I Z A Institute of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 16329

Exposure to the One-Child Policy and Fertility among Chinese Immigrants to the US

Siyuan Lin
Laura Argys
Susan Averett

JULY 2023

DISCUSSION PAPER SERIES

IZA DP No. 16329

Exposure to the One-Child Policy and Fertility among Chinese Immigrants to the US

Siyuan Lin
Lehigh University

Laura Argys
University of Colorado Denver, CUPC and IZA

Susan Averett
Lafayette College and IZA

JULY 2023

ISSN: 2365-9793

IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Exposure to the One-Child Policy and Fertility among Chinese Immigrants to the US*

We examine whether women exposed to China's one-child policy (OCP) change their fertility decisions when they migrate to a country without fertility restrictions. Using American Community Survey data (2010–2020), we compare the childbearing decisions of Chinese-born women with varying degrees of exposure before migrating to the US to each other and a control group of other Asian immigrants. We find that Chinese women aged 35-45 exposed to the OCP for a longer duration have significantly fewer children than women who were not exposed to the OCP. These findings are robust to several specification checks.

JEL Classification: F22, I15, J13, N35

Keywords: fertility, one-child policy, immigrants, China

Corresponding author:
Susan Averett
Department of Economics
Lafayette College
216 Simon Center
Easton, PA 18042
USA
E-mail: averetts@lafayette.edu

* We thank Angela Dills, Wei Fu, Alícia Adserà, and participants at the Lehigh University seminar series for helpful comments on earlier drafts.

1 Introduction

In the early 1970s, due to concerns that the rapidly increasing population would strain resources and lead to a reduced standard of living, Chinese leaders enacted the one-child policy (OCP), which became effective in 1980. The OCP was one of the most restrictive fertility policies ever enacted and was strictly enforced with a system of economically harsh penalties accompanied by widespread propaganda espousing the benefits of small family sizes and low population growth. These restrictions were in effect for decades (1980-2015), and recent generations of Chinese adults primarily grew up subject to this fertility policy. In this paper, we provide the best evidence to date regarding whether growing up under the strict family planning requirements of the OCP changed later-life fertility decisions. Because we cannot examine changes in unrestricted fertility among women who remained in China and were subject to the OCP, we analyze the fertility outcomes of first-generation Chinese immigrants in the US who grew up with varying degrees of exposure to the OCP.

Our focus on first-generation Chinese immigrants to the US has several advantages: first is the absence of any restrictive family planning policy in the US. Compared with their peers remaining in China, Chinese women who immigrated to the US for at least some portion of their childbearing years can make their fertility decisions in an environment of unrestricted fertility. Second, the implementation of the OCP in China was heavily enforced, widely communicated, and long-lasting. Thus, all Chinese immigrants, despite their family background, were exposed to the intense anti-natalist efforts that were part of the OCP. Third, focusing on Chinese migrants has the advantage of leveraging a woman's differential exposure to the OCP based on her birth year and timing of migration. Fourth, Chinese immigrants to the US comprise the third largest origin group among all US immigrants assuring us of a large sample size for estimation purposes (Rosenbloom & Batalova, 2023). Furthermore, the fact that the US is also one of the largest destinations for immigrants from other Asian countries/regions provides a sizeable potential control group.

Our work contributes to an extensive literature examining the OCP's effects on various outcomes (see Zhang (2017)). In particular, we posit that exposure to the fines and propaganda associated with the OCP altered social norms surrounding the appropriate family size and dampened the fertility preferences of women growing up in China during this period. This is important because, in the 2010s, anticipated population decline attracted global attention and prompted reconsideration of the OCP. In 2016, the OCP became the two-child policy, and in 2021 the three-child policy was introduced. However, some have argued that the relaxation of the OCP is unlikely to boost fertility because having one child has become the social norm in China, and it is a legacy that will be felt for decades to come (Zraick, 2015). Our results support this conjecture: the longer a woman was exposed to the OCP, the lower her subsequent fertility.

The remainder of the paper proceeds as follows. In Section 2, we provide the history and background of fertility policy in China. In Section 3, we summarize the findings of papers that have looked at the impact of the OCP on fertility outcomes in China. Section 4 briefly discusses economic literature highlighting the two potential channels through which the OCP is expected to impact the fertility decisions of immigrants. Section 5 describes the data, and Section 6 presents the empirical model. The results are shown in Section 7, and we report the results of several robustness checks in Section 8. Section 9 concludes and discusses the policy implications of the main findings.

2 Fertility Policy in China

The OCP, launched at the end of 1979, restricted couples to having only one child.[1] In this section, we provide some background about China's fertility and this policy for context.

In the post-World War II era, China's population grew rapidly as the country stepped into industrialization. The total population in China increased from 541.7 million in 1949 to 662.1 million in 1960 (National Bureau of Statistics of China, 2020). During this time, the Chinese government saw both advantages and disadvantages of a large population.

The central government came to believe that endorsing contraception and slowing down population growth was vital to liberating women and boosting the economy. In December 1973, the Chinese government launched the “Later-Longer-Fewer” (LLF) campaign (Greenhalgh & Winckler, 2005). This campaign encouraged later marriage, longer intervals between children, and fewer children. The theme of the LLF was “One child isn’t too few, two are just fine, and three are too many.” Couples were to achieve these goals by using various birth control methods. As shown in figure 1, with the effort of these voluntary family planning programs, the Total Fertility Rate (TFR) in China dropped from its peak value of 6.4 in 1965 to 2.75 in 1979 (The World Bank, 2020). Still, the population continued to grow, which was believed to be an obstacle to implementing economic reform and improving living standards.

In response to continuing population concerns, the Chinese government announced the OCP in December 1979. The OCP was maintained through a system of incentives, including cash subsidies, health subsidies, access to better housing, and extra food rations for families adhering to the policy. In contrast, families violating the policy have been required to pay substantial monetary penalties and, in some cases, have been denied bonuses or advancement at their workplace. Higher parity (out-of-plan) children were provided only sub-standard state-supported medical care and education, and their families did not qualify for the allocation of food or land typically offered for additional family members (Short & Zhai, 1998).

As the OCP came into effect, information was widely disseminated. Posters were seen throughout the country, such as those that displayed the “one couple, one child” motto so that all couples would be aware of the new regulations (Nie & Wyman, 2005). Other posters urged families to “Do a good job in family planning to promote economic development" (Zhang, 1986). Couples who had given birth to one child received "One Child Honorary Certificates" in which they pledged not to bear any more children (Feng *et al.*, 2014). Most families reported awareness of the current family planning policy through various means (Huang *et al.*, 2021). This exposure to a small family ideology contributed to a social norm of smaller families. After adopting the strictly-enforced OCP, figure 1 shows the TFR in China continued to fall, reached 1.60 in 1997 and then was relatively flat for decades until a very recent decline. Given the focus on having only one child, the strict nature of the enforcement of the OCP, and the long-lasting influence of the OCP, we focus on the impact of exposure to the OCP on subsequent childbearing.[2]

3 Previous Work on the OCP and Fertility

The TFR in China continued to drop after the enactment of the OCP, but a causal relationship is hard to establish. One concern is potential policy endogeneity. In other words, the introduction of the policy may be correlated with changes in socioeconomic factors that may also directly affect fertility. In addition, because the OCP was a national policy enacted at a single point in time, researchers have had to be clever to find policy variation to exploit to identify a potentially causal effect. One approach has been to use regional variation in the OCP within China. For example, several scholars examined differences in the number of children allowed in rural versus urban areas and geographical variation in the fines assessed for violating the OCP (McElroy & Yang, 2000; Ebenstein, 2010; Liu, 2014; Huang *et al.*, 2021). Another source of variation used to identify the effects of the OCP focuses on differential policy treatment by ethnicity. In particular, people of the majority Han ethnicity faced stricter fertility limits than minority ethnic groups in China (Li & Zhang, 2007; Pan & Liu, 2021).[3] Using these approaches, researchers have confirmed that the OCP has affected various fertility outcomes. For example, Huang *et al.* (2021) find that experiencing larger monetary penalties during early life led to lower fertility, higher education, and later marriage. Other scholars, using county variation in the magnitude of penalties, found that higher financial penalties are associated with smaller family sizes in rural China (McElroy & Yang, 2000).

In addition to its impact on fertility/family size, evidence suggests that the OCP impacted the sex ratio at birth. A restriction on the number of children, combined with a strong culture of preference for male children, is expected to increase the sex ratio at birth, defined as the proportion of male children to female children born. Using identification strategies similar to those described above, researchers have found that the sex ratio at birth rose dramatically after the implementation of the OCP and more notably in areas with higher fines for additional children (Ebenstein, 2010; Li *et al.*, 2011; Chen & Zhang, 2019).

Because the OCP results in an exogenous reduction in family size, research using the OCP has also contributed to our understanding of the quantity-quality trade-off. This theory suggests that parents, facing time and income constraints, will respond to having fewer children by investing more in them (Becker, 1960). Although Qian (2009) finds unexpectedly positive effects of the relaxation of China's OCP on the school enrollment of the first child for rural families, most research in this area finds empirical evidence confirming the existence of a quality-quantity trade-off in which smaller family size results in higher levels of school enrollment of each child (Rosenzweig & Zhang, 2009; Liu, 2014; Huang, 2015; Argys & Averett, 2019; Pan & Liu, 2021).

To understand how the OCP affects desired fertility, we need to observe women exposed to the OCP but whose current/adult fertility is not restricted. Hence our focus on immigrants is essential. This approach is similar to that used by Argys & Averett (2019), who examine the educational attainment of Chinese migrants to the US who were born before and after the enactment of the OCP. Their findings that fewer siblings in one's family of origin results in greater educational attainment, combined with the important role that women's education plays in fertility decisions, suggest the need for careful attention to the role of education in our models.

4 Determinants of Immigrant Fertility

As noted above, our focus is on the fertility of Chinese immigrants to the US. In addition to the components of the standard theoretical model of fertility (Becker, 1960), examining the fertility of migrants also necessitates capturing factors from their country of origin that may shape their fertility preferences.

There are two channels through which the OCP may potentially influence the fertility decisions of female immigrants. Culture or social attitudes have long been recognized as important determinants of preferences for completed family size. Thus we can view the OCP as a diffusion of small family culture over time. A second channel through which the OCP may affect the fertility of immigrant women from China is its effect on the number of siblings in a woman's natal family. Those who grew up with few siblings may have developed a preference for a smaller family. The presence of the OCP at the time of a woman's birth would exogenously alter the likelihood of her having few or no siblings. In the following subsections, we discuss literature relevant to these two channels separately.

4.1 Culture and the Fertility Decision

Fertility preferences are shaped by family background and social norms related to family size and gender roles. As noted earlier, in addition to the environment in which they currently live, immigrants bring their cultural preferences to the fertility decision from their country of origin.

Economists report consistent evidence of the effects of home culture on the fertility of first- and second-generation immigrants (Blau, 1992; Mayer & Riphahn, 2000; Fernández & Fogli, 2006, 2009; Di Miceli, 2019). A common measure of cultural influence included in these models is the level of fertility in one's country of origin. Home-country/region fertility typically exerts a positive impact on subsequent immigrant fertility. Although the evidence is mixed overall, some consistent findings are that the home country's cultural effects are most pronounced for first-generation immigrants (Mayer & Riphahn, 2000) and that there exists inter-generational transmission of female gender roles (Blau *et al.*, 2013).

