The Effects of Coerced Sterilization Among American Indian Women*

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Abstract

Thousands of American Indian women were sterilized in the 1970s without proper consent or adequate explanation of the consequences. Using retrospective household data, I find that this mass sterilization resulted in significant declines in fertility and had long-lasting health, social, and economic impacts. Investments in children also decreased, with children of affected parents being less likely to attain a high school diploma or complete any college education. Furthermore, I observe a significant effect on the fertility of the next generation, which tends to increase — a pattern likely driven by medical mistrust and reduced reliance on family planning methods among subsequent generations.

JEL Classification: I15; J13; J15; N32; O12.

Keywords: Sterilization; fertility; human capital; intergenerational transmission.

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1 Introduction

On March 25, 1974, the Court for the Western District of Pennsylvania received a civil action (No. 74-313) filed by the lawyer of Norma Jean Serena. A bilateral salpingectomy was performed on her without her knowledge or consent after the delivery of her third child on August 16, 1970. The procedure was deemed necessary for her health, based on the belief that she had enough children and that further pregnancies could result in children with disabilities (USDC WDPA, 1974). Like Serena, thousands of American Indian women were sterilized in the 1970s, often without consent or full understanding the procedure or its physical and psychological effects. According to Dr. Constance Redbird Pinkerton-Uri, a Choctaw-Cherokee physician, nearly 25 percent of Native women of childbearing age in the U.S. underwent forced sterilization between the 1960s and 1970s. This loss of reproductive autonomy not only disrupted traditional family structures but also led to significant economic, psychological, and emotional consequences. Many marriages ended in divorce, friendships dissolved, and an increasing number of women faced marital conflicts, alcoholism, and physical and mental health challenges.

The coerced sterilization of American Indian women represents one of several coercive population control measures enacted in the United States during the 20th century. Many of these measures were informed by the belief that certain human traits should be *"bred out"*, a notion that gained traction with the rise of the eugenics movement in the early 20th century. Estimates suggest that between 3,406 and 70,000[1] American Indian women were coercively sterilized, either through tubal ligation or hysterectomy, during the mid-1960s to late 1970s, from a total population of nearly 100,000 women of childbearing age (Ralstin-Lewis, 2005). Nevertheless, the full-scale effects of forced sterilization among American Indians, both in terms of fertility and its broader ramifications, has yet to be fully understood.

In this paper, I estimate the potential impact of coerced sterilization among American Indian women. I begin by evaluating the potential effect of forced sterilization on fertility and then consider its ramifications on health, labor market decisions, and investment in children. I also evaluate whether the experiences of affected parents influenced their children's attitudes toward contraception. To assess this intergenerational transmission, I analyze fertility choices among children whose parents were potentially impacted by forced sterilization.

Complete information on women who were sterilized in the 1970s is nearly impossible

[1]The difference in the number of sterilized women depends on the source. Official figures from the Government Accountability Office report 3,406 sterilizations, but these numbers are based on data from a small number of IHS facilities and cover only the 1973–76 period. Estimates from American Indian researchers suggest a much higher total.(i.e., Salvanes et al. (2024)) are much higher.

to obtain. Therefore, identifying American Indian households affected by forced sterilization is a significant challenge. I address this issue by capturing the likelihood of exposure to sterilization programs through proxies for the loss of reproductive autonomy during this period. Specifically, I consider women whose last child was conceived during the 1970s, or alternatively, whose fertility ceased during this specific period of time. This group likely forms the treatment cohort, although it may also include women nearing the end of their reproductive years or reflecting broader fertility trends. However, the influence of these confounding factors should be substantially mitigated when comparing women born in the same year.

To test the validity of the treatment, I rely on the medical literature (e.g., Clarke-Pearson and Geller (2013)) which points at long-lasting complications associated with permanent sterilization, and data from the National Health Interview Survey (NHIS) which provides information on women's genital organ issues (e.g., inflammation, infertility, etc.). I find that the treatment increases the probability of self-reporting genital organ issues among women by more than 50 percent compared to the sample mean which provides evidence supporting the validity of the treatment.

For the main analysis, I use retrospective household data from the 1990 5% U.S. Census State Sample[2], combined with NHIS data[3], and exploit variation across treated and untreated cohorts as well as variation across races. Using this difference-in-differences approach, I find that coerced sterilization significantly reduced fertility among American Indian women. The probability of having more than one child for treated households decreases by approximately 6.1 percentage points, corresponding to an 8 percent reduction relative to the sample mean. The probability of having more than two children decreases by nearly 11 percent, and the estimated probability of having more than three children drops by roughly 6. This reduction in fertility becomes even more pronounced when American Indians are compared to White households, thereby excluding the possibility that other minorities went through such a trauma. In this case, the reduction in the probability of having more than one child is close to 10 percent, while the probability of having more than two children decreases by nearly 13 percent relative to the mean.

When focusing on specific American Indian tribes, I find that the Cherokee, Chickasaw, Choctaw, Comanche, Crow, Osage, and Tlingit-Haida were disproportionately affected by sterilization. For example, the probability of having more than two children among the Comanche decreases by approximately 14.6 percentage points, and by nearly 17.1 percentage points among the Osage.

The effect begins to manifest in households whose last child was born in 1969, with fer-

[2]Data for the IPUMS 5% U.S. Census State Sample is provided by Ruggles et al. (2024)
[3]Data for the National Health Interview Survey is provided by Blewett et al. (2024)

tility continuing to decline among successive cohorts. Consistent with anecdotal evidence that reports sporadic cases starting after 1965 (when the IHS initiated family planning programs) and a marked intensification in the early 1970s, I find no significant effect for pre-treatment cohorts or during the 1965–1969 period. The absence of a significant effect between 1965-1970 should rule out reductions due to family planning programs which the IHS provided since 1965.

The economic ramifications are substantial and corroborate accounts from families discussed in the literature. I find that the probability of the spouse not being present in the household increases by 1.7 percentage points. The probability of work-related disability increases by 3.6 percentage points. Treated households are more likely to self-report worse health outcomes, a greater number of health issues, and a higher likelihood of spending more than one week bed-disability in the past 12 months. As a result, labor force participation decreases by nearly 3 percentage points, leading to significant reductions in both family and personal income. The decline in personal income is particularly pronounced among women, with a reduction of 33 percent, compared to a 23 percent reduction for men.

I then look at children in treated households to evaluate the impact on education of American Indian children in households likely exposed to the treatment. Controlling for birth cohort and school attendance, I find that the probability of completing a high school diploma (grade 12) and at least one year of college decreases by 2.9 and 4.3 percentage points, respectively. While the probability of completing middle school (grade 8) is neither statistically nor economically significantly affected, which is likely to be the result of compulsory education laws. These effects are only slightly mitigated when controlling for the education, labor force participation, and socioeconomic conditions of the household head.

Finally I estimate the intergenerational transmission of fertility among children born in households exposed to the treatment using data from the IPUMS 2000 US census (5% sample) and the Panel Study of Income Dynamics - Social, Health, and Economic Longitudinal File (PSID-SHELF) [4]. Using these two sources, I find that children born into households potentially affected by sterilization are likely to have a higher number of children, which appears consistent with an adverse attitude toward contraception among children in these households. However, formally testing the latter is challenging due to the lack of intergenerational data linking contraception use.

Overall, these results corroborate anecdotal evidence and family accounts covered in the literature. However, unlike existing evidence, the analysis provides a clearer understanding of the magnitude of the short- and long-term effects of forced sterilization on

[4]Data for the PSID-SHELF is provided by Pfeffer et al. (2023)

American Indian women.

This paper is closely related to the emerging economics literature that focuses on the long-term effects of medical negligence. Gaston and Alleyne-Green (2013) conduct a systematic review to examine the legacy of abuse from medical experimentation on slaves and African Americans, finding significant effects of these past experiences on attitudes toward HIV-related health care. Alsan and Wanamaker (2018) evaluate the lasting impact of the Tuskegee Study of Untreated Syphilis on the behavior and health of older Black men, documenting enduring effects on medical mistrust and mortality. Chang (2018) study the impact of the controversy surrounding the measles-mumps-rubella (MMR) vaccine on vaccination rates among subsequent cohorts and observe spillover effects on the uptake of other vaccines. Similarly, Qian et al. (2020) provide evidence of confirmatory bias in health decisions following the MMR-autism vaccine controversy. Lowes and Montero (2021) find lower vaccination rates and diminished trust in medicine in areas heavily exposed to the French medical campaign to treat and prevent sleeping sickness in Africa. Martinez-Bravo and Stegmann (2022) examine the effects of the anti-vaccination campaign led by the Taliban after news emerged that the CIA had used a vaccination program as cover to capture Osama Bin Laden. Finally, Archibong and Annan (2023) investigate the impact of the 1996 Pfizer human trials in Kano, Northern Nigeria, where an experimental antibiotic for meningitis led to the deaths of 11 children.

