(2)	(3)	(4)	(5)	(6)
			After 3rd Birth			
# Tubal Sterilisations/1,000 Women	0.115**	-0.0191	0.135***	0.0280	0.0308	0.0123***
	(0.046)	(0.043)	(0.030)	(0.017)	(0.037)	(0.004)
# Abortions/1,000 Women	-0.155***	-0.0750***	-0.0797***	-0.0496***	-0.138***	-0.0139***
	(0.040)	(0.026)	(0.022)	(0.012)	(0.028)	(0.003)
R^2	0.066	0.055	0.037	0.066	0.038	0.087
Observations	168,403	168,403	168,403	168,403	168,403	168,403
Mean Dependent Variable	51.26	27.49	23.77	16.94	35.99	4.17
			After 2nd Birth			
# Tubal Sterilisations/1,000 Women	0.104***	0.0232	0.0809**	0.0227	0.0213	0.0113***
	(0.034)	(0.047)	(0.034)	(0.015)	(0.032)	(0.003)
# Abortions/1,000 Women	-0.119***	-0.0761***	-0.0429***	-0.0440***	-0.0851***	-0.0107***
	(0.032)	(0.027)	(0.012)	(0.012)	(0.025)	(0.003)
R^2	0.063	0.057	0.034	0.066	0.034	0.086
Observations	360,686	360,686	360,686	360,686	360,686	360,686
Mean Dependent Variable	56.24	30.67	25.57	18.67	38.08	4.68
			After 1st Birth			
# Tubal Sterilisations/1,000 Women	0.0679*	0.0626	0.00531	0.0301**	-0.0374	0.0103***
	(0.034)	(0.042)	(0.039)	(0.014)	(0.032)	(0.003)
# Abortions/1,000 Women	-0.118***	-0.0676***	-0.0503***	-0.0428***	-0.0765***	-0.0106***
	(0.018)	(0.012)	(0.014)	(0.006)	(0.018)	(0.002)
R^2	0.053	0.050	0.029	0.057	0.030	0.074
Observations	409,144	409,144	409,144	409,144	409,144	409,144
Mean Dependent Variable	60.66	34.67	25.99	20.55	40.29	5.13
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). "LFP" is an indicator variable for being in the labor force; "full-time" is an indicator variable for being in the labor force with at least 40 usual hours of work per week; "part-time" is an indicator variable for being in the labor force with less than 40 usual hours of work per week; "Hours" is usual hours of work per week; "High RTX" is an indicator variable for being in an occupation with above median returns to experience; and asinh(Wage) is the inverse hyperbolic sine transformation of wage income. All indicator variables are multiplied by 100. The sample includes all women who had a 1st, 2nd, or 3rd birth between 1970–1985 at ages 18–44, and was surveyed within 5 years after the birth. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table A.17: Effect of Exposure to Sterilization Rate on Labor Market Outcomes, Alternative Definitions

	$\geq$ 35 Hours	$<$ 35 Hours	$\geq$ p50 RTX Alt	$\geq$ p50 Wage
	(1)	(2)	(3)	(4)
	After 3rd Birth			
# Tubal Sterilisations/1,000 Women	0.0411	0.170***	0.0674***	0.202***
	(0.032)	(0.029)	(0.024)	(0.028)
# Abortions/1,000 Women	-0.0729***	-0.0325*	-0.0830***	-0.100***
	(0.014)	(0.017)	(0.020)	(0.018)
R^2	0.058	0.040	0.033	0.076
Observations	395,983	395,983	395,983	395,983
Mean Dependent Variable	37.24	21.83	31.80	52.93
	After 2nd Birth			
# Tubal Sterilisations/1,000 Women	0.0631**	0.0744**	-0.0528**	0.139***
	(0.031)	(0.028)	(0.022)	(0.019)
# Abortions/1,000 Women	-0.0665***	-0.0271***	-0.0666***	-0.0890***
	(0.015)	(0.008)	(0.013)	(0.016)
R^2	0.060	0.037	0.032	0.071
Observations	822,263	822,263	822,263	822,263
Mean Dependent Variable	40.02	22.64	32.03	56.62
	After 1st Birth			
# Tubal Sterilisations/1,000 Women	0.0269	-0.00985	-0.141***	0.0377*
	(0.028)	(0.024)	(0.022)	(0.022)
# Abortions/1,000 Women	-0.0692***	-0.0142***	-0.0648***	-0.0804***
	(0.013)	(0.004)	(0.009)	(0.015)
R^2	0.053	0.033	0.031	0.057
Observations	954,206	954,206	954,206	954,206
Mean Dependent Variable	42.33	21.78	32.44	58.25
State and Year FE	Yes	Yes	Yes	Yes
Age, Race, Education controls	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (3). "$\geq$ 35 Hours" is an indicator variable for being in the labor force with at least 35 usual hours of work per week; "$<$ 35 Hours" is an indicator variable for being in the labor force with less than 35 usual hours of work per week; "$\geq$ Median RTX Alt" is an indicator variable for being in an occupation with above median returns to experience, where returns to experience is defined for each 3-digit occupation group; and "$\geq$ Median Wage" is an indicator for having above median wage. All indicator variables are multiplied by 100. Tubal sterilization rates are at the division and age-group level, for the sample which includes all women who had a 1st, 2nd, or 3rd birth between 1970–1978 at ages 18–44, and was surveyed within 10 years after the birth. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