The OCP was notable for its attempts to shape a small family culture and frame low fertility to improve economic well-being. A critical channel of promoting the OCP in China has been through propaganda disseminated via government billboards and posters (Dodge & Suter, 2008; Alden, 2020). This propaganda achieved two main goals: reconciling the resistance to the OCP provoked by the "son-preference" culture and defining adherence to the OCP as a civic duty (Gupta *et al.*, 2003). To fulfill the first goal, the government used slogans stating that girls and boys are of equal value, such as "girls can also maintain family heritage." To promote the second goal, emphasizing the civic importance of compliance with the OCP, the government used slogans such as "Do a good job in family planning to promote economic development," "Carry out family planning, implementing the basic national policy," and "It is the right and obligation for citizens to carry out family planning." Since these government campaigns were commonly seen throughout China, exposure to this barrage of OCP propaganda may permanently shape a woman's fertility preferences (Nie & Wyman, 2005).

4.2 Family Size and Fertility Decisions

In addition to potentially changing preferences through propaganda, the exogenously-imposed OCP was followed by a reduction in fertility. Recognizing that the structure of one's family of origin can also shape fertility preferences into adulthood introduces a second mechanism by which the OCP may alter fertility. The idea that one's natal family size (i.e., the number of siblings an individual has) may influence one's fertility is not new. Extensive literature in demography examines the association between the number of siblings and the number of own children.

Beaujouan & Solaz (2019) summarize the research on the effects of family size on subsequent childbearing decisions in developed countries. A positive link between the number of siblings and one's fertility seems to have withstood the widespread changes in families in developed countries during the twentieth century, though most of these studies focused on inter-generational fertility in Europe and North America. In addition to any correlation across generations that would be caused by a genetic transmission of diminished fertility, this research suggests there is a substantial role played by the socialization that occurs growing up in a small or large family (and having one's close peers in similarly sized families) in determining fertility preferences as an adult.

Although the pre-OCP family planning in China was technically voluntary, it also included coercive measures (Whyte *et al.*, 2015; Zhang, 2017), suggesting that women born in China during this period experienced some exogenous increase in the probability of growing up as an only child. This became more pronounced for women born after the implementation of the OCP. Women who migrate from China to the US may adopt this intrafamily norm (Booth & Kee, 2009).

Although the effect of a woman's natal family size on her fertility decision is not the main focus of this paper, we acknowledge its importance and include proxies for natal family size in many specifications to confirm the cultural-influence interpretation of our estimate of the impact of exposure to the OCP on fertility.

5 Data

The 2010-2020 American Community Survey (ACS) is the primary data source for this project. The ACS is an annual national survey collecting data and producing information on the US population's social, economic, housing, and demographic characteristics (U.S. Census Bureau, 2017). Every year, the US Census Bureau contacts over 3.5 million households nationwide to participate in the ACS, representing 1% to 3% of the total population. Our main sample consists of first-generation female Chinese immigrants to the US.

The ACS is well-suited for our study in that it collects information on country of birth, year of migration, age at migration, and many sociodemographic variables. In our models, we control for a woman's education,[4] her unearned income (which includes her spouse's earnings if she has one), her birth year, her marital status when appropriate, and her residential location. We also control for her English language proficiency and citizenship status. In some models, we control for spousal characteristics for currently-married women.[5]

Our preferred outcome variable for this study is the number of children ever born to a woman, which is no longer directly asked in the ACS. To capture this variable, we rely on reports of the number of own children in a household at the time of the survey.[6] We seek to identify a sample of female respondents who have likely completed their childbearing and whose children are not old enough to have moved out of their parent's homes. To this end, we select a sample of women between the ages of 35 and 45 for our analysis.

This sample restriction is informed by age-specific fertility rates, a woman's biological clock, and the behavior of any of her grown children. In 2010, when our data began, the age-specific fertility rates for women in the US show that the maximum rate of nearly 100 births per 1,000 occurs between the ages of 25 and 29. The fertility rate for women between the ages of 35 and 39 drops by more than half to 45.9 births per 1,000 women. Most importantly, for women between the ages of 40-44, the fertility rate is only about 10 births per 1,000 women (Hamilton *et al.*, 2011).

To determine the upper end of the age range, we investigate the age of menopause and the likely age at which older children move out of their parent's home. The average menopause age in China is 48.7 (Wang *et al.*, 2021).[7] Furthermore, children are likely to leave their parent's home at age 18. Given that the mean age of first-time mothers in 2000 is 24.9 years, women in our sample would expect their eldest child to leave the household when their mothers are nearing 45 years of age (Mathews & Hamilton, 2016). Our focus on women aged 35-45 years is a cohort born in China between 1965 and 1985, who have likely finished their childbearing but whose children are likely to still be at home.[8] We further restrict our sample to individuals who migrated to the US by age 30 to ensure that these women have time to have additional children in the US.

To verify if our age restriction likely captures a woman's completed fertility, we plot the reported number of own children in the household for our main sample as shown in figure 2.[9] The maximum values of the number of children in the household for this group is attained when women are between the ages of 37 and 43. We conduct robustness checks using this smaller age range to be sure that possible measurement error in our dependent variable does not alter the significance of our results.

The primary independent variable of interest is the fraction of years between the ages of 6 and 30 (after beginning school and before the maximum age of migration to the US) that a woman lived in China while the OCP was in effect.[10] Exposure to the OCP varies by the woman's birth year and the year she migrated from China to the US. In our sample, we have limited the oldest age of migration to age 30, as described earlier, which corresponds to a maximum of 25 years of exposure to the OCP. This calculation of OCP exposure is detailed in the matrix below.

	Arrived before 1980	Arrived at and after 1980
Born before 1975	0	$\frac{Year\, Arrived\, in\, the\, US - 1980}{25}$
Born during and after 1975	0	$\frac{Year\, Arrived\, in\, the\, US - Year\, Aged\, 5}{25}$

As shown in the first column, if a woman migrated from China to the US before 1980, regardless of her birth year, her exposure to the OCP is zero because the policy had not yet been implemented. For those who arrived in or after 1980, who were born before 1975, their exposure after age 6 begins with the introduction of the OCP in 1980 (row 1, column 2) and continues through her age at migration. A woman born during and after 1975 was exposed continuously from age 6 until she migrated (row 2, column 2). A woman in this group could be exposed to the OCP for 100 percent of her school and early reproductive years if she migrated to the US at the age of 30.[11] Figure 4 shows the distribution of OCP exposure among Chinese immigrants.

Because exposure to the OCP could alter fertility through exposure to a small family culture or from growing up in a small family, in some specifications, we include one of two additional variables intended to capture the likelihood of being raised in a small family. The first is our estimate of the probability that an individual grew up in a single-child family and is calculated using data from the various years of the Chinese census. See Appendix A for details regarding the data source and derivation of this variable. The second variable we use to proxy for natal family size is the TFR in China in a woman's birth year.

In some specifications, we also use a control group of immigrant women from other Asian countries/regions to address issues of selection into migration and to address the likelihood that the fertility of Asian immigrants may rise as they assimilate into the norms of their new country. For our control group, we select women who originate from countries/regions that are geographically and culturally close to China but did not have a fertility policy as centralized, punitive, and long-lasting as the OCP. These countries/regions include Hong Kong, Malaysia, Singapore, South Korea, and Taiwan. Measures of the TFR are available for all of these countries from the World Bank.[12]

Table 1 presents the means and standard deviations of our outcome and control variables for the full treatment and control samples and currently-married subsamples. Beginning with the full sample and currently-married samples for Chinese immigrants shown in columns 1 and 2, we note that, as expected, women in the currently-married sample report more children in their households (1.64) than the full sample (1.44). Women in the full- and currently-married samples migrated to the US at similar ages (21.97 vs. 22.4). They were exposed to the OCP for a similar duration (.42 versus .43). The majority

(78 percent) of the full sample are currently married, and among those 29 percent were married in China. As expected, the married sample's unearned income (total income net of the woman's earnings) is higher. The two samples are very similar across other characteristics, including levels of education, English ability, and citizenship status.

In columns 1 and 3, we compare the Chinese sample to the Asian sample. All the mean values are significantly different at the 1% significance level, except for the "Years in the US (19-27 Years)" and "Speaks English Very Well" variables. Chinese women migrated to the US at older ages on average than women from the control group. Compared with Chinese women, women in the control group are less likely to be currently and previously married, and, not surprisingly, their average number of children is smaller. They have higher educational attainment and better English language proficiency. In addition, the Asian control group reports higher unearned income, is less likely to live in a metropolitan area, and a higher proportion are US citizens. Since their home countries/regions initiated family planning programs in the 1960s (rather than the 1970s), their average birth year TFR is smaller than the TFR for Chinese women.[13] We include these control variables in our models. We further address these differences in our robustness checks.

Columns 2 and 4 of Table 1 present descriptive statistics for the currently-married treatment and control samples. All the mean values are significantly different at the 1% significance level, except for the "Years in the US (19-27 Years)" and "Speaks English Very Well" variables. Women's characteristics and residential patterns are similar to the full sample, although Chinese and Asian currently-married women are more similar regarding the number of own children in their household. For currently-married women, we report the characteristics of their husbands. For the most part, the pattern of spouses' characteristics mirrors women's characteristics, with reports of higher education and better English proficiency among spouses in the control group. Chinese women are much more likely to migrate after marriage and hence more likely to marry men from their home country.

6 Empirical Model

We first estimate a baseline empirical model for the sample of Chinese women who immigrated to the US:

$$E(Y_{isbt}|\mathbf{X}) = \exp(\alpha + \gamma OCP\ Exposure_i + \lambda Birth Year_b + \kappa Birth Year_b^2 + \rho_s + \tau_t). \qquad (1)$$

In the above equation, i indexes the individual, s the state of residence, b the individual's birth year and t the survey year. Our dependent variable, Y_{isbt}, is the number of own children in a household. All models include a linear and quadratic birth year trend to control for temporal changes in fertility, state of residence fixed effects to account for any regional differences in fertility and survey year fixed effects.

Because OCP exposure is calculated for all observations in the sample of female Chinese immigrants, the coefficient γ captures the change in the number of children for women with varying degrees of exposure to the OCP.[14]

The dependent variable, the number of own children in the household, is measured as an integer. Count models are usually used in estimating non-negative response variables such as this (Cameron & Trivedi, 2005). As is found in many other studies of the number of children ever born, our estimation of a Poisson model revealed that the children in the household data are under-dispersed (Wang & Famoye, 1997; Harris *et al.*, 2012). The Generalized Poisson regression model is appropriate for under-dispersed household fertility data (Harris *et al.*, 2012). All models are estimated using the ACS person weights, and in this model, we cluster standard errors by year of birth and age arrived in the US to account for both correlation by age and length of time in the US.