The paper is also related to the literature on racial discrimination in the US. A large part of this literature has focused on the effect of slavery (Acharya et al., 2016; Ager et al., 2021; Bertocchi and Dimico, 2014; Bleakley and Rhode, 2024; Boustan and Margo, 2014; Engerman and Sokoloff, 2012; Fogel and Engerman, 1995; Levine et al., 2020; Naidu, 2010; Nunn, 2008; Wright, 2022), the impact of the Jim Crow laws (Althoff and Reichardt, 2024; Bertocchi and Dimico, 2017; Carruthers and Wanamaker, 2017; Collins, 2003; Margo, 1982, 1984, 1987, 1990; Ruef and Grigoryeva, 2018) and consequences of racial violence (Albright et al., 2021; Collins and Margo, 2004, 2007; Cook, 2014; Cook et al., 2018; Williams, 2022). A small part of this literature has focused instead on discrimination against American Indians. Anderson and Lueck (1992) argues that the low agricultural productivity across Indian reservations is the result of constraints imposed by the federal government over Indian land. Dippel (2014) studies the impact of American Indian reservation and finds that force coexistence led to a reduction in income per capita on reservations today by about 30%. Gregg (2018) shows that American Indian boarding schools led to lower level education. Leonard et al. (2020) evaluate the impact of land titling following the General Allotment Act of 1887 and find a non-linear effect on income across reservations. Feir et al. (2023) look at discrimination in the mortgage market, while Feir et al. (2023) evaluate the impact on health of the Slaughter of the Bison toward the

end of the 19th century on health. Frye and Parker (2021) focus on the the 1934 Indian Reorganization Act (IRA) and show that IRA tribes had 12 percent lower income when compared to non-IRA tribes in 2016.

The paper also contributes to the literature which looks at the impact of parental job loss, maternal mental health, negative family environment and children outcomes (Aizer et al., 2016; Carneiro et al., 2021, 2024; Dahlen, 2016; Eshaghnia et al., 2022; Frank and Meara, 2009; Heckman, 2007; Huttunen and Riukula, 2024; Mörk et al., 2020; Oreopoulos et al., 2008; Persson and Rossin-Slater, 2018; Salvanes et al., 2024; Willage and Willén, 2022).

The paper is structured as follows. Section 2 provides a discussion of the historical background which led to coerced sterilization among American Indian women. Section 3 introduces data sources and lays out the empirical strategy adopted to estimate the effect of coerced sterilization. Section 4 reports the impact of coerced sterilization on fertility. Health and economic consequences are reported in Section 5, while Section 6 provides potential ramifications in terms of investment in children. The potential intergenerational transmission in terms of fertility is evaluated in Section 7. The paper ends with short conclusions

2 Background

The 1960s and 1970s marked a period of significant change for many American women, particularly in terms of reproductive rights. President Lyndon B. Johnson's War on Poverty provided unprecedented access to family planning programs, under the expectation that increased reproductive autonomy would foster greater economic mobility and equality. For many women, the ability to control their fertility represented an opportunity for self-sufficiency, enabling them to take advantage of the educational and economic prospects created by the program. While many American women benefited from these policies, reports of reproductive rights abuses involving American Indian women at Indian Health Service (IHS) hospitals began to surface. Several women from various tribes came forward with accounts of forced sterilizations. The growing number of such reports, along with allegations of questionable sterilization practices at the Claremore IHS hospital in Oklahoma, prompted Dr. Constance Redbird Pinkerton-Uri, a physician with the IHS, to conduct her own inquiry. By examining records from 26 of the 35 IHS hospitals across the country with obstetric wards, she estimated that approximately 25 percent of American Indian women had been sterilized (Shepherd, 2021). Dr. Uri's findings led to an investigation by the Government Accountability Office (GAO) in four of the twelve IHS program areas: Aberdeen, Albuquerque, Oklahoma City, and Phoenix (Lawrence, 2000).

The resulting report, released in 1976, revealed that the IHS performed 3,406 sterilizations between 1973 and 1976 and highlighted potential issues in terms of: *(1) sterilization of persons under 21 years of age* - despite the Department of Health, Education, and Welfare (HEW) moratorium on such sterilizations, *(2) inadequately documenting what the Indian understanding of to the use of consent forms, (3) lack of widespread physician understanding of the regulations, and (4) lack of definitive requirements for informed consent when sterilizations are performed by contract doctors at contract facilities* (Government Accountability Office, 1976).

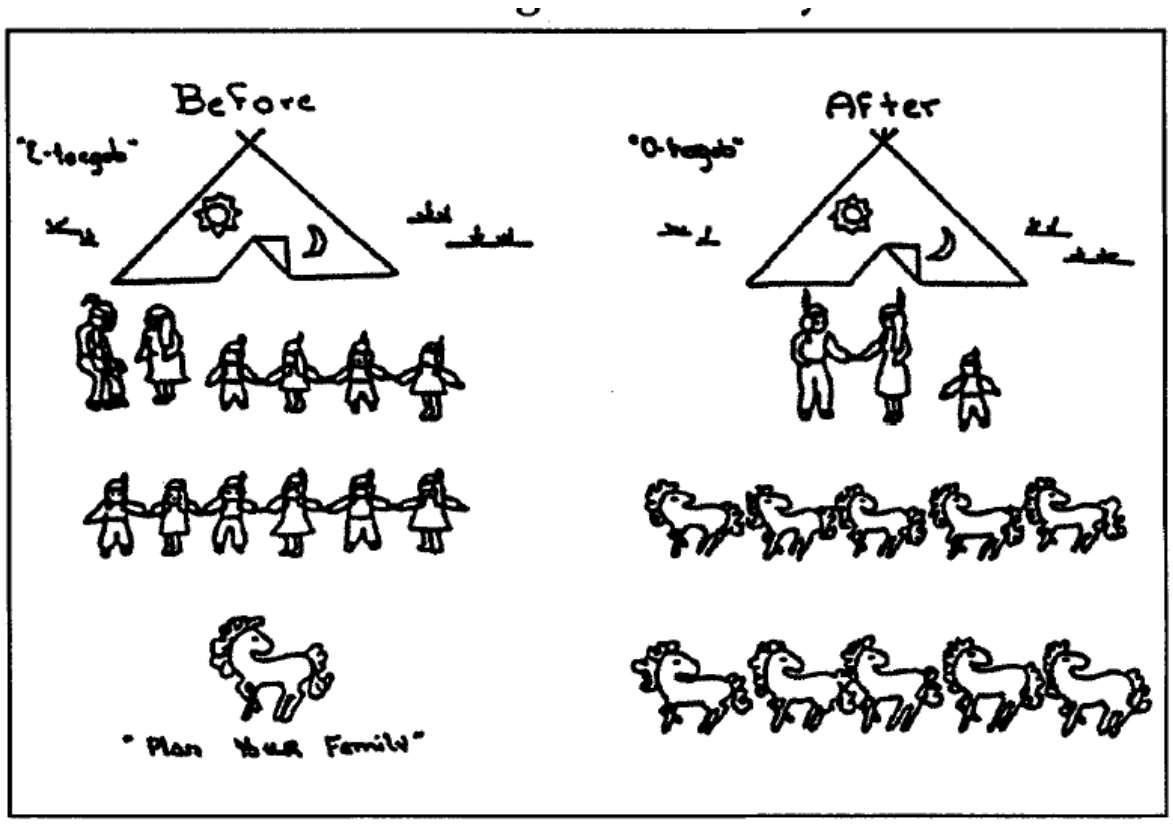
The resurgence of eugenic movements in the 1960s, following their decline after World War II, alongside Malthusian fears about overpopulation, resource scarcity, and the social burdens of a growing population, seems to provide the most plausible explanation for the sterilizations at the IHS facilities. President Nixon identified population growth as *"one of the most serious challenges to human destiny in the last third of this century"* (Nixon, 1969) and viewed birth control methods of all types as a potential solution to this issue. The Department of Health, Education, and Welfare (HEW) was tasked, under the Economic Opportunity Act of 1964, with administering family planning programs targeted at poor and disadvantaged populations. The following year, the Indian Health Service (IHS)—established in 1955 as part of HEW—began offering family planning services to American Indians.

American Indians were seen as a primary target for these programs due to their high fertility rates [5] and the poor economic conditions of women on reservations (Ralstin-Lewis, 2005). Despite the availability of free family planning services, the contraceptive use among American Indian women remained strikingly low (Temkin-Greener et al., 1981). To incentivize their use, the Family Planning Act fully subsidized (up to 90 percent) the cost of sterilization to Medicaid and IHS facilities which indirectly provided financial incentives for physicians to perform sterilization (Shepherd, 2021). At the same time, HEW launched information campaigns in the early 1970s promoting the benefits of sterilization (Figure 1). While HEW directives stressed that sterilization should only be performed on individuals at risk and with valid informed consent, physicians at IHS facilities frequently disregarded these requirements, with doctors pressurizing women into sterilizations so they could meet these surgical requirements.

Over the 1973-1976 period considered by the GAO, the reported rates of female sterilization procedures at the four IHS centers under investigation ranged from approximately 3 percent of women sterilized at the IHS Albuquerque center to nearly 7 percent at the

[5] Lawrence (2000) reports that the average number of children per women among American Indian was above three vs an average of two children for White women. The average number of children per women among some tribes (i.e., Navajo and Apache) was even higher (around 4).

Figure 1: Family Planning and American Indians.



Note: A 1974 Department of Health Education and Welfare pamphlet titled Plan Your Family. The image compares a American Indian family with many children and one horse before sterilization against a family with one children and many horses after sterilization .