B Sensitivity of Results to Choice of Age of Exposure

In this section, I test the sensitivity of the results on age at last birth in Table 1 to the choice of age of exposure.

The main analysis compares women across census regions and cohorts with differential exposure to tubal sterilizations, measured by the tubal sterilization rate in her region of birth in the year she turns 30. I selected age 30 for the year of exposure, since it is the average age of women who had a tubal sterilization over this period. Here, I alternatively consider exposure to sterilization at ages 31 to 35.

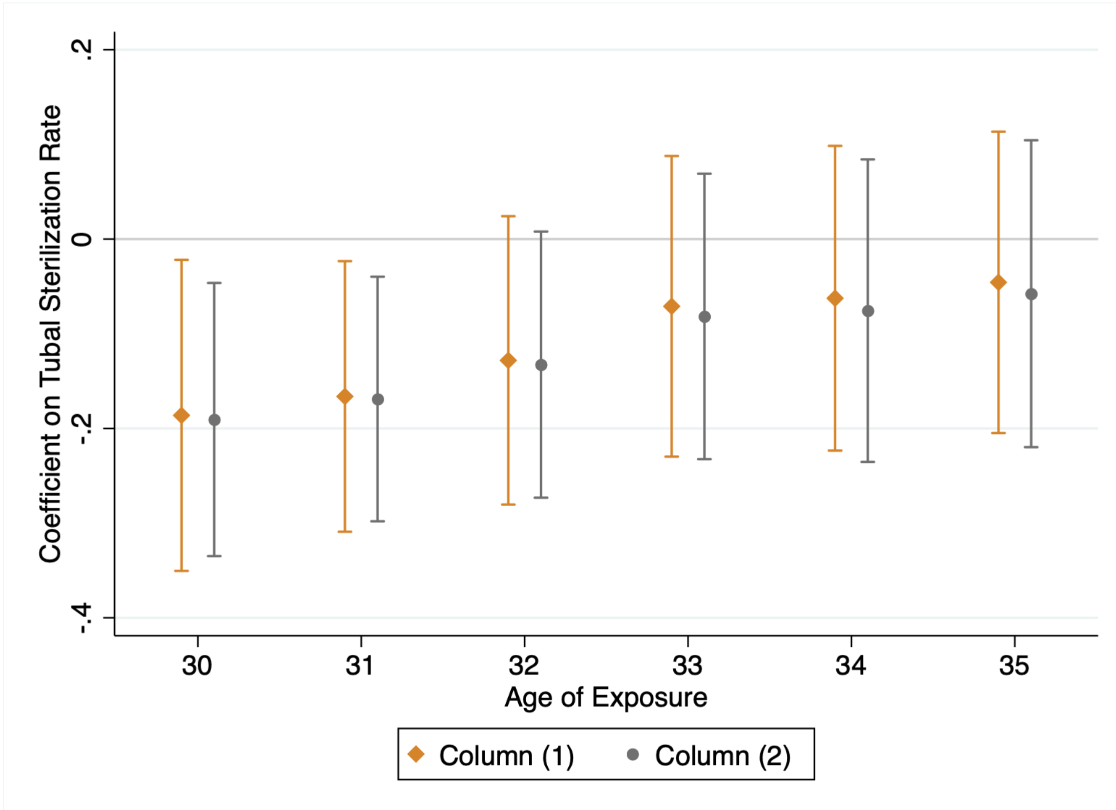
As the public-use NSFG dataset does not contain geographic information after 1995, I cannot construct measures of exposure to pill usage after age 30 for all cohorts of women in the original sample. Instead of the original sample of women born between 1920–1965, I consider in this section the restricted sample of women born between 1920–1965.