As discussed above, to disentangle the two channels through which the OCP alters fertility, we also estimate an alternative specification intended to separate the small family culture effect (captured by OCP exposure) from the size of a woman's family of origin. The ACS does not include data on the size of a woman's natal family, so we proxy for this in two alternative ways. The first is a measure of the probability of a woman growing up as an only child, $Pr(sib = 0)$. Using Census data from China we calculate predicted probabilities of being an only child dependent on a woman's year of birth. The distribution of $Pr(\hat{sib} = 0)$ by birth year is included in appendix figure A.1. The predicted probability of growing up in China as an only child declines prior to 1975, after which it begins to rise and continues its dramatic increase throughout the implementation of the OCP. Details regarding the creation of $Pr(\hat{sib} = 0)$ are discussed in appendix A. The second approach is to include the TFR in the year the woman was born. This model is specified as follows:

$$\begin{aligned} E(Y_{isbt}|\mathbf{X}) = \exp(&\alpha + \gamma OCP\ Exposure_i + \delta Pr(\hat{sib} = 0)_b / TFR_b \\ &+ \lambda BirthYear_b + \kappa BirthYear_b^2 + \rho_s + \tau_t). \end{aligned} \tag{2}$$

As mentioned earlier, we also use a control group comprised of female immigrants from other Asian countries/regions. The data necessary for the calculations of $Pr(sib = 0)$ is not available for all countries/regions represented in our Asian control group. Therefore only TFR is used as a control for natal family size for this sample. Because the control group consists of women who migrated from multiple countries/regions, we include a new subscript, c, to index the country/region of birth. γ remains the coefficient of interest. In this specification, we include country/region of origin fixed effects. We then interact the birth year trend with an indicator that a woman was born in China to allow for differential birth year trends for the treatment and control groups. The specification for models that include this control group is:

$$\begin{aligned} E(Y_{iscbt}|\mathbf{X}) = \exp(&\alpha + \gamma OCP\ Exposure_i + TFR_{cb} + \eta Chinese + \lambda BirthYear_b \\ &+ \theta(BirthYear_b \times Chinese_i) + \kappa(BirthYear_b^2 \times Chinese_i) + \zeta_c + \rho_s + \tau_t). \end{aligned} \tag{3}$$

Most of our sample is married, thus we also estimate models using a currently-married sample which allows us to control for a woman's place of marriage.[15] Since exposure to the

OCP in China is influenced largely by the timing of migration to the US, one may be concerned that OCP exposure is capturing exclusively less time to assimilate to US fertility levels rather than the influence of the OCP while in China. To disentangle the assimilation effects from the cultural influence of the OCP on fertility, we add in a set of dichotomous variables indicating the number of years spent in the US.[16] This specification is as follows:

$$\begin{aligned} E(Y_{iscbt}|\mathbf{X}) = \exp(&\alpha + \gamma OCP\ Exposure_i + TFR_{cb} + \eta Chinese + \lambda BirthYear_b \\ &+ \phi \mathbf{A}_{iscbt} + \psi M_{iscbt} + \theta(BirthYear_b \times Chinese_i) + \kappa(BirthYear_b^2 \times Chinese_i) \\ &+ \zeta_c + \rho_s + \tau_t). \end{aligned} \tag{4}$$

In this alternative specification, we add in the set of dummies controlling for women's years spent in the US ($\mathbf{A}$) and a dichotomous variable controlling for whether the woman was married when she migrated (M). Estimation using the Asian control group will identify these assimilation effects on fertility for a group unaffected by the OCP. For all models with the Asian control group, we cluster standard errors by year of birth, age arrived in the US, and country/region of origin. Birth year clustering accounts for correlations by age. Clustering by the age that women arrived in the US accounts for correlations in assimilation to US culture and country/region of origin clustering accounts for correlations within the home country/region.

Finally, we specify a fully saturated model for currently-married women for both the Chinese sample and the sample that includes the Asian control group. These equations are as follows:

$$E(Y_{isbt}|\mathbf{X}) = \exp(\alpha + \gamma OCP\ Exposure_i + \delta TFR_b + \beta\chi_{isbt} + \lambda Birth\,Year_b + \kappa Birth\,Year_b^2 + \rho_s + \tau_t). \quad (5)$$

$$E(Y_{iscbt}|\mathbf{X}) = \exp(\alpha + \gamma OCP\ Exposure_i + \delta TFR_{cb} + \beta\chi_{iscbt} + \eta Chinese + \lambda Birth\,Year_b + \theta(Birth\,Year_b \times Chinese_i) + \kappa(Birth\,Year_b^2 \times Chinese_i) + \zeta_c + \rho_s + \tau_t). \quad (6)$$

The individual-level covariates in the vector χ include the previous assimilation variables, marital status at the time of migration, years of education, unearned income[17], citizenship status[18], English language proficiency, metropolitan status, and spousal characteristics. Because this model uses the Asian control group, we use the birth year TFR to control for the woman's natal family size in the Chinese sample.

7 Results

7.1 Fertility among Chinese Immigrants

We begin our empirical analysis by estimating the baseline specification of equation 1 exclusively for women who migrated from China to the US. Selected estimates are reported in table 2 for three different samples of Chinese women. The first column reports results for the full sample, including all women regardless of marital status. The second column includes only women who were ever married (both currently- and previously-married women). The last column reports regression results exclusively for currently-married women.

The IRR in column 1 indicates that if a woman were fully exposed to the OCP between the ages of 6 and 30 (i.e., her OCP exposure was equal to 1), the number of her children in her household would be .983 of the number of children of a woman who was never exposed to the OCP. An easier way to interpret this estimate is to recognize that this represents 1.7 percent $((1 - .983) * 100)$ fewer children for women fully exposed to the OCP, as shown in square brackets in row 3 of column 1, although the estimated coefficient for the full sample does not reach conventional levels of statistical significance.

Decision-making about fertility will likely differ depending on a woman's marital status. Columns 2 and 3 present the same specifications as column 1 for ever-married and currently-married women, respectively.[19] The general finding, that longer exposure to the OCP is associated with fewer children, is evident across all samples and is more precisely estimated for ever- and currently-married women than for the full sample that includes never-married women. As expected, results are more pronounced for ever-married women, particularly for those who are currently married, where full OCP exposure results in a 14.8 percent decrease in the number of children compared to currently-married Chinese immigrants who were never exposed to the OCP, as shown in row 3 of column 3.

In the next specification, shown in table 3, we aim to separate the mechanisms through which OCP exposure affects fertility. To do so we estimate equation 2 including one of the two variables intended to capture the size of a woman's natal family, $Pr(\hat{sib} = 0)$ or the TFR in her year of birth. Results from regressions incorporating these variables for the sample of Chinese women are shown in table 3. The odd-numbered columns control for $Pr(\hat{sib} = 0)$, and the even-numbered columns control for TFR. After netting out the effect of a woman's natal family size on her fertility, the effect of OCP exposure on fertility is only slightly smaller than the results in table 2. This is true regardless of which measure we use to control for natal family size.

7.2 Selection into Migration: Introduction of an Asian Control Group

One concern with our method would be that non-random selection into migration might bias our results. One source of selection into migration would be if Chinese women nearing their childbearing years selectively choose to migrate to the US to avoid the restriction imposed on their fertility by the OCP. Because this would select women with higher desired fertility, the presence of this type of selection would bias our results toward 0. To address this concern, we introduce a control group of women who migrated from countries/regions that are culturally similar and geographically close to China, as described in section 5. These women also faced the challenges of migration and adjusting to life in the US but were not exposed to the OCP. Including this control group is important as it allows us to disentangle any fertility assimilation patterns experienced by all immigrant women from the effects of exposure to the OCP exclusive to Chinese women.

Because our paper aims to investigate the long-term effect of exposure to a coercive anti-natalist policy on fertility, we need to understand whether women in our control group were exposed to similar policies in their countries/regions of origin. The programs in these countries/regions typically provided voluntary contraception access and, therefore, were less punitive, heavy-handed, and long-lasting than the OCP. An exhaustive description of all these family planning policies is beyond the scope of this paper, but we mention each briefly here. Beginning in the 1950s, the Family Planning Association of Hong Kong became responsible for informational and educational activities to motivate couples to begin contraceptive practices (Chan, 1976). The Singapore Family Planning Association conducted its first family planning campaign in 1960, and by 1966, the government had inaugurated the Family Planning and Population Board (Singh *et al.*, 1989). Following a successful pilot experiment in Taichung City, Taiwan extended its family planning program across the island in 1963 (Cernada *et al.*, 2007). Influenced by the successful pilot studies in Taiwan, South Korea soon incorporated family planning features into their national policies (Yang & Watson, 1973). In 1966, the Family Planning Act became law in Malaysia (bin Marzuki & Love, 1968).

Table 4 reports estimates from equation 3, where we introduce the control group of women who immigrated to the US from other Asian countries/regions and had no exposure to the OCP. We continue to find that exposure to the OCP exerts a negative and significant impact on fertility for ever-married and currently-married women that is more pronounced for currently-married women. The magnitude of the effect for currently-married women indicates that complete exposure to the OCP would lower the number of children by 14.5 percent on average compared to Chinese women who were not exposed to the OCP *and* immigrants from other Asian countries/regions. The finding that estimates of the impact of OCP exposure are robust to adding a control group of immigrants from different countries/regions unaffected by the OCP increases our confidence that Chinese immigrants are not selected for migration differently than other Asian migrants.

We now turn to the estimation of equation 4 where we disentangle the effect of assimilation from the cultural influence of the OCP on fertility. To capture assimilation, we add a set of dichotomous variables indicating the number of years spent in the US. In addition, we include an indicator of marital status before migration. The estimates of the effect of exposure to the OCP from this specification now reflect the influence of the anti-natalist impact of the OCP over and above the typical immigrant fertility assimilation. In all of the following tables, because three-quarters of our sample are currently-married women and non-marital fertility is relatively rare among Chinese women,[20] we focus on models estimated only for the currently-married sample.[21]

Estimates of the impact of OCP exposure controlling for time spent in the US are shown in table 5. The assimilation effects (not shown here) demonstrate that the fertility of Asian immigrants increases as the number of years a woman spends in the US rises. This is consistent with the oft-found result that the fertility of migrant women tends to assimilate to the fertility of women in the host country. Nevertheless, the negative effect of OCP exposure on fertility is still evident, even controlling for changes in fertility due to assimilation.

Tables 6 and 7 present results from estimating equations 5 and 6, which include the full set of controls for the Chinese and Asian currently-married samples respectively. In these specifications, we add controls for women's individual-level covariates including years of education, unearned income, citizenship status, English language proficiency and metropolitan status. In recognition of the fact that the father's preferences are part of the fertility decision, in the second column of tables 6 and 7 we also control for his country/region of birth, age, education, English language proficiency, and citizenship status. These fully saturated models confirm the previous negative impact of OCP exposure on the subsequent fertility of Chinese immigrant women. These results are similar whether or not we control for spouse characteristics. Our preferred specification is reported in column 2 of table 7, which includes all possible covariates, including spouse characteristics, and uses the Asian immigrant control group. In this specification, full exposure to the OCP decreases fertility by over 7 percent compared with Asian immigrant women who were not exposed to the OCP.

8 Robustness Checks

In this section, we test the sensitivity of our estimates to a number of modifications. These robustness checks are based on our preferred specification and estimated on the sample of currently-married women. We start with table 8 where we explore changing functional form, excluding the mother's education, changing the definition of OCP exposure, adding a control for LLF exposure, and further restricting the age of our sample.

The estimates in columns 1 and 2 investigate the magnitude of any difference between the Generalized Poisson and OLS estimates. To facilitate the comparison, in column 1, we first repeat the Generalized Poisson results from our preferred specification shown initially in column 2 from table 7. The OLS regression results with the same sample and control variables are shown in column 2. To make reliable comparisons between results from Generalized Poisson models and OLS models, we conduct back-of-the-envelope calculations to convert the OLS estimates in row 1 to ratio change estimates in row 3.[22] The results in row 3 of column 1 and column 2 are strikingly similar.

The specification in column 3 replaces the linear birth year trend with a set of birth year dummies to allow for more flexibility in estimating cohort fertility effects. The estimate of the impact of OCP exposure on fertility remains essentially unchanged. Because it has been found that the OCP has increased women's education (Argys & Averett, 2019), column 4 excludes controls for the woman's years of schooling. The significant negative effect of OCP exposure remains whether education is controlled or not.