IHS Oklahoma center, with an average across the four centers of around 6 percent (Government Accountability Office, 1976). Considering that sterilizations likely began in the late 1960s and continued until 1979, Dr. Uri's estimates of 25 percent of women of reproductive age being sterilized over the entire period does not seem so unlikely.

3 Data and Empirical Model

I use a combination of three different data sources. I begin with retrospective information on households from the IPUMS 1990 5 percent U.S. State Sample. I chose the 1990 census for specific reasons related to the type of data required for my analysis. More recent censuses (from 2000 onward) only report information on the number of children currently in the household, which tends to cause issues in terms of distribution when evaluating the impact on fertility given that children who left the household are not counted. The 1990 census, on the other hand, reports the total number of children ever born which seems a much more reliable measure of fertility. The 1980 also report the total number of

children ever born. However this sample is too close to the treatment period resulting in a censored distribution of fertility given that children born after the treatment period (i.e., after 1980) will not be reported. In addition, complete information on tribal affiliation of American Indian is only available from 1990 onward.

Information on the total number of children ever born is only reported for women, hence, for the household head if she is a woman or for the spouse of the household head if the latter is a man. For this reason, I exclude from the sample individuals who are unlikely to report children and I focus on parents (the household head and his/her spouse), the parent of the household head, and possible partners of the head. I also exclude individuals who are not yet of reproductive age (i.e., below 15) and those above 90 (i.e., born before 1900) as they are unlikely to have had children during the treatment period and, therefore, unlikely to provide cohort variation.

The National Health Interview Survey (NHIS) is the second source of data I use. The NHIS is an annual survey collecting information on health, health care, and health behaviors since 1963. However, data on American Indians as a racial category is only available from 1979 onward and, similar to recent censuses, includes information only on children still residing in the household. Because the NHIS is a survey, the number of American Indians reported in each year is relatively small (i.e., between 200 and 500 per year during the period under consideration), which does not provide enough variation in the treatment. To increase the variation, I use information for individuals over the period 1980-1995 which includes more than $7,000$ American Indians. This time period is chosen because of data constraints (i.e., no information on American Indians before 1979) and because the oldest children in a treated household should be in his mid twenties by 1995, and hence still likely to be a member of the household.

Finally, to evaluate the intergenerational transmission of fertility choices, I use the IPUMS 2000 5 percent sample of the population[6] and the 2023 Panel Study of Income Dynamics - Social, Health, and Economic Longitudinal File (PSID-SHELF)[7] . Both datasets have potential issues which hopefully will be mitigated when considered together. The IPUMS 2000 5 percent sample allows me to analyze the children of treated individuals who are still residing within the household. However, this results in a selected sample with specific characteristics. For instance, children in extended families are more likely to remain in the household longer, potentially causing an upward bias since they are also more likely to have more children. The PSID-SHELF, on the other hand, only includes a small number of American Indians (372 in my sample) and the number of treated

[6]I use the 2000 sample to examine intergenerational transmission because the children of treated individuals are likely to be between 20 and 35 years old by 2000, making them old enough to have children.

[7]The PSID does not provide information on American Indians as a racial category until 1978.

individuals is even smaller raising concerns in terms of representativeness of the sample. Appendix A provides details about the construction of these datasets. Table A1-A4 report summary statistics for the most important variables.

Using the four datasets above I will estimate variations of a classical DiD model using the following model:

$$Y_{i,t} = \alpha + \sigma_{race} + \gamma_{son_cohort} + \delta_{mother_cohort} + \beta Treat + \rho_{other} + \epsilon_{i,t}$$

In the model above, $Y_{i,t}$ represents an outcome for an individual i in a birth cohort t. The treatment ($Treat$) aims to capture the effect of forced sterilization of American Indian women during the 1970s. Finding a perfect measure of sterilization for these women is almost impossible. However, considering that procedures carried out by IHS doctors were irreversible, it should be possible to capture the probability of being sterilized by looking at the potential loss of reproductive autonomy of American Indian women during the 1965-1980 period, which is when the IHS began providing family planning programs to American Indians (1965) until the last possible case of sterilization. This loss of reproductive autonomy can be captured by examining whether the last son (indicating the end of fertility) is born during the 1965–1980 period, or, alternatively, whether pregnancy became impossible during that period. As a result, the treatment ($Treat$) will be the product of a dummy for American Indians and a dummy for whether the last son is born during the period 1965-1980.

Aging and changes in fertility preferences are other potential reasons why women might stop having children during the period under consideration, and hence could be correlated with the treatment. To attenuate the bias from these other effects, the model also includes individual birth cohort fixed effects (δ_{mother_cohort}). Differences across races and cohort effects related to the loss of reproductive autonomy will be captured by σ_{race} (i.e., race fixed effects) and γ_{son_cohort} (i.e., youngest child cohort fixed effects). Other fixed effects, (ρ_{other}), include county fixed effects, birth place fixed effects, marital status, urban/rural residency, citizenship, gender, and relation to the head (i.e., whether the individual is the spouse, mother, partner, etc.).

Confounding the effect of family planning, which the IHS began providing in 1965, is another issue, even though the literature suggests that contraceptive use among American Indians was negligible (Temkin-Greener et al., 1981). (Bailey, 2006; Goldin and Katz, 2002) argue that family planning has been quite effective for White and African American women. Therefore, the reduction in fertility due to family planning in the control group should be larger than the change among American Indians, which, in the worst-

Table 1: Female Genital Issues

	(1) Female Genital Issues
Coerced Sterilization	0.0290**
	(0.0147)
Adj.R-squared	0.004
Observation	47596
Treated	180
Sample Mean	0.0336
Clusters	298
Individual Cohort FE	Yes
Youngest Child Cohort FE	Yes
Region FE	Yes
Survey Year FE	Yes
Other FE	Yes

Notes: The dependent variable is a dummy indicating whether the woman had any genital issue in the last year. Controls include: *i*) Region FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Survey year FE; *v*) Marital status; *vi*) Race; *vii*) Relation to the head; *viii*) Number of children. Clustered standard errors at a primary sampling unit. *** p<0.01, ** p<0.05, * p<0.1.

case scenario, should bias the results toward zero. However, by examining the dynamic treatment, it should be clear whether family planning actually had an effect on American Indian women.

For a small number of women in the sample (almost 9%) the NHIS provides information on whether the woman experienced genital organ issues in the last year. These issues can be related to inflammatory disorders, infertility, or any other kind of disorder. According to the medical literature (i.e., Clarke-Pearson and Geller (2013)), sterilization is one of the potential causes of such disorders. For this reason, to test the validity of my treatment, in Table 1 I estimate the impact of the treatment on whether the woman had any sort of disorder in the last year. Controlling for the number of children in the household to exclude the effect of parity (another likely cause of disorders), I find that the probability of treated women having genital issues in the last year increases by almost 2.9 percentage points. The mean for women reporting such issues in the sample is close to 3.4 percent. Thus, the treatment nearly doubles the probability of experiencing genital issues. Even though the estimated sample includes only 180 treated women out of 388 American Indian women, this result seems to support the validity of the treatment as a proxy for coerced sterilization of American Indian women.

Table 2: The Effect of Sterilization on Fertility

	(1) Nr Children	(2) Nr Children> 1	(3) Nr Children> 2	(4) Nr Children> 3
Coerced Sterilization	-0.0667**	-0.0605***	-0.0464***	-0.0127**
	(0.0296)	(0.00636)	(0.00813)	(0.00599)
Adj.R-squared	0.258	0.107	0.173	0.203
Observation	2103823	2103823	2103823	2103823
Treated	7315	7315	7315	7315
Sample Mean	2.588	0.764	0.409	0.199
Clusters	434	434	434	434
Individual Cohort FE	Yes	Yes	Yes	Yes
Youngest Child Cohort FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes
Other FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is the number of children ever born (Model 1) and dummies for more than one children in the household (Model 2), more than 2 children in the household (Model 3), and more than 3 children in the households (Model 4). Controls include: *i*) County FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Race; *v*) Marital status; *vi*) Citizenship; *vii*) Birth place; *viii*) Relation to the head; *ix*) Urban/rural residency. Clustered standard errors at a county level. *** p<0.01, ** p<0.05, * p<0.1.

4 Fertility and Coerced Sterilization

I begin by analyzing retrospective information on the total number of children ever born from the 1990 US Census to evaluate the effect of coerced sterilization on fertility. Figure B1 in Appendix B shows the overall trend in the average number of children ever born for Whites, African Americans, and American Indians, based on the birth year of the last child, to illustrate the variance exploited by the treatment. The average number of children decreases across groups for cohorts born after the 1960s, which, as documented in the literature, is likely the result of family planning methods introduced during that decade. However, the reduction in the average number of children ever born for American Indians is significantly larger, declining from nearly five children per woman to fewer than three. The reduction among African Americans is also larger compared to Whites but is not as pronounced as that of American Indians. While African Americans were also targeted by sterilization programs in the 1960s, the reduction in fertility for this group is unlikely to be primarily due to such programs, as the relative number of African American women forcibly sterilized appears to have been relatively small.