I first show that results are not affected by using this restricted sample (Table B.1). In fact, the estimates here are slightly larger, and imply the the increase in tubal sterilizations between 1965 and 1985 reduced age at last birth by 1.9 years, and the probability of birth after age 30 by up to 34%. Tables B.2 to B.6 then report results using exposures at ages 31 to 35 respectively.

The main findings are summarized in two figures. Figure B.1 plots the coefficients on tubal sterilization rate by age of exposure, reported in columns (1) and (2) of the tables. The estimates show that exposure to tubal sterilization at ages 30 and 31 reduced age at last birth, while exposure at older ages do not lead to statistically significant reductions. This result is exactly as expected. Figure 2 shows that the average age at last birth for the earliest cohorts is around 32, hence exposure at ages 32 or later becomes less relevant.

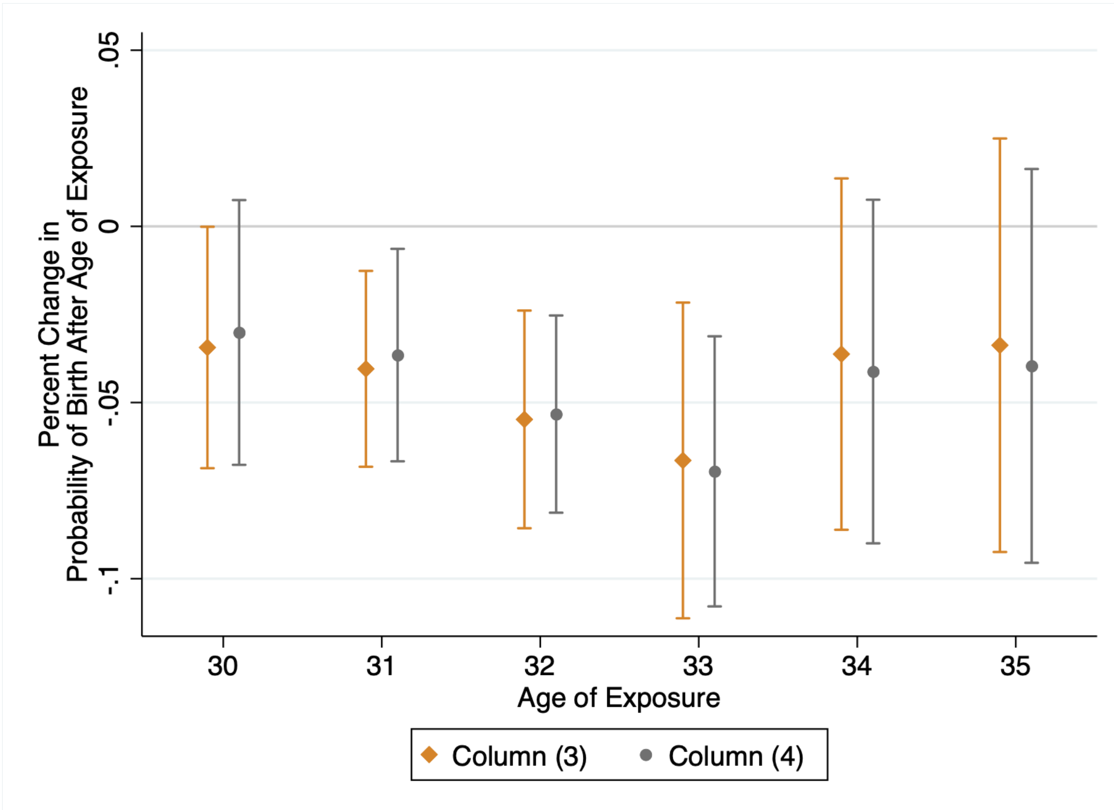
Figure B.2 plots the percent decrease in the probability of birth after each age of exposure implied by the coefficients in columns (3) and (4) of the tables. The estimates imply the effect of tubal sterilization in reducing births at these older ages is increasing between age 30 and 33.

Figure B.1: Effect of Exposure to Sterilization Rate on Age at Last Birth, By Age of Exposure



Note: This figure reports the coefficients from estimating Equation (1), using each age between 30–35 as the age of exposure. The dependent variable is a woman's age at last birth. 'Column (1)' and 'Column (2)' indicate the regression specification corresponding to the column in the regression tables. The sample includes all women born between 1920–1960. Standard errors are clustered at the state level.