The specification in column 5 uses an alternative definition of OCP exposure (during fertile years between the ages of 15 and 35 rather than beginning at age 6).[23] Although the original model assumes that the salient period for exposure to the OCP begins when a young woman starts school and is aware of the family size of her peers and she becomes aware of the limits placed on her reproductive freedom, the results in column 5 that measure exposure to the OCP over an older age range also demonstrate a strong negative effect on fertility.

Recognizing the introduction of an anti-natalist policy under the LLF in 1973, we added a control for LLF exposure between the ages of 6 and 30 in the specification reported in column 6. These results demonstrate the effect of exposure to the OCP persists after controlling for any additional exposure to the LLF. Finally, we assess the sensitivity of our results to potential mismeasurement of completed fertility. This mismeasurement could occur either because women had not completed their fertility by age 35 or children had moved out of the home for women at the upper end of our age range at 45. In the last column, we narrow the age group to women between the ages of 37 to 43. The negative and significant impact of OCP exposure on fertility remains.

We then test the sensitivity of our results to alternative control groups. We first introduce an alternative control group of American-born women whose first or second ancestry category is self-reported as Chinese, Hong Kongese, or Taiwanese. The use of a native-born control group helps address another type of selection that may occur if migrants behave differently from non-migrants. For example, migrant women might be considered to be risk-takers since they have decided to adapt to living in a new cultural environment. Table 9 consists of four columns shows the results of this exercise. In the first two columns, we do not control for assimilation. Column 1 does not control for spouse characteristics, while column 2 does. The results in these two columns are nearly identical. In the last two columns of table 9, we add the controls for assimilation. Column 3 does not control for spouse characteristics, while column 4 does. The results in columns 3 and 4 are quite similar, but as before, the inclusion of assimilation accounts for part of the negative effect of OCP exposure on fertility. With controls for assimilation and spouse characteristics, the specification in column 4 is most similar to our preferred specification.[24] This result indicates the number of children in the household is 26.5 percent smaller for a woman fully exposed to the OCP compared to those not exposed when using a native-born control group.

Finally, in table 10, we continue our exploration of alternative control groups by employing propensity score matching (PSM) and removing countries/regions one at a time from the control group to cross-validate our results. PSM gives us a control group that is more closely matched to our treatment group regarding the sample means presented in column 2 of table 1.[25] The use of this control group suggests an even larger negative and significant effect. In columns 3 through 7, we cross-validate our results by removing one country/region from the control group at a time. Regardless of the country/region removed, the results are qualitatively similar.

In the last column of table 10, we present the results of a falsification test. In this specification, we no longer use the Chinese sample. Instead, we treat the control group of immigrants from other Asian countries as if they were exposed to the OCP calculating OCP exposure in the same way as we did for the Chinese sample. Because this group was not exposed to the OCP, we expect no effect, and our results are consistent with this expectation. The results of this falsification test further increase our confidence that our estimates of the effect of exposure to the OCP are not spurious but, indeed, a reflection of the OCP's effect on Chinese immigrants' fertility.

9 Conclusion

The response by the Chinese government to concerns about overpopulation was to enact arguably the most restrictive fertility policy in recent history that lasted for more than three decades. In this paper, we ask whether exposure to such a restrictive policy and its influence in shaping a small family culture permanently altered the subsequent fertility of Chinese women even after they were in an environment that did not restrict fertility.

To answer this question, we examine fertility outcomes for a sample of Chinese women who migrated to the US after growing up for varying lengths of time exposed to the OCP. Our findings indicate that Chinese women exposed to the OCP for a longer duration have significantly fewer children compared to similar women who were less exposed to the OCP. We also find that exposure to the OCP reduces the number of children even after controlling for natal family size in an attempt to disentangle the effect of growing up in a smaller family from the impact of OCP exposure to a small family culture in shaping fertility preferences. Our results are stronger for currently-married women and hold when we use a sample of only Chinese women and when we introduce a control group of women from other Asian countries/regions. The negative impact of exposure to the OCP on fertility is evident even after controlling for patterns of fertility assimilation of migrants and education levels that might have increased due to the OCP. Estimates from our preferred specification suggest that exposure to the OCP from age 6-30 results in about 7 percent fewer children than similar women who were not exposed to the OCP. These findings are robust to many alternative specification checks.

The implementation of the OCP, while reducing fertility, has also had unintended consequences. Data from the World Bank show that the old-age dependency ratio, a critical indicator of strain faced by the younger generation to support the older generation, has risen dramatically in recent years. The OCP, enacted in a country with a strong son preference, has also led to a skewed sex ratio resulting in a large proportion of unmarried men (Ebenstein, 2010; Li *et al.*, 2011). In addition to altering the future family prospects of these men, some evidence suggests this imbalance has also led to an increase in crime (Edlund *et al.*, 2013; Cameron *et al.*, 2019). In response to concerns about the consequences of the low level of Chinese fertility and the recently declining population, the government enacted a two-child policy in 2016 that was quickly followed by a three-child policy in 2021.

Our finding that the duration of exposure to the OCP reduced subsequent fertility seems to be borne out by preliminary evidence from adopting the two-child policy in 2016. Despite eliminating penalties and encouraging families to have a second child through altered messaging, China's TFR has continued to fall from 1.67 in 2015 to 1.28 in 2020, as shown in figure 1. Clearly, fertility has not rebounded as policymakers had hoped, hence the enactment of the three-child policy in 2021. Our research suggests that this policy has little chance of success since the vast majority of women currently of childbearing age in China were exposed to OCP messaging and penalties throughout most of their lives. It is unclear how long it will take to overcome decades of small-family cultural norms or if it is even possible (Jacobs & Paris, 2023).

References

Adserà, Alícia, & Ferrer, Ana. 2016. The Fertility of Married Immigrant Women to Canada. *The International Migration Review*, **50**(2), 475–505.

Alden, Akemi. 2020. One-Child Policy Propaganda: An Analysis of How Chinese Propaganda Depicts and Reconstructs Female Identity. *Women and Language*, **31**(1), 1–24.

Ang, Seng Bin, & How, Choon How. 2013. Menopause: An Important Milestone in Women's Health. *Singapore Medical Journal*, **54**(2), 60–63. PMID: 23462827.

Argys, Laura M., & Averett, Susan L. 2019. The effect of family size on education: new evidence from China's one-child policy. *Journal of Demographic Economics*, **85**(1), 21–42.

Beaujouan, Eva, & Solaz, Anne. 2019. Is the Family Size of Parents and Children Still Related? Revisiting the Cross-Generational Relationship Over the Last Century. *Demography*, **56**, 595–619.

Becker, Gary. 1960. *An Economic Analysis of Fertility*. New York: Columbia University Press.

bin Marzuki, Ariffin, & Love, Ten. 1968. Malaysia: The Family Planning Program, 1967. *Studies in Family Planning*, **1**(26), 12–15.

Blau, Francine. 1992. The Fertility of Immigrant Women: Evidence from High-Fertility Source Countries. *Pages 93–134 of: Immigration and the Work Force: Economic Consequences for the United States and Source Areas*. National Bureau of Economic Research, Inc.

Blau, Francine D., Kahn, Lawrence M., & Papps, Kerry L. 2011. Gender, Source Country

Characteristics, and Labor Market Assimilation Among Immigrants. *The Review of Economics and Statistics*, **93**(1), 43–58.

Blau, Francine D., Kahn, Lawrence M., Liu, Albert Yung-Hsu, & Papps, Kerry L. 2013. The transmission of women's fertility, human capital, and work orientation across immigrant generations. *Journal of Population Economics*, **26**, 405–435.

Booth, Alison L., & Kee, Hiau Joo. 2009. Intergenerational Transmission of Fertility Patterns. *Oxford Bulletin of Economics and Statistics*, **71**(2), 183–208.

Cameron, A.C., & Trivedi, P.K. 2005. *Microeconometrics: Methods and Applications*. Cambridge University Press.

Cameron, Lisa, Meng, Xin, & Zhang, Dandan. 2019. China's Sex Ratio and Crime: Behavioural Change or Financial Necessity? *The Economic Journal*, **129**(618), 790–820.

Cernada, G., Sun, T. H., Chang, M. C., & Tsai, J. F. 2007. Taiwan's Population and Family Planning Efforts: An Historical Perspective. *International Quarterly of Community Health Education*, **27**(2), 99–120.

Chan, K. C. 1976. The Role of the Family Planning Association in Hong Kong's Fertility Decline. *Studies in Family Planning*, **7**(10), 284–289.

Chen, Ruoyu, & Zhang, Lingxiang. 2019. Imbalance in China's Sex Ratio at Birth: A Review. *Journal of Economic Surveys*, **33**(3), 1050–1069.

Di Miceli, Andrea. 2019. Horizontal vs. vertical transmission of fertility preferences. *Journal of Comparative Economics*, **47**(3), 562–578.

Dodge, Patrick Shaou-Whea, & Suter, Elizabeth A. 2008. "It's Okay to Have a Girl": Patronymy and China's One Child Policy. *Communication Studies Undergraduate Publications, Presentations and Projects*, **110**, 13–22.

Ebenstein, Avraham. 2010. The "Missing Girls" of China and the Unintended Consequences of the One Child Policy. *The Journal of Human Resources*, **45**(1), 87–115.

Edlund, Lena, Li, Hongbin, Yi, Junjian, & Zhang, Junsen. 2013. Sex Ratios and Crime: Evidence from China. *The Review of Economics and Statistics*, **95**(5), 1520–1534.

Family Health Service. 2013. Accessed May 10, 2023.

Feng, Xiao-Tian, Poston, Dudley L., & Wang, Xiao-Tao. 2014. China's One-child Policy and the Changing Family. *Journal of Comparative Family Studies*, **45**(1), 17–29.

Fernández, Raquel, & Fogli, Alessandra. 2006. Fertility: The Role of Culture and Family Experience. *Journal of the European Economic Association*, **4**(2/3), 552–561.

Fernández, Raquel, & Fogli, Alessandra. 2009. Culture: An Empirical Investigation of Beliefs, Work, and Fertility. *American Economic Journal: Macroeconomics*, **1**(1), 146–177.

Greenhalgh, Susan. 2008. *Just one child: science and policy in Deng's China*. Berkeley and Los Angeles, California: University of California Press.

Greenhalgh, Susan, & Winckler, Edwin A. 2005. *Governing China's Population: from Leninist to Neoliberal Biopolitics*. Stanford, California: Stanford University Press.

Gupta, Monica Das, Zhenghua, Jiang, Bohua, Li, Zhenming, Xie, Chung, Woojin, & Hwa-Ok, Bae. 2003. Why is Son preference so persistent in East and South Asia? a cross-country study of China, India and the Republic of Korea. *The Journal of Development Studies*, **40**(2), 153–187.

Hamilton, Brady E., Martin, Joyce A., & Ventura, Stephanie J. 2011. *Births: Preliminary Data for 2010*. Tech. rept. 2. Division of Vital Statistics, Hyattsville, MD: National Center for Health Statistics.

Harris, Tammy, Yang, Zhao, & Hardin, James W. 2012. Modeling Underdispersed Count Data with Generalized Poisson Regression. *The Stata Journal*, **12**(4), 736–747.

Huang, Wei, Lei, Xiaoyan, & Sun, Ang. 2021. Fertility Restrictions and Life Cycle Outcomes: Evidence from the One-Child Policy in China. *The Review of Economics and Statistics*, **103**(4), 694–710.