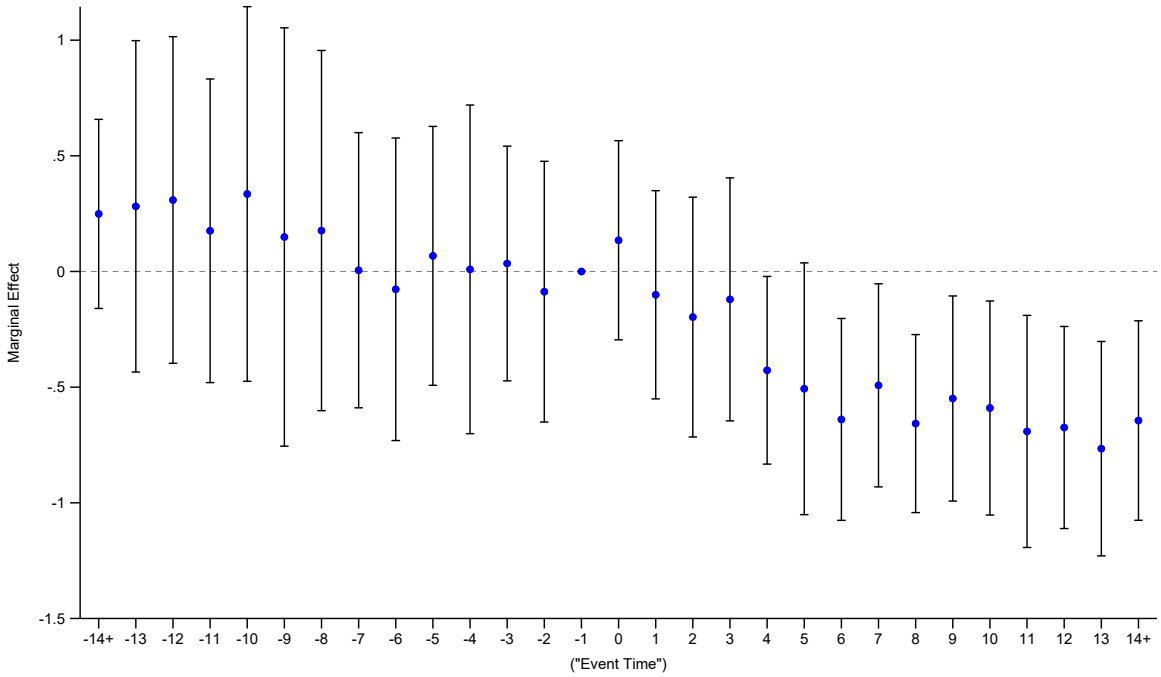
Table 1 reports the average treatment effects. In Model 1, the dependent variable is the total number of children ever born. The effect of the treatment (i.e., whether the woman has been sterilized) in Model 1 is significant at the 5 percent level, with a

coefficient of -0.067. This corresponds to a reduction of approximately 2.6 percent in the total number of children when compared to the sample average. In Model 2, I replace the dependent variable with a dummy indicating whether the woman reports having more than one child. For treated women, the probability of having more than one child decreases by nearly 6 percentage points, or approximately 8 percent relative to the mean. In Models 3 and 4, I estimate the changes in the probabilities of having more than two children and more than three children, respectively. The probability of having more than two children decreases by approximately 11.2 percent in Model 3, while the probability of having more than three children decreases by 6.5 percent in Model 4, both relative to the mean. These probabilities suggest that sterilization was significantly more likely to occur after the second child, seemingly to pressure American Indian families to conform to the family size norms prevalent among White families.

Figure 2 illustrates the dynamic treatment effect, using the year before the IHS began providing family planning programs as the reference point. Prior to the treatment, there is no significant difference in the number of children ever born between treated and untreated women. The treatment effect becomes statistically significant for households whose youngest child was born after 1969 — almost five years after the IHS started providing family planning services — and remains relatively constant in subsequent event periods. The lack of significant effects for early cohorts (up to the 1970s) suggests that any potential impact of family planning is minimal. This aligns with existing literature indicating a limited use of contraceptive methods among American Indians due to cultural and gender norms. Doran (1972), for instance, interviewed Navajo women who had delivered at the Gallup Indian Medical Center (GIMC) and found that traditional beliefs—such as the idea that a woman is of no worth to a man unless she can bear him children—were key factors behind the low adoption of contraception. The timing of the observed treatment effect also coincides with the *Jessin v. County of Shasta* ruling in 1969, which recognized sterilization as an acceptable family planning method, and the 1970 Family Planning Act, which subsidized sterilizations at Medicaid and Indian Health Service facilities and provided economic incentive to doctors to perform such a surgery.

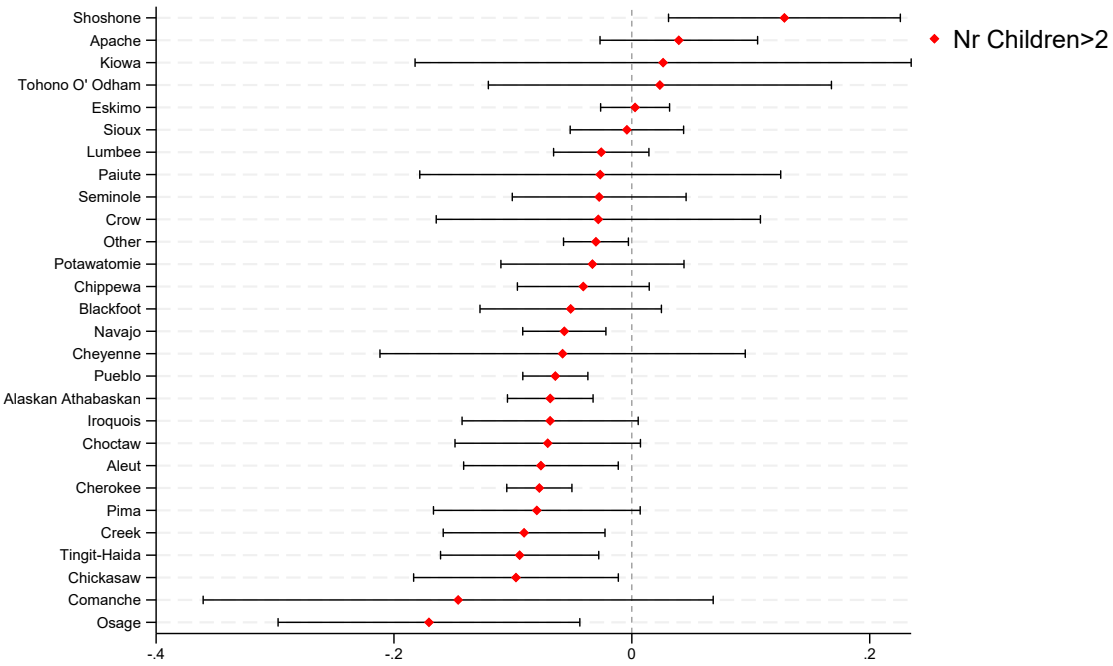
Theobald (2019) argues that the 1970 Family Planning Act, which subsidized sterilizations and indirectly provided financial incentives for physicians at IHS hospitals (Shepherd, 2021), led to a significant increase in sterilization rates on many reservations. For example, sterilization rates on the Navajo reservation doubled between 1972 and 1978. In Figure 3, I exploit information on tribal affiliation to estimate the impact of sterilization by tribe, focusing on the probability of having more than two children—the measure with the largest observed change in probability. While small sample sizes for some tribes result

Figure 2: Dynamic Treatment



Note: The dependent variable is the number of children ever born. The vertical axis reports changes in the number of children ever born. The horizontal reports event periods. Controls include: *i*) County FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Race; *v*) Marital status; *vi*) Citizenship; *vii*) Birth place; *viii*)Relation to the head; *ix*) Urban/rural residency. Clustered standard errors at a county level. 5% confidence intervals. .

Figure 3: Average Treatment Effect by Tribe



Note: The dependent variable is a dummy for whether the number of children ever born is above two. The horizontal axis reports changes in the probability of having more than two children. Controls include: *i*) County FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Race; *v*) Marital status; *vi*) Citizenship; *vii*) Birth place; *viii*)Relation to the head; *ix*) Urban/rural residency. Clustered standard errors at a county level. 5% confidence intervals .

in large standard errors, several important patterns emerge. The Osage tribe is the most affected, with a decrease in the probability of having more than two children nearing 17 percentage points. For the Comanche and Chickasaw tribes, the reduction ranges from approximately 10 to 15 percentage points. Other tribes, including the Tlingit-Haida, Aleut, Iroquois, Pima, Choctaw, Cherokee, Chippewa, Navajo, and Creek, also experience significant declines. In contrast, the Shoshone and Apache tribes are the only groups where the probability of having more than two children increases. This increase is likely due to the broader provision of health care by the IHS since 1958, which may have enhanced fertility among groups less affected by coerced sterilization. Figure B2 in Appendix B shows changes in the probability of having more than one, two, and three children across tribes.

Kluchin (2020) argues that the civil and reproductive rights movements of the 1950s and 1960s provided *"neo-eugenic"* advocates with new opportunities, leading to a renewed wave of sterilizations among African Americans. For example, Sinderbrand (2005) notes that African Americans accounted for 60 percent of those sterilized in North Carolina during the 1960s. However, by the late 1960s, the total number of sterilizations in the state had declined significantly, with only 290 procedures performed between 1966 and 1968 (State Library of North Carolina, 1968). This equates to roughly 90 annual sterilizations among African Americans in a population of about 1.2 million, a rate unlikely to significantly impact the estimated effects. In Appendix C, I test the effect of sterilization among American Indians compared to either Whites (Table C1) or African Americans (Table C2). For treated American Indian women, the average number of children ever born decreases by approximately 2.5 percent relative to the mean when compared to White women. Additionally, the probability of having more than two children decreases by 12.8 percent relative to the mean. When compared to African Americans, this reduction in probability is smaller but still notable, at approximately 4.8 percent.