Figure B.2: Effect of Exposure to Sterilization Rate on Probability of Birth Thereafter, By Age of Exposure



Note: This figure reports the implied percent effect from estimating Equation (1), using each age between 30–35 as the age of exposure. The dependent variable is an indicator variable for a woman giving birth between after the relevant age of exposure, multiplied by 100. The reported percentage change is calculated as the coefficient from the estimation multiplied by the increase in tubal sterilization rates between 1965 and 1985 (9.99) and divided by the mean dependent variable. 'Column (1)' and 'Column (2)' indicate the regression specification corresponding to the column in the regression tables. The sample includes all women born between 1920–1960. Standard errors are clustered at the state level.

Table B.1: Effect of Exposure to Sterilization Rate on Age at Last Birth (Exposure at Age 30, Cohorts 1920-1960)

	Age at Last Birth	Age at Last Birth	Birth after 30	Birth after 30
	(1)	(2)	(3)	(4)
Tubal Sterilization Rate at Age 30	-0.1862**	-0.1906**	-1.3946*	-1.2218
	(0.0838)	(0.0736)	(0.7092)	(0.7778)
Pill Legal Ages 21-30	0.0781		-0.4067	
	(0.7186)		(5.7100)	
Abortion Legal Ages 21-30	1.0879		-8.5777	
	(1.5882)		(9.8793)	
Abortion Rate at Age 30		0.0183***		0.0981*
		(0.0056)		(0.0489)
Pill Usage at Age 30		-0.0024		-0.0118
		(0.0051)		(0.0484)
Abortion Legal Ages 14-20	0.2256	0.1750	-4.8119	-5.1275
	(0.8306)	(0.8554)	(5.1309)	(5.2458)
Abortion Access Ages 14-20	-0.4575	-0.4299	-6.1816	-5.7693
	(0.9721)	(0.9660)	(6.3422)	(6.3761)
Pill Legal Ages 14-20	2.1573**	1.4365	5.3574	4.9881
	(0.8909)	(0.9429)	(6.5749)	(6.7004)
Pill Access Ages 14-20	4.3318***	3.4929***	13.3909	12.6941
	(1.0892)	(1.1715)	(10.1127)	(10.0088)
Observations	10,061	10,061	10,997	10,997
Mean Dependent Variable	30.07	30.07	40.57	40.57
State and Cohort FE	Yes	Yes	Yes	Yes
Race and Ethnicity Controls	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes
State Linear Time Trends	No	No	No	No

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (1). "Age at Last Birth" is the age of a woman in the year her youngest child was born; and "Birth after 30" is an indicator variable for a woman giving birth between ages 31–55, multiplied by 100. The sample in columns (1)–(2) includes all women born between 1920–1960 with at least 1 birth; for columns (3)–(4) all women born between 1920–1960. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table B.2: Effect of Exposure to Sterilization Rate on Age at Last Birth (Exposure at Age 31, Cohorts 1920-1960)

	Age at Last Birth	Age at Last Birth	Birth after 31	Birth after 31
	(1)	(2)	(3)	(4)
Tubal Sterilization Rate at Age 31	-0.1662**	-0.1689**	-1.4218***	-1.2845**
	(0.0729)	(0.0659)	(0.4987)	(0.5409)
Pill Legal Ages 21-31	0.0433		-2.5694	
	(0.7647)		(5.9536)	
Abortion Legal Ages 21-31	1.0499		-3.2488	
	(1.6302)		(9.5151)	
Abortion Rate at Age 31		0.0147***		0.0953***
		(0.0052)		(0.0336)
Pill Usage at Age 31		-0.0015		-0.0085
		(0.0053)		(0.0482)
Abortion Legal Ages 14-20	0.3130	0.2684	-6.0576	-6.1124
	(0.8240)	(0.8605)	(4.3810)	(4.6959)
Abortion Access Ages 14-20	-0.3893	-0.3739	-7.5764	-7.0375
	(0.9394)	(0.9540)	(5.8258)	(6.0923)
Pill Legal Ages 14-20	2.3908**	1.8453*	5.1102	4.0359
	(0.9061)	(0.9601)	(5.6060)	(6.4718)
Pill Access Ages 14-20	4.4751***	3.8293***	14.5472*	13.0739*
	(1.1077)	(1.1860)	(7.9007)	(7.4932)
Observations	10,061	10,061	10,997	10,997
Mean Dependent Variable	30.07	30.07	35.16	35.16
State and Cohort FE	Yes	Yes	Yes	Yes
Race and Ethnicity Controls	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes
State Linear Time Trends	No	No	No	No