Huang, Yue. 2015. *Does A Child Quantity-Quality Trade-Off Exist? Evidence from the One-Child Policy in China*. VfS Annual Conference 2015 (Muenster): Economic Development - Theory and Policy 113215. Verein für Socialpolitik / German Economic Association.

Imbens, Guido W., & Rubin, Donald B. 2015. *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction*. Cambridge University Press.

Jacobs, Andrew, & Paris, Francesca. 2023 (Feb. 9,). *Can China Reverse Its Population Decline? Just Ask Sweden.*

Lee, Pei-Shan, & Lee, Chyi-Long. 2021. Prevalence of symptoms and associated factors across menopause status in Taiwanese women. *Menopause*, **28**(2), 182–188.

Li, Hongbin, & Zhang, Junsen. 2007. Do High Birth Rates Hamper Economic Growth? *The Review of Economics and Statistics*, **89**(1), 110–117.

Li, Hongbin, Yi, Junjian, & Zhang, Junsen. 2011. Estimating the Effect of the One-Child Policy on the Sex Ratio Imbalance in China: Identification Based on the Difference-in-Differences. *Demography*, **48**(4), 1535–1557.

Liu, Haoming. 2014. The quality-quantity trade-off: evidence from the relaxation of China's one-child policy. *Journal of Population Economics*, **27**(2), 565–602.

Mathews, T.J., & Hamilton, Brady E. 2016. *Mean Age of Mothers is on the Rise: United States, 2000–2014*.

Mayer, Jochen, & Riphahn, Regina T. 2000. Fertility Assimilation of Immigrants: Evidence from Count Data Models. *Journal of Population Economics*, **13**(2), 241–261.

McElroy, Marjorie, & Yang, Dennis Tao. 2000. Carrots and Sticks: Fertility Effects of China's Population Policies. *American Economic Review*, **90**(2), 389–392.

Minnesota Population Center. 2020. *Integrated Public Use Microdata Series, International: Version 7.3 [dataset].*

moe.gov.cn, Ministry of Education. 2009 (July 22).

National Bureau of Statistics of China, NBS. 2020. *2020 China Statistical Yearbook.*

Nie, Yilin, & Wyman, Robert J. 2005. The One-Child Policy in Shanghai: Acceptance and Internalization. *Population and Development Review*, **31**(2), 313–336.

OECD Family Database. 2020. *SF2.4: Share of births outside of marriage.*

Pan, Yao, & Liu, Yishen. 2021. Birth control, family size and educational stratification: Evidence from the Han and ethnic minorities in China. *Economics of Education Review*, **81**, 102078.

Park, Young-Joo, Kim, Hesook Suzie, & Kang, Hyun-Choel. 2002. The Age at Menopause and Related Factors in Korean Women. *Journal of Korean Academy of Nursing*, **32**(7), 1024–1031.

Perpustakaan Negara Malaysia. 2022. *Clinical Practice Guidelines: Management of Menopause in Malaysia.* visited 6-May-2023.

Qian, Nancy. 2009. *Quantity-quality and the one child policy: The only-child disadvantage in school enrollment in rural China.* Tech. rept. National Bureau of Economic Research.

Rosenbloom, Raquel, & Batalova, Jeanne. 2023. *Chinese Immigrants in the United States.* Tech. rept. Migration Policy Institute, 1275 K St. NW, Suite 800, Washington, DC 20005.

Rosenzweig, Mark R, & Zhang, Junsen. 2009. Do population control policies induce more human capital investment? Twins, birth weight and China's "one-child" policy. *The Review of Economic Studies*, **76**(3), 1149–1174.

Sachs, Susan. 2001. *FUJIAN, U.S.A.: A special report; Within Chinatown, a Slice of Another China.*

Short, Susan E., & Zhai, Fengying. 1998. Looking Locally at China's One-Child Policy. *Studies in Family Planning*, **29**(4), 373–387.

Singh, K., Viegas, O.A.C., & Ratnam, S.S. 1989. *Balance in Family Planning.* Tech. rept. Worls Health Organization, Geneva, Switzerland.

Tang, Mengjun. 2022. Induced abortion among unmarried women in China. *China Population and Development Studies*, **6**, 78–94.

The World Bank. 2020. *Fertility rate, total (births per woman) - China.*

U.S. Census Bureau. 2017. *American Community Survey Information Guide.*

Wang, Meng, Kartsonaki, Christiana, Guo, Yu, Lv, Jun, Gan, Wei, Chen, Zheng-Ming, Li, Li-Ming, Hu, Chong-Gao, Yang, Ling, & Yu, Min. 2021. Factors related to age at natural menopause in China: results from the China Kadoorie Biobank. *Menopause*, **28**(10), Menopause.

Wang, Weiren, & Famoye, Felix. 1997. Modeling Household Fertility Decisions with Generalized Poisson Regression. *Journal of Population Economics*, **10**(3), 273–283.

Whyte, Martin King, Feng, Wang, & Cai, Yong. 2015. Challenging Myths About China's One-Child Policy. *The China Journal*, **74**, 144–159.

Yang, Jae-Mo, & Watson, Walter B. 1973. Family Planning and Fertility Decline in Korea: Retrospect and Prospect. *International Journal of Health Services*, **3**(4), 821–832.

Zhang, Junsen. 2017. The Evolution of China's One-Child Policy and Its Effects on Family Outcomes. *Journal of Economic Perspectives*, **31**(1), 141–60.

Zhang, Zhenhua. 1986. Do a good job in family planning to promote economic development. *In: "Xin jiating" baoshe.* Liaoning "Xin jiating" baoshe.

Zraick, Karen. 2015 (Oct. 30,). *China Will Feel One-Child Policy's Effects for Decades, Experts Say.*

Footnotes

[1] Although the central government in 1984 issued a document which allowed rural couples with only a daughter to have a second child, the original policy sought to limit virtually all couples to having one child (Greenhalgh, 2008).

[2] In our empirical analysis, we estimate the robustness of our results to the inclusion of exposure to LLF.

[3] Minority women were allowed to have two or more children while Han urban women are only allowed to have one child or two children for Han rural women if their first birth is a daughter.

[4] Out of concern that education is potentially endogenous, we take education out of our specification in one of our robustness checks.

[5] Spousal characteristics include spouse's age, years of education, English language proficiency, country of birth, and citizenship status.

[6] For the ease of discussion, we use the term "fertility" interchangeably with the term "number of children," even though they are not necessarily the same due to the possibility that a child may enter a family as an adopted or stepchild.

[7] Later in the paper, we introduce a control group including women from Hong Kong, Malaysia, Singapore, South Korea, and Taiwan and the average menopause age for women in these countries/regions ranges from 48 to 51, which is similar to China, see Park *et al.* (2002); Ang & How (2013); Family Health Service (2013); Lee & Lee (2021); Perpustakaan Negara Malaysia (2022)).

[8] The earliest birth year we consider is 1965, which excludes women potentially affected by malnutrition at birth due to the Great Famine (late 1950s to early 1960s) in China.

[9] We replicate this figure for our control group, and the patterns are similar as shown in 3. The number of children reported is similar for both groups, rising slightly until age 37 and fairly consistent across this age range.

[10] This is a measure similar to Mayer & Riphahn (2000), who argue for looking at

influences that occurred during a woman's fertile years. The starting age is 6 because China's compulsory schooling starts at age 6 (moe.gov.cn, Ministry of Education, 2009).

[11] This measure of exposure to the OCP eliminates the concern of potential endogeneity between survey age and OCP exposure because, in this formula, a woman's exposure to the OCP ends at age 30 while her ACS survey is conducted at age 35 to 45. The correlation between age at the time of the ACS and exposure to OCP in our full Chinese sample (14,581 observations) is -0.1394, and the correlation in our currently married Chinese sample (11,694 observations) is -0.1653.

[12] The data provided by the World Bank is collected from several sources: (1) United Nations Population Division. World Population Prospects: 2019 Revision. (2) Census reports and other statistical publications from national statistical offices, (3) Eurostat: Demographic Statistics, (4) United Nations Statistical Division. Population and Vital Statistics Report (various years), (5) US Census Bureau: International Database, and (6) Secretariat of the Pacific Community: Statistics and Demography Programme. The fertility data for Taiwan is collected from Population Projection for the R.O.C. (Taiwan), Taiwan National Development Council.

[13] We provide more details on the family planning policies in our control countries/regions in section 7.2.

[14] Age is excluded from the specification because there exists collinearity in the time variables, i.e., Age at Migration + Years USA = Age and Birth Year + Age = Survey Year.

[15] Previous studies also focus on the fertility decisions of currently-married women immigrants, e.g., Fernández & Fogli (2009) and Adserà & Ferrer (2016).

[16] This is a specification used in Mayer & Riphahn (2000) and similar to that used by Blau (1992) and Blau *et al.* (2011).

[17] This is calculated using family total income netting out one's wage and salary income.

[18] Since the observations are immigrants born outside the US, they are either naturalized

citizens or non-citizens.

[19] The sample of never-married women was too small for separate analysis.

[20] Births to unmarried women in China and in many Asian countries are among the lowest in the world (Tang, 2022; OECD Family Database, 2020).

[21] Previous studies also focus on the fertility decisions of currently-married women immigrants, e.g., Fernández & Fogli (2009) and Adserà & Ferrer (2016).

[22] We use the OLS estimates divided by the sample means in row 5.

[23] The assimilation variable is altered in this specification using productive years spent in the US rather than lifetime years spent in the US.

[24] We define the assimilation of American-born Chinese by using their age.

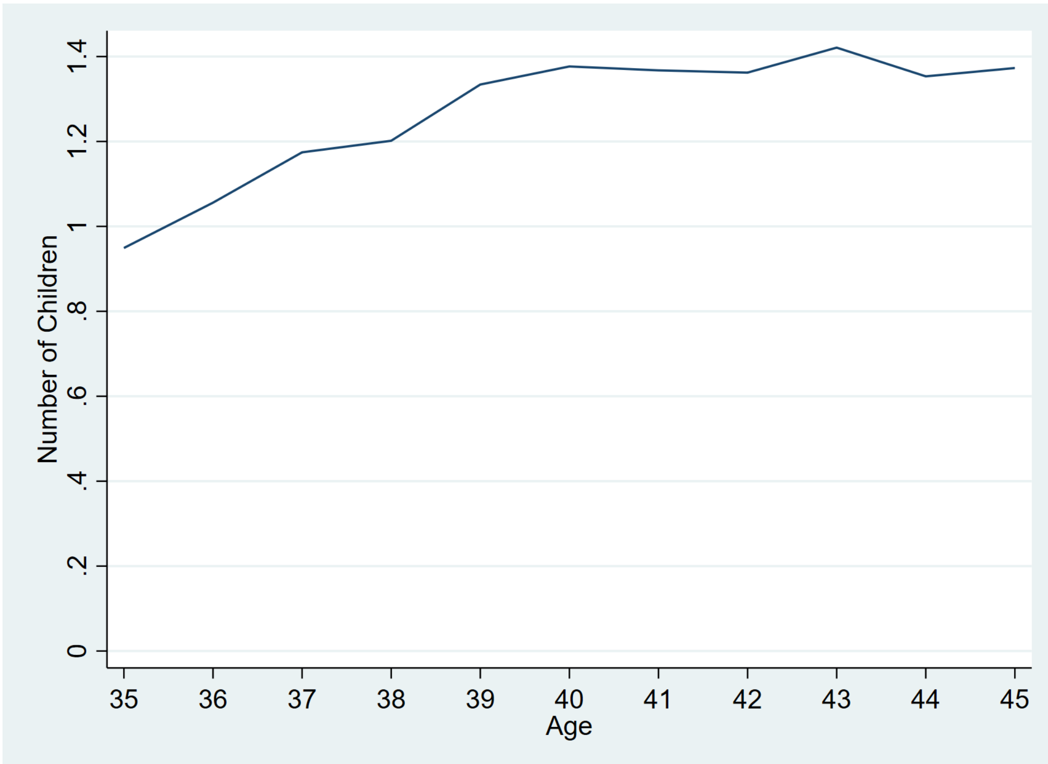
[25] We use the strategy developed by Imbens & Rubin (2015) to select covariates, interaction terms, and second-order terms to include in the propensity score estimations using iterative procedures. Variables included in the models are a woman's age at migration, place of marriage, years of education, birth year, citizenship status, English language proficiency, metropolitan status, and their various interaction terms. The inclusion of spousal characteristics leaves the results qualitatively unchanged.