In Table C4 in Appendix C, I test the robustness of the effect using data from the NHIS for the period 1980–1995. Unlike the 1990 US Census, the NHIS provides information only about the number of children currently residing in the household, which is likely to influence both the mean and variance of the fertility distribution. This bias in the distribution of fertility is also likely to be group-specific. For instance, children in extended families are more likely to remain in the household for longer periods, which could lead to an upward bias[8]. The results in Table C4 largely confirm the negative effect of sterilization on fertility. As expected, the estimated effect is larger than the one

[8]For example, if White children are more likely to leave the household earlier, the observed change in fertility due to sterilization would be compared to a smaller change in fertility in the untreated group. This difference would result in an upward bias.

obtained using data on the total number of children ever born. In Model 1, the total number of children in the household decreases by nearly 9 percent relative to the mean, compared to a 2.6 percent reduction in the total number of children ever born. Similarly, the probability of having more than two children decreases by approximately 25 percent, compared to an 11.2 percent reduction reported in Table 1.

5 The Impact on Health and Economic Outcomes

5.1 Health and Labour Outcomes

Lawrence (2000) argues that the inability to conceive and bear children had profound emotional and psychological consequences, affecting not only the women themselves but also their families, friends, and the broader Indian community. To evaluate the consequences of coerced sterilization, I use health information from the NHIS and socioeconomic data from the 1990 US Census.

Table 3 reports the estimated effects of sterilization on health outcomes using the same empirical methodology applied to fertility. Model 1 examines the probability of individuals self-reporting poor health conditions (i.e., fair or poor). Treated households are nearly 2.6 percentage points more likely to self-report a health level classified as fair or poor. The number of self-reported health issues[9] in Model 2 increases by approximately 16.2 percent. In Model 3, the probability of having more than one week of bed disability in the past year rises by nearly 2.3 percentage points. Lastly, in Model 4, the probability of drinking alcohol on more than 10 days in the past 2 weeks[10] increases by about 3.2 percentage points. All these effects are significant at the 5 percent level.

Table 4 presents the impact of sterilization on socioeconomic conditions. In Model 1, I estimate the effect on whether the spouse is present in the household, which I use as a proxy for single-headed households and, consequently, as a measure of family disruption. The probability of a single-headed household increases by nearly 11 percent compared to the mean. In Model 2, the probability of work disability[11] increases by approximately 3.6 percentage points, or nearly 40 percent relative to the mean. Model 3 examines the effect on labor force participation, which decreases by more than 2.4 percentage points (equivalent to a 3 percent reduction relative to the mean). This reduced labor force

[9]The variable is skewed toward zero and has a quite long tail with a few individuals reporting more than 20 health conditions. To normalize the distribution I take the log of the variable ($log(0.01 + x)$).

[10]Ideally, it would have been preferable to use a dummy variable for whether the individual drinks alcohol daily to better capture alcoholism. However, the number of individuals reporting drinking alcohol for all 14 days in the last 2 weeks is relatively low, with limited variation to exploit.

[11]Work disability is a binary variable equal to one if the individual reports any work-related disability.

Table 3: Health and Socioeconomic Consequences

	Health	Nr Conditions	Bed Disability	Alcol Cons.
Coerced Sterilization	0.0258**	0.162***	0.0226**	0.0315**
	(0.0119)	(0.0564)	(0.00877)	(0.0124)
Adj.R-squared	0.064	0.037	0.014	0.011
Observation	517457	456303	516199	37235
Treated	1775	1522	1765	95
Sample Mean	0.106	0.715	0.111	0.055
Clusters	298	298	298	297
Youngest Child Cohort FE	Yes	Yes	Yes	Yes
Individual Cohort FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes	Yes
Other FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is a dummy for whether self-reported health is fair or poor (Model 1), the number of reported health conditions (Model 2), a dummy for at least one week of bed disability in the last 12 months (Model 3), and whether the individuals has drunk alcohol for at least 10 days in the last 2 weeks (Model 4). Controls include: *i*) Region FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Survey year FE; *v*) Marital status; *vi*) Race; *vii*) Gender; *viii*) Relation to the head. Clustered standard errors at a primary sampling unit. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Health and Socioeconomic Consequences

	Spouse Away	Disability	LFP	Income	Income
Coerced Sterilization	0.0172***	0.0357***	-0.0252***	-0.233***	-0.323**
	(0.00269)	(0.00422)	(0.00617)	(0.0897)	(0.126)
Adj.R-squared	0.880	0.115	0.266	0.214	0.145
Observation	3814783	3814783	3814674	3814674	2103733
Treated	12554	12554	12554	12554	7315
Sample Mean	0.148	0.089	0.753	17577.5	9599.2
Clusters	434	434	434	434	434
Individual Cohort FE	Yes	Yes	Yes	Yes	Yes
Youngest Child Cohort FE	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes	Yes
Other FE	Yes	Yes	Yes	Yes	yes

Notes: Dependent variables are whether the spouse is present in the household (Model 1), a dummy for reported work disability (Model 2), labour force participation (Model 3) and personal income (Model 4 and Model 5). Estimates in Model 5 are confined to women. Controls include: *i*) County FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Race; *v*) Marital status; *vi*) Citizenship; *vii*) Birth place; *viii*) Gender;*ix*) Relation to the head; *x*) Urban/rural residency. Clustered standard errors at a county level. *** p<0.01, ** p<0.05, * p<0.1.

participation leads to a decrease in personal income in Model 4, estimated at nearly 23 percent. This effect is even larger—around 32 percent—when the analysis is restricted to women (Model 5).

These results confirm the large ramifications for women experiencing such a trauma. Family structure was undermined. Health was badly affected. As a result, labour force participation and income both decreased.

5.2 Investment in Children

According to the quantity-quality (Q-Q) trade-off, parents are likely to devote more resources to investing in their children when fertility declines. However, the Q-Q framework considers ceteris paribus conditions, where socioeconomic factors remain constant. Consequently, the positive effect on child investment becomes less certain in scenarios where family dynamics, health, and economic conditions are negatively impacted.

I use data from the 1990 US census again to examine the consequences in terms of investment in children. Specifically, I focus on children of the household head and merge data on children's characteristics with information about the household head to evaluate the impact on children of parents who are likely to be treated[12]. The fact that I can only look at children within the household may introduce issues related to sample selection, as these children are likely to be those with fewer opt-out options. However, given the prevalent family structure, White children should be much more likely to leave the household than American Indian children. Consequently, the mean and variance of the distribution of education in the sample for the control group may be relatively lower, which could potentially bias the estimates toward zero.

Treated children in 1990 should be between the ages of 10 and 21[13]. Some of these children are likely to have completed their education, while others may still be enrolled in educational programs. For this reason, the estimated model includes a control for whether the child is still in education. Table 5, Panel A, reports the estimated impact of a parent being treated on the probability of the child completing the 8^{th} degree (Model 1), the 12^{th} degree (Model 2) and any college (Model 3). Compulsory education in most states is between the ages of 6 and 16[14]. For this reason, the probability of the child completing at least the 8th grade[15] is not significantly affected. However, the probability

[12]The treatment will capture whether the parent's last child was born between 1965 and 1980.

[13]Figure 2 shows that households most likely to be affected by sterilization are those with the youngest child born after 1969.

[14]Compulsory school attendance laws in the U.S. vary by state, with some states requiring attendance to start at age 5, while others impose a minimum drop-out age of 17.

[15]I look at the probability of completing the 8th grade (rather than the 9th grade) for consistency with estimates using data from the NHIS reported in Appendix C, where grades 9, 10, and 11 are grouped

Table 5: Investment in Children

	(Panel A)		
	Grade 8	Grade 12	College
treatment	-0.00299	-0.0289***	-0.0425***
	(0.00219)	(0.00411)	(0.00526)
Adj.R-squared	0.881	0.746	0.114
Observation	3444510	3444510	3444510
Treated	14677	14677	14677
Sample Mean	0.587	0.230	0.114
Clusters	434	434	434
Individual Cohort FE	Yes	Yes	Yes
Youngest Child Cohort FE	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Race FE	Yes	Yes	Yes
Other FE	Yes	Yes	Yes
	(Panel B)		
	Grade 8	Grade 12	College
treatment	-0.00218	-0.0264***	-0.0413***
	(0.00219)	(0.00434)	(0.00418)
Adj.R-squared	0.881	0.749	0.425
Observation	3444510	3444510	3444510
Treated	14677	14677	14677
Sample Mean	0.587	0.230	0.114
Clusters	434	434	434
Individual Cohort FE	Yes	Yes	Yes
Youngest Child Cohort FE	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Race FE	Yes	Yes	Yes
Other FE	Yes	Yes	Yes

Notes: Panel A reports estimates without controlling for the education level, labour force, and Duncan socioeconomic Index of the household head. Panel B includes these controls. The dependent variable is a dummy for whether the highest completed level of education is grade 8 (Model 1), grade 12 (Model 2), or any college (Model 3). Controls include: *i*) County FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Race; *v*) Birthplace; *vi*) Household head marital status; *vii*) Household head citizenship; *viii*) Gender; *ix*) Household head gender; *x*) Household head urban/rural residency; *xi*) Household head Duncan Socioeconomic Index; *xii*) Household head highest education Level; *xiii*) Household head labour force participation; *xiv*) School attendance. Clustered standard errors at a county level. *** p<0.01, ** p<0.05, * p<0.1.

of completing either the 12th grade or any college significantly decreases by nearly 2.9 and 4.2 percentage points, respectively. These changes in probability amount to a reduction in the likelihood of completing the 12th grade by almost 12.6 percent compared to the mean, and a reduction in completing any college of close to 39 percent. Panel B includes controls for employment status and the education level of the household head to account for intergenerational preferences for education. Including these controls has little impact on the magnitude of the estimated effect and no effect on the significance level associated with the treatment.