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (1). "Age at Last Birth" is the age of a woman in the year her youngest child was born; and "Birth after 31" is an indicator variable for a woman giving birth between ages 32–55, multiplied by 100. The sample in columns (1)–(2) includes all women born between 1920–1960 with at least 1 birth; for columns (3)–(4) all women born between 1920–1960. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table B.3: Effect of Exposure to Sterilization Rate on Age at Last Birth (Exposure at Age 32, Cohorts 1920-1960)

	Age at Last Birth	Age at Last Birth	Birth after 32	Birth after 32
	(1)	(2)	(3)	(4)
Tubal Sterilization Rate at Age 32	-0.1281	-0.1326*	-1.6322***	-1.5874***
	(0.0777)	(0.0717)	(0.4695)	(0.4254)
Pill Legal Ages 21-32	0.0977		-1.1832	
	(0.8488)		(4.7287)	
Abortion Legal Ages 21-32	0.7851		-15.9618*	
	(1.5147)		(9.5026)	
Abortion Rate at Age 32		0.0146**		0.0814
		(0.0065)		(0.0499)
Pill Usage at Age 32		-0.0005		0.0436
		(0.0053)		(0.0445)
Abortion Legal Ages 14-20	0.3658	0.3046	-2.3461	-3.4436
	(0.8190)	(0.8620)	(4.8734)	(5.2191)
Abortion Access Ages 14-20	-0.3544	-0.3604	-4.0829	-4.5406
	(0.9265)	(0.9616)	(5.9706)	(6.2857)
Pill Legal Ages 14-20	2.5066***	2.0778**	8.0960	12.5008
	(0.8871)	(0.9515)	(7.2424)	(8.0060)
Pill Access Ages 14-20	4.5039***	3.9905***	21.0472***	25.7129***
	(1.1161)	(1.1762)	(6.0196)	(6.4827)
Observations	10,061	10,061	10,997	10,997
Mean Dependent Variable	30.07	30.07	29.79	29.79
State and Cohort FE	Yes	Yes	Yes	Yes
Race and Ethnicity Controls	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes
State Linear Time Trends	No	No	No	No

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (1). "Age at Last Birth" is the age of a woman in the year her youngest child was born; and "Birth after 32" is an indicator variable for a woman giving birth between ages 33–55, multiplied by 100. The sample in columns (1)–(2) includes all women born between 1920–1960 with at least 1 birth; for columns (3)–(4) all women born between 1920–1960. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table B.4: Effect of Exposure to Sterilization Rate on Age at Last Birth (Exposure at Age 33, Cohorts 1920-1960)

	Age at Last Birth	Age at Last Birth	Birth after 33	Birth after 33
	(1)	(2)	(3)	(4)
Tubal Sterilization Rate at Age 33	-0.0710	-0.0817	-1.6577***	-1.7349***
	(0.0810)	(0.0769)	(0.5704)	(0.4880)
Pill Legal Ages 21-33	0.1560		-4.5756	
	(0.9472)		(5.2519)	
Abortion Legal Ages 21-33	1.0134		-6.8460	
	(1.4775)		(10.5479)	
Abortion Rate at Age 33		0.0134*		0.0929*
		(0.0079)		(0.0551)
Pill Usage at Age 33		0.0011		0.0636*
		(0.0054)		(0.0358)
Abortion Legal Ages 14-20	0.3854	0.3063	-1.5680	-2.2524
	(0.8229)	(0.8661)	(4.7790)	(5.0779)
Abortion Access Ages 14-20	-0.3394	-0.3772	-3.4288	-3.5506
	(0.9247)	(0.9823)	(4.8660)	(5.3070)
Pill Legal Ages 14-20	2.6135***	2.2251**	11.6401	14.6295*
	(0.8552)	(0.9137)	(8.6873)	(8.4545)
Pill Access Ages 14-20	4.5841***	4.1235***	18.4649***	21.4349***
	(1.0989)	(1.1479)	(6.8367)	(6.8617)
Observations	10,061	10,061	10,997	10,997
Mean Dependent Variable	30.07	30.07	24.95	24.95
State and Cohort FE	Yes	Yes	Yes	Yes
Race and Ethnicity Controls	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes
State Linear Time Trends	No	No	No	No

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. This table reports the coefficients from estimating Equation (1). "Age at Last Birth" is the age of a woman in the year her youngest child was born; and "Birth after 33" is an indicator variable for a woman giving birth between ages 34–55, multiplied by 100. The sample in columns (1)–(2) includes all women born between 1920–1960 with at least 1 birth; for columns (3)–(4) all women born between 1920–1960. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table B.5: Effect of Exposure to Sterilization Rate on Age at Last Birth (Exposure at Age 34, Cohorts 1920-1960)