10 Figures and Tables

Figure 1: Total Fertility Rate of China, 1965-2021.

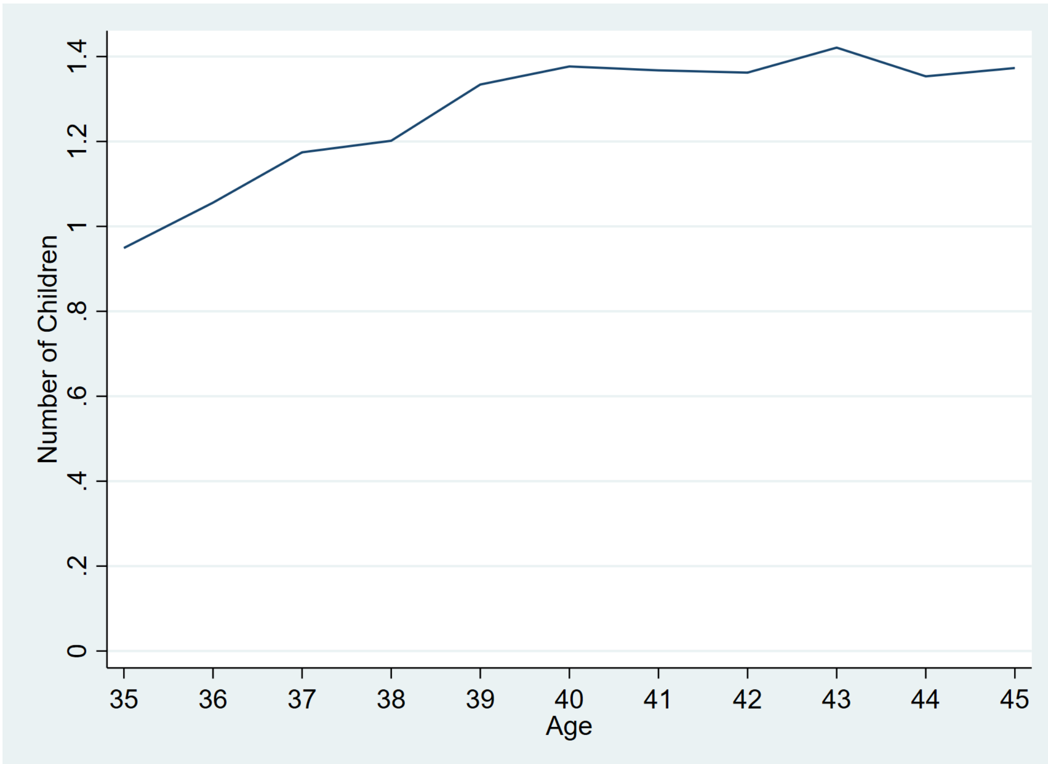
Notes: The data is collected from the World Bank (The World Bank, 2020). "LLF" represents "Later, Longer, Fewer" which was initiated in 1973, "OCP" represents "One-Child Policy" which was effective in 1980, "2CP" represents "Two-Child Policy" which was effective in 2016 and "3CP" represents "Three-Child Policy" which was effective in 2021.

Figure 2: Average Number of Children in the Household by Women's Age
- Chinese Sample.



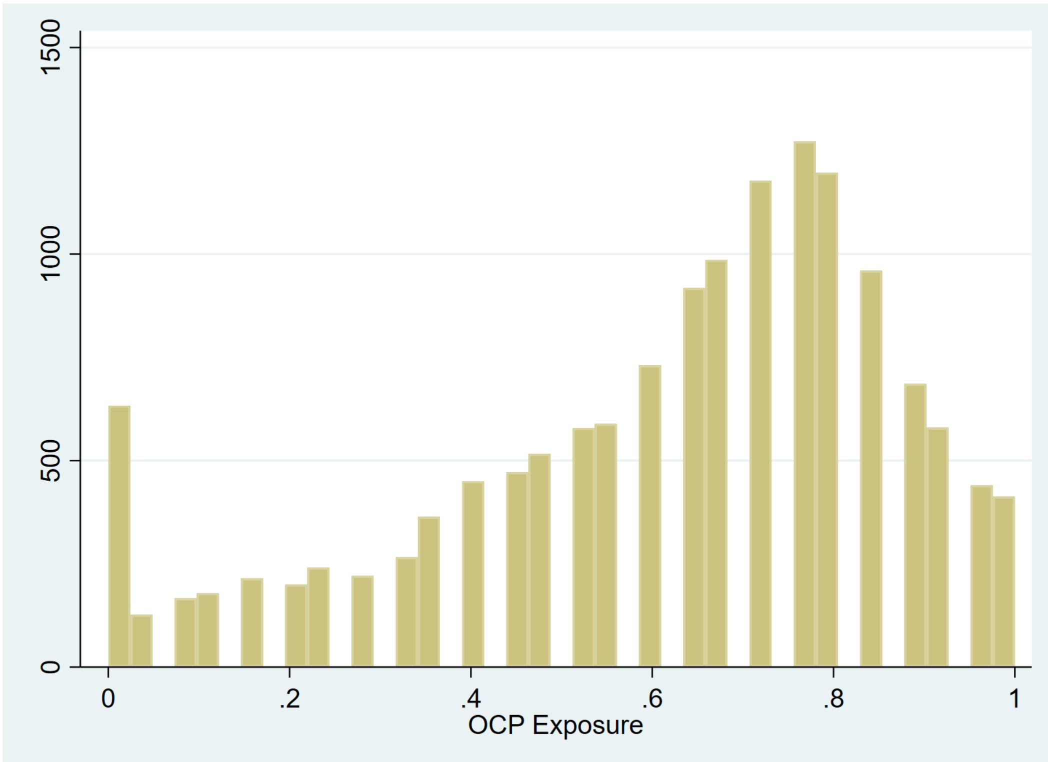
Notes: The sample consists of Chinese women ages 35 to 45 who migrated to the US by the age of 30. Data are from the American Community Survey 2010 - 2020.

Figure 3: Average Number of Children in the Household by Women's Age - Asian Control Group.



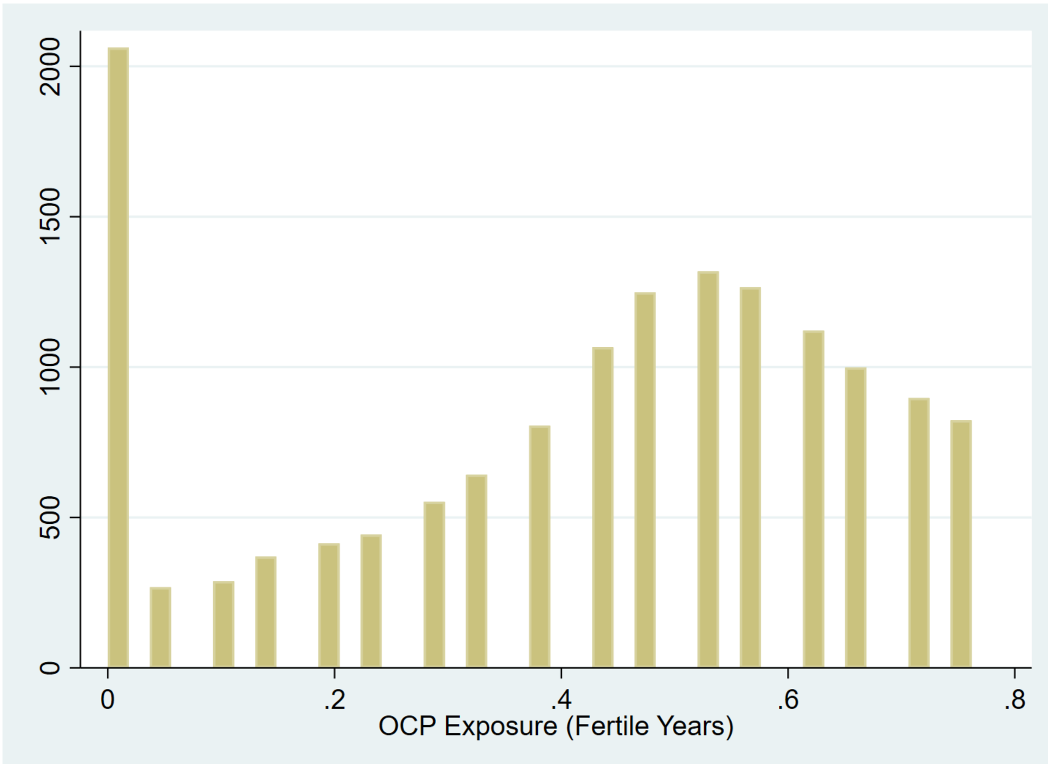
Notes: The sample consists of women from Hong Kong, Malaysia, Singapore, South Korea, and Taiwan women ages 35 to 45 who migrated to the US by the age of 30. Data are from the American Community Survey 2010 - 2020.

Figure 4: Distribution of Exposure to the OCP
Among Female Chinese Immigrants.



Notes: The sample consists of Chinese women ages 35 to 45 who migrated to the US by the age of 30. Data are from the American Community Survey 2010 - 2020. Exposure to the OCP is defined as the fraction of years between the ages of 6 and 30 that a woman lived in China while the OCP was in effect. Exposure to the OCP varies by the woman's birth year and the year she migrated from China to the US. In our sample, the oldest age of migration is 30, which corresponds to a possible maximum of 25 years of exposure to the OCP.

Figure 5: Distribution of Exposure to the OCP
Among Female Chinese Immigrants.



Notes: The sample consists of Chinese women ages 35 to 45 who migrated to the US by the age of 30. Data are from the American Community Survey 2010 - 2020. Exposure to the OCP is defined as the fraction of years between the ages of 15 and 35 that a woman lived in China while the OCP was in effect. Exposure to the OCP varies by the woman's birth year and the year she migrated from China to the US. In our sample, the oldest age of migration is 30, which corresponds to a possible maximum of 16 years of exposure to the OCP.