To evaluate the robustness of these results, I repeat the same exercise using survey data from the NHIS over the period 1980-1995, which allows me to exploit the annual variation. Looking again at children of parents who have been exposed to the treatment, I find a similar negative effect on the probability of completing further education. The probability of completing the 8^{th} grade in Table C3 in Appendix C is not significantly affected, nor is the probability of completing the 12^{th} grade. However, there is a significant reduction in the probability of completing any college, which amounts to almost 3.5 percentage points, or a reduction of nearly 32 percent compared to the mean. This effect is not far from the 39 percent reduction in the probability of completing any college estimated using data from the US Census.

6 Intergenerational Transmission

The economic evidence on medical negligence shows a long-lasting culture of medical distrust (Alsan and Wanamaker, 2018), which can potentially spread to future generations. If children of parents likely exposed to the treatment tend to avoid family planning methods because of their parents' experiences, then one should expect them to have more children compared to a control group that tends to use contraception.

To estimate the intergenerational transmission, I begin with the 2023 Panel Study of Income Dynamics - Social, Health, and Economic Longitudinal File (PSID-SHELF). The PSID-SHELF is a longitudinal study that follows the descendants of panel families originally sampled in 1968. It reports information about children, which can then be linked back to the original family. After linking children to parents, the sample includes 74 treated individuals out of 342 American Indians in the dataset. The relatively small number of treated individuals is likely to cause issues in terms of representativeness. For this reason, to increase the reliability from a representativeness perspective, I supplement results from the PSID-SHELF with estimates using the IPUMS 2000 5 percent sample of

together.

Table 6: Intergenerational Transmission of Fertility

	Panel A: PSID-SHELF			
	(1)	(2)	(3)	(4)
	Nr of Children	Children > 1	Children > 2	Children > 3
Coerced Sterilization	0.517**	0.157**	0.102*	0.0388
	(0.196)	(0.0741)	(0.0581)	(0.0446)
Adj.R-squared	0.255	0.242	0.125	0.067
Observation	20643	20643	20643	20643
Treated	58	58	58	58
Sample Mean	1.05	0.32	0.15	0.06
Clusters	52	52	52	52
Individual Cohort FE	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes
Youngest Son FE	Yes	Yes	Yes	Yes
Other FE	Yes	Yes	Yes	Yes
	Panel B: 2020 US Census			
	(1)	(2)	(3)	(4)
	Nr of Children	Children > 1	Children > 2	Children > 3
Coerced Sterilization	0.116***	0.0352***	0.0169***	0.00880***
	(0.0166)	(0.00554)	(0.00422)	(0.00282)
Adj.R-squared	0.167	0.100	0.046	0.020
Observation	1288728	1288728	1288728	1288728
Treated	4573	4573	4573	4573
Sample Mean	0.14	0.03	0.01	0.003
Clusters	425	425	425	425
Individual Cohort FE	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes
Youngest Son FE	Yes	Yes	Yes	Yes
Other FE	Yes	Yes	Yes	Yes

Notes:The dependent variable is the number of children ever born (Model 1) and dummies for more than one children in the household (Model 2), more than 2 children in the household (Model 3), and more than 3 children in the households (Model 4).

Panel A reports the impact of sterilization fertility using data from the IPUMS-SHELF. Controls include: *i*) Individual cohort FE for the parent and his/her child; *ii*) Youngest child birth cohort FE; *iii*) State FE for the parent and his/her child; *iv*) Parent's race; *v*) Parent's education; *vi*) Parent's number of children; *vii*) Parent's employment status; *viii*) Parent's salary income and wage ; *ix*) Children's gender ;*x*) Children's married; *xi*) Children education level; *xii*) Children's relation to the head; *xiii*) Children's employment status; *xiv*) Children's salary income and wage. Clustered standard errors at a state level. *** p<0.01, ** p<0.05, * p<0.1.

Panel B reports estimates using data from the 2000 US Census. Controls include: *i*) Individual Cohort FE for the parent and his/her child; *ii*) Youngest child birth cohort FE; *iii*) County FE; *iv*) Child race; *v*) Child gender; *vi*) Child Duncan socioeconomic index; *vii*) Child education; *viii*) Gender of the household head ; *vii*) Marital status of the head ;*ix*) Number of children of the head; *x*) Duncan socioeconomic index of the head; ; *xi*) Education level of the head; *xii*) An indicator for extended family. Clustered standard errors at a county level. *** p<0.01, ** p<0.05, * p<0.1.

the US Census. I use the 2000 sample because children of parents likely exposed to the treatment should be between 20 and 35 years old by 2000 and therefore all of reproductive age. The issue with the 5 percent US Census is that I can only look at children who are still living with their parents, which, of course, will cause sample selection problems again. However, the two sources together should provide a clear indication of the potential intergenerational effect of the trauma.

Table 6, Panel A reports estimates using the PSID-SHELF. The number of treated individuals, after including controls, drops further to 58. The estimated number of children in Model 1 for treated individuals increases by almost 0.5, which, compared to the average number of children in the sample, corresponds to an average increase of nearly 50 percent. The probability of having more than one child (Model 2) increases by almost 15.7 percentage points (nearly 50 percent compared to the mean), and the probability of having more than two children (Model 3) increases by almost 10 percentage points (significant at a 10 percent level). The effect on the probability of having more than three children (Model 4), on the other hand, is not significantly affected by the treatment. However, this loss of significance for the latter reflects the relatively low number of women in the sample (and hence in the treatment group) with more than three children.

Panel B reports estimates using the 5 percent US Census sample. The average number of children in this sample is much smaller (i.e., close to 0.14 children), which reflects the selection issue in this sample. This sample selection generates an upward bias. However, the estimates confirm the positive impact of parents' trauma on their children's fertility. The estimated number of children in Model 1 drops by almost 82 percent. The probability of having more than one child (Model 2), more than two children (Model 3), and more than three children (Model 4) increases by nearly 3.5, 1.7, and 0.9 percentage points, respectively.

7 Conclusions

The IHS has provided an important healthcare service for American Indians since it was founded in 1955. However, physicians working at IHS facilities often operated under the assumption that Native people were morally, mentally, and socially defective (Lawrence, 2000). This presumption, combined with a government narrative that birth rates should be reduced due to Malthusian fears, led to the mass sterilization of American Indians. Women who went into hospitals for tonsillectomies or appendectomies often came out with tubal ligations or salpingectomies.

Using different data sources, I show that this mass sterilization had a large impact on

fertility, which then led to deep social and economic ramifications. Future generations may also have been affected by the creation of a culture of medical mistrust and lower reliance on family planning methods.

These social and economic consequences persist today, with American Indians having some of the highest rates of suicide and alcoholism in the nation (Leavitt et al., 2018). To what extent this trauma explains such poor health outcomes is something that still needs to be better understood.

Appendix A - Data Description

IPUMS 1990 5% US Census State Sample

The 1990 5% State sample is a 1-in-20 national random sample of the population. The file is hierarchical in structure, meaning that a housing unit record is followed in sequence by records for the persons in that housing unit. The variable *relate* identifies household members and their relation to the head of the household.

I keep the head of the household, the spouse, parents, and partners of the head (*relate=1, 2, 5, 11*) for the analysis related to fertility and economic consequences. This choice is justified by the fact that data on children ever born is only reported for women. This means that information on children ever born is reported for the head if she is female or the spouse if the head is male. Parents and partners will also report information on children ever born if they are women and have had children. I also exclude household members aged below 15 because they are unlikely to have children, and those aged above 90.

For the analysis related to investment in children, on the other hand, I only keep observations related to children of the household head (*relate=3*), excluding children-in-law. I then merge children's characteristics with information about the household head (*relate=1*) using the household identifier (*serial*) to control for parental characteristics. Children for whom information on school attendance is not available (i.e., children under 3) are dropped from the sample.

IPUMS NHIS 1980-1995

The National Health Interview Survey is a survey that collects information on the health, health care access, and health behaviors of the U.S. population. Each record represents an individual, and similar to the U.S. Census, person records are organized into households. To evaluate health consequences, I keep observations related to the household head and their spouse (*relate=10, 21, 22*). Furthermore, similar to the analysis conducted using the 1990 U.S. Census sample, I also drop individuals under 15 and above 90.