	Age at Last Birth	Age at Last Birth	Birth after 34	Birth after 34
	(1)	(2)	(3)	(4)
Tubal Sterilization Rate at Age 34	-0.0625	-0.0756	-0.7450	-0.8468
	(0.0821)	(0.0815)	(0.5228)	(0.5113)
Pill Legal Ages 21-34	0.1475		-0.6817	
	(1.0490)		(4.3355)	
Abortion Legal Ages 21-34	0.8836		-4.7644	
	(1.5703)		(13.4202)	
Abortion Rate at Age 34		0.0156**		0.1210*
		(0.0074)		(0.0630)
Pill Usage at Age 34		0.0027		0.0556*
		(0.0055)		(0.0322)
Abortion Legal Ages 14-20	0.4026	0.3012	-1.2021	-2.2602
	(0.8257)	(0.8620)	(4.4213)	(4.4618)
Abortion Access Ages 14-20	-0.3265	-0.3757	-3.1506	-3.6308
	(0.9133)	(0.9888)	(5.5724)	(5.5152)
Pill Legal Ages 14-20	2.6131***	2.2686**	10.0420	11.4085
	(0.8481)	(0.9025)	(10.3963)	(8.8918)
Pill Access Ages 14-20	4.5554***	4.1517***	16.0385**	17.3321**
	(1.0897)	(1.1401)	(7.5971)	(6.9428)
Observations	10,061	10,061	10,997	10,997
Mean Dependent Variable	30.07	30.07	20.55	20.55
State and Cohort FE	Yes	Yes	Yes	Yes
Race and Ethnicity Controls	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes
State Linear Time Trends	No	No	No	No

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (1). "Age at Last Birth" is the age of a woman in the year her youngest child was born; and "Birth after 34" is an indicator variable for a woman giving birth between ages 35–55, multiplied by 100. The sample in columns (1)–(2) includes all women born between 1920–1960 with at least 1 birth; for columns (3)–(4) all women born between 1920–1960. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.

Table B.6: Effect of Exposure to Sterilization Rate on Age at Last Birth (Exposure at Age 35, Cohorts 1920-1960)

	Age at Last Birth	Age at Last Birth	Birth after 35	Birth after 35
	(1)	(2)	(3)	(4)
Tubal Sterilization Rate at Age 35	-0.0457	-0.0577	-0.5645	-0.6626
	(0.0812)	(0.0827)	(0.5009)	(0.4771)
Pill Legal Ages 21-35	0.1425		-0.6548	
	(1.1632)		(4.5977)	
Abortion Legal Ages 21-35	0.5567		-3.7133	
	(1.6927)		(14.1567)	
Abortion Rate at Age 35		0.0130*		0.0611*
		(0.0067)		(0.0347)
Pill Usage at Age 35		0.0031		0.0474
		(0.0057)		(0.0337)
Abortion Legal Ages 14-20	0.4108	0.3165	-0.7608	-1.4020
	(0.8351)	(0.8607)	(4.7384)	(4.7708)
Abortion Access Ages 14-20	-0.3235	-0.3736	-1.2307	-1.5283
	(0.9122)	(1.0052)	(6.1690)	(6.2715)
Pill Legal Ages 14-20	2.5300***	2.2998**	11.2942	12.7476**
	(0.8148)	(0.8996)	(7.3260)	(5.5601)
Pill Access Ages 14-20	4.4493***	4.1913***	15.5972***	17.0868***
	(1.0486)	(1.1503)	(5.2165)	(5.8512)
Observations	10,061	10,061	10,997	10,997
Mean Dependent Variable	30.07	30.07	16.73	16.73
State and Cohort FE	Yes	Yes	Yes	Yes
Race and Ethnicity Controls	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes
State Linear Time Trends	No	No	No	No

Note: *** p<0.01, ** p<0.05, * p<0.1. This table reports the coefficients from estimating Equation (1). "Age at Last Birth" is the age of a woman in the year her youngest child was born; and "Birth after 35" is an indicator variable for a woman giving birth between ages 36–55, multiplied by 100. The sample in columns (1)–(2) includes all women born between 1920–1960 with at least 1 birth; for columns (3)–(4) all women born between 1920–1960. Standard errors are clustered at the state level and reported under the corresponding estimates in parentheses.