Table 1: Descriptive Statistics – Immigrant Women Ages 35-45, ACS (2010-2020)

	Chinese Full Sample (1)	Chinese Currently-married (2)	Asian Full Sample (3)	Asian Currently-married (4)
Number of Own Children in the Household	1.441	1.639	1.273	1.579
	(0.010)	(0.010)	(0.010)	(0.011)
OCP Exposure (From Ages 15-35)	0.415	0.430	0.000	0.000
	(0.002)	(0.003)	-	-
Age	39.873	39.956	40.060	40.151
	(0.032)	(0.036)	(0.029)	(0.033)
Age Migrated to the US	21.968	22.396	16.050	16.940
	(0.070)	(0.074)	(0.091)	(0.104)
Birthyear TFR (Home Country/Region)	4.005	4.033	3.382	3.405
	(0.012)	(0.014)	(0.008)	(0.009)
$Pr(\hat{sib} = 0)$	0.058	0.057	-	-
	(0.001)	(0.001)	-	-
Currently Married	0.784	1.000	0.734	1.000
Previously Married	0.130	0.000	0.109	0.000
Never Married	0.086	0.000	0.157	0.000
Years in the US (0-9 Years)	0.083	0.082	0.053	0.058
Years in the US (10-18 Years)	0.532	0.557	0.304	0.333
Years in the US (19-27 Years)	0.273	0.262	0.265	0.262
Years in the US (28-36 Years)	0.093	0.082	0.232	0.213
Years in the US (37-45 Years)	0.019	0.017	0.146	0.133
Years of Education	14.873	15.041	15.778	15.861
	(0.043)	(0.047)	(0.025)	(0.028)
Speaks English Only	0.065	0.059	0.238	0.219
Speaks English Very Well	0.427	0.440	0.423	0.424
Speaks English Well	0.294	0.291	0.246	0.259
Speaks English Not Well	0.185	0.181	0.088	0.095
Does not Speak English	0.029	0.029	0.004	0.004
Unearned Income (in thousands $)	59.217	70.365	63.342	79.344
	(0.664)	(0.754)	(0.666)	(0.800)
Foreign Born Naturalized Citizen	0.636	0.627	0.730	0.712
Foreign Born Not a Naturalized Citizen	0.364	0.373	0.270	0.288
Lives in Metropolitan Area	0.639	0.628	0.587	0.573
Married in the Home Country		0.286		0.111
Spouse's Age		43.426		42.819
		(0.069)		(0.059)
Spouse's Years of Education		15.306		16.099
		(0.049)		(0.028)
Spouse Speaks English Only		0.152		0.357
Spouse Speaks English Very Well		0.402		0.377
Spouse Speaks English Well		0.236		0.197
Spouse Speaks English Not Well		0.169		0.065
Spouse Does not Speak English		0.042		0.004
Spouse Born in the Same Country		0.714		0.492
Spouse Born USA		0.146		0.354
Spouse Born in Other Countries/Regions		0.140		0.154
Spouse $\sim$ Not a Naturalized Citizen		0.470		0.429
Spouse Foreign Born Naturalized Citizen		0.384		0.217
Hong Kongese			0.121	0.115
Malaysian			0.039	0.043
Singaporean			0.015	0.015
South Korean			0.607	0.609
Taiwanese			0.218	0.219
Observations	14581	11694	17222	12991

Standard deviations for continuous variables in parentheses.

Table 2: Baseline Model - Chinese Sample

Dependent Variable: Number of Own Children in the Household	Full Sample		Ever-married		Currently-married	
	(1)		(2)		(3)	
OCP Exposure	0.983		0.889	***	0.852	***
	(0.028)		(0.024)		(0.022)	
	[-0.017]		[-0.111]		[-0.148]	
Dependent Variable Mean	1.441		1.539		1.639	
Observations	14581		13447		11694	

Notes: Data source: ACS 2010 - 2020. Regressions include controls for linear birth year trend, squared birth year trend, state of residence fixed effect, and ACS survey year fixed effect. Standard errors clustered by birth year by age arrived in the US are in parentheses. The figures in square brackets show the estimated impact of OCP culture on the number of own children in the household on a fully exposed woman compared to a woman with no exposure to the OCP.
Sample: Column 1 includes all Chinese women ages 35-45. Column 2 includes previously-married and currently-married Chinese women ages 35-45. Column 3 includes currently-married Chinese women ages 35-45.
$*** = p < .01; ** = p < .05; * = p < .10$

Table 3: Baseline Model Plus Controls for Natal Family Size - Chinese Sample

Dependent Variable: Number of Own Children in the Household	Full Sample		Ever-married		Currently-married	
	(1)	(2)	(3)	(4)	(5)	(6)
OCP Exposure	0.989	0.984	0.892 ***	0.888 ***	0.855 ***	0.852 ***
	(0.028)	(0.028)	(0.024)	(0.024)	(0.022)	(0.022)
	[-0.011]	[-0.016]	[-0.108]	[-0.112]	[-0.145]	[-0.148]
Natal Family Size	$Pr(\hat{sib} = 0)$	TFR	$Pr(\hat{sib} = 0)$	TFR	$Pr(\hat{sib} = 0)$	TFR
Dependent Variable Mean	1.441		1.539		1.639	
Observations	14581	14581	13447	13447	11694	11694

Notes: Data source: ACS 2010 - 2020. Regressions include controls for linear birth year trend, squared birth year trend, state of residence fixed effect, and ACS survey year fixed effect. Standard errors clustered by birth year by age arrived in the US are in parentheses. The figures in square brackets show the estimated impact of OCP culture on the number of own children in the household on a fully exposed woman compared to a woman with no exposure to the OCP.

Sample: Columns 1 and 2 include all Chinese women ages 35-45. Columns 3 and 4 include previously married and currently-married Chinese women age 35-45. Columns 5 and 6 include currently-married Chinese women ages 35-45.

$*** = p < .01; ** = p < .05; * = p < .10$

Table 4: Baseline Model Plus Controls for Natal Family Size
- Asian Sample

Dependent Variable: Number of Own Children in the Household			
	Full Sample	Ever-married	Currently-married
	(1)	(2)	(3)
OCP Exposure	0.995	0.875 ***	0.855 ***
	(0.030)	(0.025)	(0.024)
	[-0.005]	[-0.125]	[-0.145]
Dependent Variable Mean	1.350	1.511	1.607
Observations	31803	28139	24685

Notes: Data source: ACS 2010 - 2020. Regressions include controls for women's natal family size (TFR), linear birth year trend, Chinese-specific linear birth year trend, Chinese-specific squared birth year trend, country/region of birth fixed effect, state of residence fixed effect, and ACS survey year fixed effect. Standard errors, clustered by birth year by age arrived in the US by country/region of origin are in parentheses. The figures in square brackets show the estimated impact of OCP culture on the number of own children in the household on a fully exposed woman compared to a woman with no exposure to the OCP.
Sample: The Asian sample consists of women who migrated to the US from China, Hong Kong, Malaysia, Singapore, South Korea, and Taiwan. Column 1 includes all women ages 35-45. Column 2 includes previously-married and currently-married women ages 35-45. Column 3 includes currently-married women ages 35-45.
$*** = p < .01; ** = p < .05; * = p < .10$

Table 5: Baseline Model Plus Controls for Natal Family Size and Assimilation - Asian Sample

Dependent Variable: Number of Own Children in the Household		
	Currently-married (1)	
OCP Exposure	0.901	***
	(0.031)	
	[-0.099]	
Dependent Variable Mean	1.607	
Observations	24685	

Notes: Data source: ACS 2010 - 2020. Regressions include controls for women's natal family size (TFR), years in the US, place of marriage, linear birth year trend, Chinese-specific linear birth year trend, Chinese-specific squared birth year trend, country/region of birth fixed effect, state of residence fixed effect and ACS survey year fixed effect. Standard errors, clustered by birth year by age arrived in the US by country/region of origin are in parentheses. The figures in square brackets show the estimated impact of OCP culture on the number of own children in the household on a fully exposed woman compared to a woman with no exposure to the OCP.
Sample: The Asian sample consists of women who migrated to the US from China, Hong Kong, Malaysia, Singapore, South Korea, and Taiwan. This sample includes currently married women ages 35-45.
$*** = p < .01; ** = p < .05; * = p < .10$

Table 6: Fully Saturated Model - Chinese Sample

Dependent Variable: Number of Own Children in the Household	Currently-married No Spouse Characteristics (1)		Currently-married With Spouse Characteristics (2)	
OCP Exposure	0.765	***	0.782	***
	(0.049)		(0.051)	
	[-0.235]		[-0.218]	
Spouse Characteristics	No		Yes	
Dependent Variable Mean		1.639		
Observations	11694		11694	

Notes: Data source: ACS 2010 - 2020. Regressions include controls for women's natal family size (TFR), years in the US, place of marriage, linear birth year trend, squared birth year trend, state of residence fixed effect, and ACS survey year fixed effect. Standard errors clustered by birth year by age arrived in the US are in parentheses. The figures in square brackets show the estimated impact of OCP culture on the number of own children in the household on a fully exposed woman compared to a woman with no exposure to the OCP. Spouse characteristics include age, years of education, English language proficiency, birthplace, and citizenship status.
Sample: This sample includes currently-married Chinese women ages 35-45.
$*** = p < .01; ** = p < .05; * = p < .10$

Table 7: Fully Saturated Model - Asian Sample

Dependent Variable: Number of Own Children in the Household	Currently-married No Spouse Characteristics (1)		Currently-married With Spouse Characteristics (2)	
OCP Exposure	0.913	***	0.928	**
	(0.031)		(0.032)	
	[-0.087]		[-0.072]	
Spouse Characteristics	No		Yes	
Dependent Variable Mean		1.607		
Observations	24685		24685	

Notes: Data source: ACS 2010 - 2020. Regressions include controls for women's natal family size (TFR), years in the US, place of marriage, linear birth year trend, Chinese-specific linear birth year trend, Chinese-specific squared birth year trend, country/region of birth fixed effect, state of residence fixed effect and ACS survey year fixed effect. Standard errors, clustered by birth year by age arrived in the US by country/region of origin are in parentheses. The figures in square brackets show the estimated impact of OCP culture on the number of own children in the household on a fully exposed woman compared to a woman with no exposure to the OCP. Spouse characteristics include age, years of education, English language proficiency, birthplace, and citizenship status.
Sample: The Asian sample consists of women who migrated to the US from China, Hong Kong, Malaysia, Singapore, South Korea, and Taiwan. This sample includes currently-married women ages 35-45.
$*** = p < .01; ** = p < .05; * = p < .10$

Table 8: Robustness Checks - Currently-married Asian Sample

Dependent Variable: Number of Own Children in the Household	Baseline	OLS	Birth Year Dummies	No Education	Fertile Years OCP Exposure	With LLF Exposure	Age 37 - 43
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OCP Exposure	0.928 **	-0.109 *	0.923 **	0.934 **	0.911 ***	0.923 **	0.878 ***
	(0.032)	(0.058)	(0.031)	(0.032)	(0.032)	(0.031)	(0.034)
	[-0.072]	[-0.068]	[-0.077]	[-0.066]	[-0.089]	[-0.077]	[-0.122]
Dependent Variable Mean				1.607			1.651
Observations				24658			1.651

Notes: Data source: ACS 2010 - 2020. Regressions include controls for spousal characteristics, women's natal family size (TFR), years in the US, place of marriage, linear birth year trend, Chinese-specific linear birth year trend, Chinese-specific squared birth year trend, country/region of birth fixed effect, state of residence fixed effect and ACS survey year fixed effect. Standard errors, clustered by birth year by age arrived in the US by country/region of origin are in parentheses. The figures in square brackets show the estimated impact of OCP culture on the number of own children in the household on a fully exposed woman compared to a woman with no exposure to the OCP. This table assesses the robustness of the results of our preferred specification in column 2 of Table 7 (i.e. the fully saturated model for the currently-married Asian sample with spouse characteristics), under varying robustness checks. Column 1 repeats the results from our preferred specification; column 2 uses an OLS functional form; column 3 uses birth year dummies to control for birth year trends; column 4 estimates the model excluding the woman's education; column 5 uses an alternative definition for OCP exposure, that measures fertile years of exposure to the OCP; column 6 adds in the control for a Chinese woman's exposure to the Later-Longer-Fewer policy in China; column 7 estimates a smaller age range, 37-43.