To evaluate investment in children, I follow the same steps as for the U.S. Census 5% sample, which are: *i)* I keep individual characteristics related to the child of the householder (*relate=41*); *ii)* I merge children's characteristics with information related to the head of the household (*relate=10*) using the household identifier (*serial*) to control for parental characteristics.

PSID-SHELF

The Panel Study of Income Dynamics–Social, Health, and Economic Longitudinal File (PSID-SHELF) provides an easy-to-use, harmonized longitudinal dataset for the Panel Study of Income Dynamics (PSID). The dataset covers the period from 1968 to 2019. I use the long version of the file, which provides information for each person over time.

To link children's information to parents, I first reshape the dataset using child identifiers to capture fertility information for each child over time. Since characteristics may change over time and I only need to exploit cross-sectional variation, I generate the mode or the maximum value of variables to obtain the most frequent or maximal values for each variable. For example, for variables like employment status and marital status, I generate the mode to reflect the prevalent employment and marital status over the period. For variables like the number of children, education levels, and family size, I take the maximum value to capture the total number of children or the highest educational level, for instance. I then collapse the dataset (at the median value) by child ID to avoid inflating standard errors. This information is subsequently merged with data about the child's parent to obtain a measure of the last child born to a given parent. Therefore, I will have a single observation for each child, along with information about the parent of that child.

IPUMS 2000 5% US Census Sample

I use the 2000 5% US sample to complement the analysis on the intergenerational transmission of fertility. To obtain a measure of fertility of children born to given parents, I follow the same procedure used to evaluate investment in children, which is: *i)* I keep observations related to children of the household head (*relate=3*), excluding children in law; *ii)* I then merge children characteristics with information about the household head (*relate=1*) using the household identifier (*serial*). Children below 15 are dropped because below reproductive age. I also drop individuals of age above 90.

Table A1: Summaries 1990 US Census

Full Sample

	count	mean	sd	min	max
Child Ever Born	2103823	2.587654	1.683605	0	12
Nr Children 1	2103823	.7643381	.4244119	0	1
Nr Children 2	2103823	.4094931	.4917404	0	1
Nr Children¿ 3	2103823	.1994426	.3995815	0	1
Spouse not Present	3814783	.1471871	.3542924	0	1
Work Disability	3814783	.0890714	.2848468	0	1
Labour Force Particip.	3814674	.7530882	.431215	0	1
Wage and Salary Income	3814674	17577.5	22700.09	0	197927
Coerced Sterilization	3814783	.0032909	.0572717	0	1
Mother Birth Cohort	3814783	1948.518	12.73693	1900	1975
Youngest Child Cohort	3814783	1978.003	11.2656	1900	1990
Race	3814783	1.486029	1.390004	1	7
Gender	3814783	1.551492	.4973416	1	2
Relation to the Head	3814783	1.681421	1.47193	1	11
Marital Status	3814783	1.623007	1.395166	1	6
Urban/Rural	3814783	1.652549	.4761605	1	2
Citizenship	3814783	.267977	.7962666	0	3
Birth Place	3814783	1.546372	1.792523	1	14

Table A2: Summaries 1990 US Census

Education Sample

	count	mean	sd	min	max
Grade 8	3444513	.5867099	.4924241	0	1
Grade 12	3444513	.2303815	.4210771	0	1
Any College	3444513	.1142832	.318155	0	1
Individual Cohort	3444513	1975.8	9.051618	1902	1987
Race	3444513	1.577327	1.490005	1	7
Gender	3444513	1.472111	.4992217	1	2
Gender Head	3444513	1.249699	.4328386	1	2
Head Marital Status	3444513	1.803982	1.497874	1	6
Youngest Child Cohort	3444513	1978.552	9.39012	1902	1990
Head Highest Education	3444513	6.587933	2.53712	0	11
Head Duncan Socioeconomic Ind.	3444513	37.15589	26.11956	0	96
Head Labour Force Particip.	3444513	1.850223	.3568696	0	2
Head Urban/Rural	3444513	1.653855	.4757403	1	2
Citizenship	3444513	.2813367	.812586	0	3
School Attendance	3444513	1.705402	.455862	1	2

Table A3: Summaries NHIS

	count	mean	sd	min	max
Genital Organ Issues	87736	.0318113	.1754985	0	1
Number of Children	983628	1.030088	1.228165	0	9
Nr Children > 1	983628	.3188482	.4660303	0	1
Nr Children > 2	983628	.1218692	.3271349	0	1
Nr Children > 3	983628	.0387037	.1928878	0	1
Poor Health Dummy	979777	.1263818	.3322794	0	1
Number of Health Cond.	873030	.8700342	1.333058	0	23
Bed Disability	976749	.1161977	.320462	0	1
Alcohol Consumption (1 if ¿10 days)	80028	.0690633	.2535634	0	1
Coerced Sterilization	983628	.0018066	.0424655	0	1
Parent Birth Cohort	983628	1944.524	14.83125	1915	1984
Race	977181	1.424512	1.771076	1	15
Region of Residence	983628	2.542469	1.037598	1	4
Relation to H. Head	983628	14.19271	5.347724	10	22
Gender	983628	1.540554	.4983529	1	2
Youngest Child Cohort	522090	1977.31	9.949697	1891	1995
Marital Status	983628	17.72638	13.70651	0	99

Table A44: Summaries PSID-SHELF

	PSID-SHELF				
	count	mean	sd	min	max
Nr of Child	40488	.5717497	1.159129	0	16
Children >1	40488	.1753112	.3802378	0	1
Children >2	40488	.083358	.276426	0	1
Children >3	40488	.0337137	.1804934	0	1
Parent Earning (real $ 2022)	40352	41866.54	40640.4	0	1185335
Children Earning (real $ 2022)	39913	46353.64	50170.7	0	1567172
Youngest Child Cohort	40488	1988.324	17.96034	1915	2019
Individual Birth Cohort	40486	1984.468	18.84357	1893	2019
Parent Birth Cohort	40486	1957.797	19.42352	1889	2003
Parent Race	37489	3.206514	3.741925	1	14
Children Gender	40488	1.491948	.4999413	1	2
Children Married	39094	.693994	.4608381	0	1
Parent Highest Education Level	40239	1.650339	1.161863	0	4
Children Highest Education Level	22888	1.501442	1.10986	0	4
Children Relation to Ref. Pers.	39411	291.3441	67.7563	100	490
Parent Nr of Children	40488	3.670569	2.241832	1	20
Parent Employment Status	40387	.6733231	.4527859	0	1
Children Employment Status	22779	.5646868	.4760685	0	1

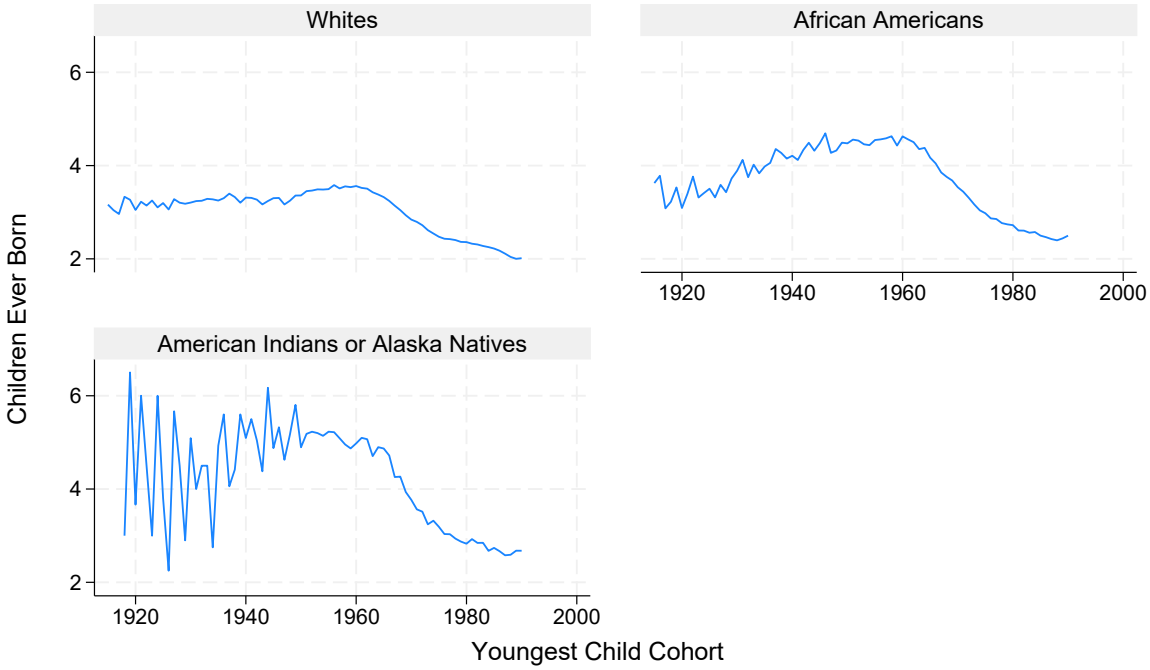
Table A5: Summaries 2000 5% Sample

Children Sample

	count	mean	sd	min	max
Nr of Children	1293049	.1442064	.5215802	0	9
Children > 1	1293049	.0337466	.1805763	0	1
Children > 2	1293049	.0108851	.1037625	0	1
Children > 3	1293049	.003368	.0579368	0	1
Coerced Sterilization	1293049	.0035366	.0593641	0	1
Individual Cohort	1293049	1976.135	9.556953	1911	1984
Parent Cohort	1288733	1948.206	11.25363	1911	1983
Race	1293049	1.955801	1.992661	1	9
Gender	1293049	1.451732	.4976649	1	2
H. Head Gender	1288733	1.332264	.4710251	1	2
H. Head Marital Status	1288733	2.137789	1.670524	1	6
Youngest Child Cohort	1288733	1979.584	11.04714	1911	2000
Parent nr of Children	1288733	2.068231	1.199722	1	9
Duncan Socioeconomic Index	1293049	25.84254	23.12667	0	96
Parent Duncan Soc. Index	1288733	33.94702	26.49292	0	96
Education Level	1293049	5.659253	1.930645	0	11
Parent Education Level	1288733	6.41217	2.59701	0	11
Dummy for Extended Family	1293049	.0804169	.2719376	0	1

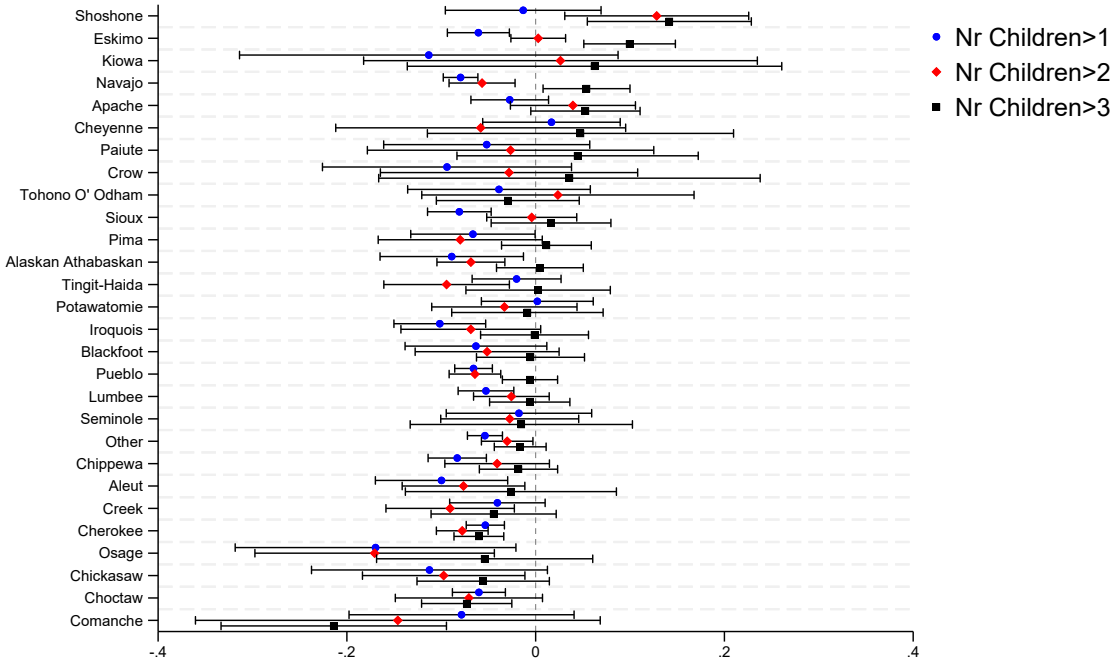
Appendix B - Figures

Figure B1: Children Ever Born by Race



Note: The graph shows the average number of children ever born by race and over the birth year of the last child. The plot reports number of children for Whites, African Americans, and American Indians. Other races are excluded. The larger variability for earlier cohorts among American Indians is due to the relative small number of observations for those years.

Figure B2: Average Treatment Effect by Tribe



Note: The dependent variable is the number of children ever born. The vertical axis reports changes in the number of children ever born. The horizontal reports periods to/from the birth year of the youngest children. Controls include: *i*) Region FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Survey year FE; *v*) Marital status; *vi*) Race; *vii*) Gender; *viii*) Relation to the head; *ix*) Number of children. Clustered standard errors at a primary sampling unit. 5% confidence intervals. .

Appendix C - Tables

Table C1: The Effect of Sterilization on Fertility

	(1) Nr Children	(2) Nr Children> 1	(3) Nr Children> 2	(4) Nr Children> 3
Coerced Sterilization	-0.0766**	0.00710	-0.0236***	-0.0229***
	(0.0378)	(0.00639)	(0.00729)	(0.00662)
Adj.R-squared	0.273	0.090	0.157	0.209
Observation	255468	255468	255468	255468
Treated	7315	7315	7315	7315
Sample Mean	3.069	0.771	0.499	0.302
Clusters	434	434	434	434
Individual Cohort FE	Yes	Yes	Yes	Yes
Youngest Child Cohort FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes
Other FE	Yes	Yes	Yes	Yes

Notes: The table reports estimates using only Whites as a control group. The dependent variable is the number of children ever born (Model 1) and dummies for more than one children in the household (Model 2), more than 2 children in the household (Model 3), and more than 3 children in the households (Model 4). Controls include: *i*) County FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Race; *v*) Marital status; *vi*) Citizenship; *vii*) Birth place; *viii*) Relation to the head; *ix*) Urban/rural residency. Clustered standard errors at a primary sampling unit. *** p<0.01, ** p<0.05, * p<0.1.

Table C2: The Effect of Sterilization on Fertility

	(1) Nr Children	(2) Nr Children> 1	(3) Nr Children> 2	(4) Nr Children> 3
Coerced Sterilization	-0.0619**	-0.0764***	-0.0512***	-0.0110*
	(0.0303)	(0.00674)	(0.00850)	(0.00607)
Adj.R-squared	0.242	0.115	0.171	0.191
Observation	1719756	1719756	1719756	1719756
Treated	7315	7315	7315	7315
Sample Mean	2.491	0.762	0.391	0.179
Clusters	434	434	434	434
Individual Cohort FE	Yes	Yes	Yes	Yes
Youngest Child Cohort FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes
Other FE	Yes	Yes	Yes	Yes

Notes: The table reports estimates using only Blacks as a control group. The dependent variable is the number of children ever born (Model 1) and dummies for more than one children in the household (Model 2), more than 2 children in the household (Model 3), and more than 3 children in the households (Model 4). Controls include: *i*) County FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Race; *v*) Marital status; *vi*) Citizenship; *vii*) Birth place; *viii*) Relation to the head; *ix*) Urban/rural residency. Clustered standard errors at a primary sampling unit. *** p<0.01, ** p<0.05, * p<0.1.

Table C3: The Effect of Sterilization on Fertility Using Data from the NHIS

	Nr Children	Nr Children> 1	Nr Children> 2	Nr Children> 3
Coerced Sterilization	-0.179***	-0.0497***	-0.0586***	-0.0326***
	(0.0481)	(0.0176)	(0.0190)	(0.0119)
Adj.R-squared	0.162	0.153	0.097	0.059
Observation	519024	519024	519024	519024
Treated	1777	1777	1777	1777
Sample Mean	1.940	0.601	0.229	0.073
Clusters	298	298	298	298
Youngest Child Cohort FE	Yes	Yes	Yes	Yes
Individual Cohort FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes	Yes
Other FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is the number of children in the household (Model 1 and dummies for more than one children in the household (Model 2), more than 2 children in the household (Model 3), and more than 3 children in the households (Model 4). Controls include: *i*) Region FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Survey year FE; *v*) Marital status; *vi*) Race; *vii*) Gender; *viii*) Relation to the head. Clustered standard errors at a primary sampling unit. *** p<0.01, ** p<0.05, * p<0.1.

Table C4: Investment in Children Using Data from the NHIS

	(Panel A)		
	Grade 8	Grade 12	College
Coerced Sterilization	0.0132	0.00505	-0.0347***
	(0.00940)	(0.0105)	(0.0114)
Adj.R-squared	0.685	0.540	0.228
Observation	406655	406655	406655
Treated	1729	1729	1729
Sample Mean	0.501	0.251	0.108
Clusters	298	298	298
Individual Cohort	Yes	Yes	Yes
Youngest Child Cohort FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes
Other FE	Yes	Yes	Yes
	(Panel B)		
	Grade 8	Grade 12	College
Coerced Sterilization	0.0182*	0.00999	-0.0283**
	(0.00965)	(0.0111)	(0.0126)
Adj.R-squared	0.687	0.548	0.252
Observation	404338	404338	404338
Treated	1705	1705	1705
Sample Mean	0.500	0.250	0.108
Clusters	298	298	298
Individual Cohort	Yes	Yes	Yes
Youngest Child Cohort FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes
Other FE	Yes	Yes	Yes

Notes: Panel A reports estimates without controlling for the education level and the employment status of the head. Panel B includes these controls. The dependent variable is a dummy for whether the highest completed level of education is grade 8 (Model 1), grade 12 (Model 2), or any college (Model 3). Controls include: *i*) Region FE; *ii*) Individual cohort FE; *iii*) Youngest child cohort FE; *iv*) Survey year FE; *v*) Marital status of the head; *vi*) Gender; *vii*) Gender of the head; ; *viii*) Race; *ix*) Employment status of the head; *x*) Education level of the head. Clustered standard errors at a primary sample unit level. *** p<0.01, ** p<0.05, * p<0.1.

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