Sample: The Asian sample consists of women who migrated to the US from China, Hong Kong, Malaysia, Singapore, South Korea and Taiwan. This sample includes currently-married women ages 35-45.

$*** = p < .01; ** = p < .05; * = p < .10$

Table 9: Robustness Checks Using American-born Chinese Women as a Control Group - with and without Spouse Characteristics and Assimilation

Dependent Variable: Number of Own Children in the Household								
	Currently married (1)		Currently married (2)		Currently married (3)		Currently married (4)	
OCP Exposure	0.823	***	0.816	***	0.736	***	0.735	***
	(0.028)		(0.027)		(0.048)		(0.049)	
	[-0.177]		[-0.184]		[-0.264]		[-0.265]	
Spouse Characteristics	No		Yes		No		Yes	
Assimilation	No		No		Yes		Yes	
Dependent Variable Mean			1.643					
Observations	16986		16986		16986		16986	

Notes: Data source: ACS 2010 - 2020. Regressions include controls for Chinese women's natal family size (TFR), linear birth year trend, Chinese-specific linear birth year trend, Chinese-specific squared birth year trend, country/region of birth fixed effect, state of residence fixed effect, and ACS survey year fixed effect. Standard errors, clustered by birth year by state of residence are in parentheses. The figures in square brackets show the estimated impact of OCP culture on the number of own children in the household on a fully exposed woman compared to a woman with no exposure to the OCP. Spouse characteristics include age, years of education, English language proficiency, birthplace, and citizenship status.

This table reports estimates using American-born Chinese women as a control group. Column 1 is the fully saturated model without spouse characteristics or assimilation variables; column 2 is the fully saturated model with spouse characteristics without assimilation variables; column 3 is the fully saturated model without spouse characteristics with assimilation variables; column 4 is the fully saturated model with both spouse characteristics and assimilation variables.

Sample: The American-born Chinese sample consists of American-born women whose first or second ancestry category is self-reported as Chinese, Hong Kongese, or Taiwanese. This sample includes currently-married women ages 35-45.

$*** = p < .01; ** = p < .05; * = p < .10$

Table 10: Robustness Checks - Currently-married Asian Sample

Dependent Variable: Number of Own Children in the Household	Baseline	PSM	No Hong Kongese	No Malaysian	No Singaporean	No South Korean	No Taiwanese	Falsification Test
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
OCP Exposure	0.928 **	0.869 ***	0.924 **	0.928 **	0.924 **	0.927 **	0.937 *	1.049
	(0.032)	(0.033)	(0.031)	(0.032)	(0.032)	(0.035)	(0.033)	(0.068)
	[-0.072]	[-0.131]	[-0.076]	[-0.072]	[-0.076]	[-0.073]	[-0.063]	[0.049]
Dep. Var. Mean	1.607	1.584	1.618	1.608	1.606	1.598	1.620	1.579
Observations	24685	17484	23043	24113	24485	17187	21606	12991

Notes: Data source: ACS 2010 - 2020. Regressions include controls for spousal characteristics, women's natal family size (TFR), years in the US, place of marriage, linear birth year trend, Chinese-specific linear birth year trend, Chinese-specific squared birth year trend, country/region of birth fixed effect, state of residence fixed effect and ACS survey year fixed effect. Standard errors, clustered by birth year by age arrived in the US by country/region of origin are in parentheses. The figures in square brackets show the estimated impact of OCP culture on the number of own children in the household of a fully exposed woman compared to a woman with no exposure to the OCP. This table assesses the robustness of the results of our preferred specification in column 2 of Table 7 (i.e. the fully saturated model for the currently-married Asian sample with spouse characteristics), under varying robustness checks. Column 1 repeats the results from our preferred specification; column 2 uses PSM to find a 1-to-1 matching from the Asian control group to support Chinese women; column 3 leaves Hong Kongese immigrants out of the Asian control group; column 4 leaves Malaysian immigrants out of the Asian control group; column 5 leaves Singaporean immigrants out of the Asian control group; column 6 leaves South Korean immigrants out of the Asian control group; column 7 leaves Taiwanese immigrants out of the Asian control group; column 8 assigns pseudo-OCP exposure values to women in the Asian control group.

Sample: The Asian sample consists of women who migrated to the US from China, Hong Kong, Malaysia, Singapore, South Korea and Taiwan. This sample includes currently-married women ages 35-45.

$*** = p < .01; ** = p < .05; * = p < .10$

Appendices

A Chinese Census

Since the ACS does not include information on the characteristics of a respondent's family of origin, we need to use data from a respondent's home country's census to understand the relationship between birth year and siblingship size. The census from China is used to calculate the probability of being raised as an only child by birth cohort for Han ethnic women.

Since the respondents in our sample were born between 1965 and 1985, we use available census data that most closely matched the reported living arrangement of our cohorts. Conducted in 1982 and 1990, respondents from our selected cohorts would have been young children likely residing with their siblings. These census data surveyed sample representing 1% of all individuals with Chinese nationality and reside in China (Minnesota Population Center, 2020). Although the census includes basic demographic information on individuals in the households, it does not directly include the variable we need, a count of the number of siblings, or an indicator of growing up as the only child in their family. Therefore, we need to use the available variables to create a proxy for the number of siblings with the following steps.

We first construct a sample of individuals that provides a reliable sibling count for individuals sorted by gender and birth cohort. We start by creating a sample that includes only observations whose relationship to the household head is "child".[26] We then count the number of children within each household by census year using their household serial number as a unique identifier. A long history of "son preference" exists in China (Gupta *et al.*, 2003). Families with daughters tend to have more children because they try to give birth to have a boy (or more boys). Thus, given each census year, we separately calculate the average sibling size by the gender and birth cohort of each child.

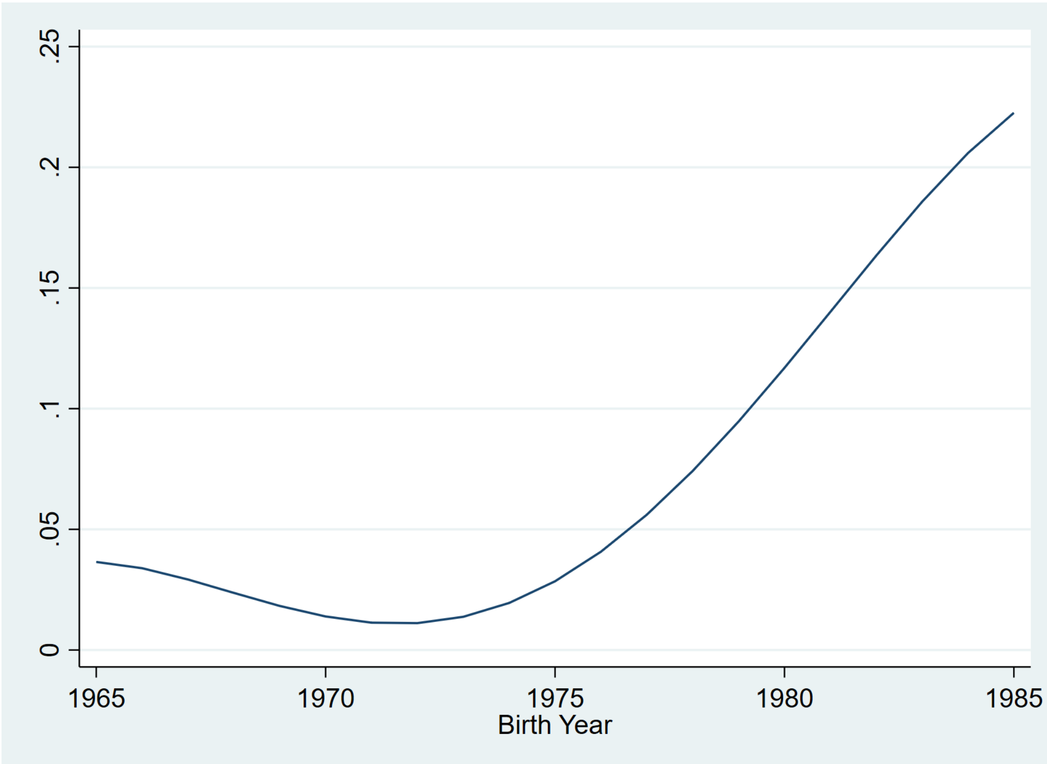
It should be noted that there exist situations where the average number of siblings can be calculated for a given birth year using data from 1982 and 1990. This would result in slightly different average values for the family size for a birth year. Two scenarios could explain these differences. We might find that the average sibling count is bigger in 1982 (say for children born in 1974) than in the 1990 census. That suggests that the count for an 8-year-old child likely captures all of their siblings (in 1982) compared to the count for a 16-year-old child (in the 1990 census). This may occur because the 16-year-old has older siblings that have moved out of the home. In contrast, the sibling count in the 1982 data for a person born in 1979 might be lower than the 1990 sibling count. This could reflect that the parents of a 3-year-old (in 1982) have not completed their childbearing. By 1990 the sibling count when the child is eleven years old will reflect completed fertility. So, for each gender, we choose the birth cohort from each census with larger mean values and construct a new sample for later regression analysis.[27]

Since immigrants from China to the US overwhelmingly consist of Chinese natives of Han ethnicity, we restrict the sample to Chinese Han respondents.[28] After selecting Census samples of Chinese Han ethnic female immigrants, we conduct OLS regression in which we regress an indicator for being an only child on birth year variables up to the 4th polynomial.

$$Pr(sib = 0) = \alpha + \beta_1 birthyr + \beta_2 birthyr^2 + \beta_3 birthyr^3 + \beta_4 birthyr^4 + \epsilon. \tag{7}$$

From this regression, we compute the predicted value of the proportion of these women that grow up as the only child by birth year, $Pr(\hat{sib} = 0)$. There is an increasing pattern over the years because it reflects the continuously intensified family planning policy. As shown in appendix figure A.1.

Figure A.1: Distribution of the Predicted Probability of Growing Up in China as an Only Child by Birth Year.



Notes: The predicted probability of growing up in China as an only child by birth year is calculated based on family records from the Third (1982) and Fourth (1990) National Population Censuses of China. These data are available from IPUMS International.

Footnotes

[26] There exists a large number of collective dwellings, i.e., a group of individuals lives in the collective dorms provided by their employers or schools. These collective households will be reported as one household with the same household serial number. Still, it is reasonable to assume that they are not reported as the child of each other unless they are related.

[27] We have calculated the mean values using available 2000s census data. All the values are smaller than in the 1990s except for the Chinese female birth cohort in 1985. Since the difference is in the hundredths, we stick with the Chinese census of 1982 and 1990.

[28] There are 56 ethnic groups in China. The largest ethnic group is Han, which accounts for 92% of the total population. The other 55 minority ethnic groups mostly reside in the western and borderline areas of China (National Bureau of Statistics of China, 2020). Although no official statistics are collecting the ethnic groups of Chinese immigrants in the US, many anecdotal reports suggest that most Chinese migrated from Fujian and Guangdong provinces of China (Sachs, 2001), which are not primarily the location of minority ethnic groups. So, we constrain the regression analysis using Han ethnics. We used the alternative definition in earlier work, and the results are qualitatively similar.