Intergenerational Transmission of Fertility: Evidence from China's Population Control Policies*

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October 2022

This paper examines how the number of siblings that parents have affects their fertility decisions. I exploit the population control policies in China, which affected individuals unequally across birth cohorts and regions. The exogenous variation in fertility is used to identify the effect of the number of siblings on the number of children for the next generation. The results show that a couple tends to have 0.068 more children (4.3% of the average number of children) and is 5.6 percentage points more likely to violate the One-Child Policy (19.4% of the violation rate) if the husband and the wife have one more sibling each. Moreover, the effect on fertility is stronger for couples in rural areas where the One-Child Policy was enforced less strictly. I also show that ideal family size, especially that of the wife, is an important channel through which the number of siblings affects fertility.

Keywords: Intergenerational transmission; Fertility; Siblings; Preference formation; Population policies; China.

JEL codes: D19, J13, J18

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1 Introduction

Individuals growing up with more siblings are likely to have more children. This intergenerational correlation of fertility has been consistently observed in both developed and developing countries (Murphy, 2012, 2013). Despite the widely documented evidence for this correlation, it is not clear whether the effect is causal. The association can simply arise due to some third factors that affect the fertility of both generations. Socioeconomic status, for example, can be similar for two successive generations (Kolk, 2014). Moreover, parents and children share some genes which can partly determine fertility (Rodgers et al., 2001; Pluzhnikov et al., 2007; Kosova et al., 2010). Therefore, to make causal inferences, one has to partial out the effects of such confounding factors.

In this paper, I ask two closely related questions. First, does the number of siblings of an individual has a causal effect on his/her number of children? Second, what is the underlying mechanism for such an effect? To answer these questions, I draw on the experience of China and exploit the variation in the fertility of the parental generation induced by the population policies. China was one of the first countries to introduce population policies, and its policies are recognized as the most stringent in the world (Cleland et al., 2006). Following the Later Longer Fewer (LLF) Campaign in the early 1970s, China introduced the world-famous One-Child Policy (OCP) in 1979. The stringent policies are found to contribute to the modern fertility decline in China (McElroy and Yang, 2000; Li et al., 2005; Ding and Hesketh, 2006; Chen and Huang, 2020; Yin, 2022).

Individuals were unequally affected by these policies across birth cohorts and regions. First, the impact varied across birth cohorts. Individuals who were exposed to the LLF Campaign and the OCP at ages with high fecundity were more affected. Second, the timing of the LLF Campaign varied across regions, which makes individuals in the same birth cohort unequally affected. For an individual, I measure exposure to the policies by duration of an individual life with a specific policy weighted by the age-specific fertility rate before the policies. Hence, someone who lived for ten years with a policy during her twenties was more exposed than someone who lived in their thirties, since individuals are more likely to have children when they are younger. Similarly, two individuals who experienced policies in their twenties might have different exposure if they lived in different parts of China. I find that individuals more exposed to the policies have fewer children on average. The variation in fertility due to different degrees of exposure, therefore, is exploited to identify the causal effect of the number of siblings on the number of children for the next generation.

Based on two waves (2010 and 2014) of the survey data from the China Family Panel Studies (CFPS), this study shows that couples who have fewer siblings because their parents were more exposed to the population policies tend to have fewer children themselves. The results reveal that a couple tends to have 0.033-0.068 fewer children (2.1-4.3% of the average number of children) and is 2.4-5.6 percentage points less likely to violate the OCP (8.0-19.4% of the violation rate) if the husband and the wife have one fewer sibling each. Moreover, the effect on fertility is stronger for couples living in rural areas where the OCP was enforced less strictly. Further analysis shows that the ideal family size is smaller for those who have fewer siblings, and this leads them to have fewer children themselves.

This study contributes to the literature on intergenerational transmission of fertility. Most studies focus on the correlation between the number of siblings and the number of children (e.g. Booth and Kee, 2009; Murphy, 2012; Beaujouan and Solaz, 2019), but there are only two studies attempting to identify the causal effect of the number of siblings on fertility. Kolk (2015) exploits the exogenous increase in the number of siblings caused by twin births. Based on the administrative register data of Swedish males and females born during 1940-1965, the study shows that the number of siblings does not affect one's fertility behavior *per se* and concludes that the commonly observed intergenerational correlation of fertility appears mainly because of other factors shared by parents and children. In contrast, using gender composition of the first two children of parents as an instrumental variable for the number of siblings, Cools and Hart (2017) do observe a positive effect of the number of siblings on fertility for males but a negative effect for females based on the Norwegian register data.[1] Compared with the two studies, this paper exploits a new variation in the

[1] In a robustness check, they use twin birth as another instrument. Although the estimated effect is in the same direction, it is not statistically significant at the conventional level. The explanation for the difference

number of siblings, i.e., the variation caused by parental exposure to population policies. The findings are also different as I observe positive effects for both men and women. Besides, this study provides new evidence in the context of a developing country, complementing the vast evidence in currently developed countries.[2]

This study also contributes to the literature on preference formation and transmission. There is a growing literature showing that one's preferences, beliefs, and behaviors in various aspects can be shaped by his/her living environments. For instance, a male tends to be less biased against his wife working if he had a working mother or if his mother had a positive attitude toward female labor supply when he was young (Fernández et al., 2004; Fernández and Fogli (2009); Farré and Vella, 2013).[3] Fernández and Fogli (2006, 2009) show that the fertility of females is also affected by their family environments. They find that second-generation American women whose ancestors are from countries with higher fertility rates tend to have more children themselves. Since these women share the same socioeconomic environments in the U.S., the authors attribute the results to the culture and preference transmitted from the previous generation. As a complement, this paper provides new evidence that people's preference for fertility can be shaped by the number of their siblings, which might act beyond the direct transmission of preference from parents.

Finally, this paper helps to understand the long-run effects of population policies on fertility. Given the strictness of China's policies, a large literature has been devoted to examining the effects of the policies on various outcomes, such as fertility (McElroy and Yang, 2000; Ding and Hesketh, 2006; Chen and Huang, 2020), quality of children (Qian, 2009; Liu, 2014; Li and Zhang, 2017) and parental life quality (Chen and Lei, 2009; Wu

provided by the authors is that twin birth may affect outcomes of children through birth intervals other than the number of siblings.

[2]Most previous studies focus on developed countries (e.g., Murphy, 1999, 2013; Murphy and Knudsen, 2002; Reher et al., 2008; Booth and Kee, 2009; Kotte and Ludwig, 2011; Beaujouan and Solaz, 2019; Morosow and Kolk, 2020) except Murphy (2012), Silalahi and Setyonaluri (2018), and Pradhan and Gouda (2019). Murphy (2012) provides evidence for 46 contemporary developing countries in Sub-Saharan Africa, Asia, and Latin America that participated in the Demographic and Health Surveys Program. Silalahi and Setyonaluri (2018) focus on women in Indonesia, and Pradhan and Gouda (2019) focus on men and women in India.

[3]See Bau and Fernández (2022) for a review on the role of the natal family for female labor force participation, fertility, and human capital investment.

and Li, 2012; Islam and Smyth, 2015; Chen and Fang, 2021).[4] However, to the best of my knowledge, there is no paper focusing on the long-run effect of the policies on fertility for the next generations. This, however, can be important for a better understanding of the persistence of low fertility in China. As will be discussed in the next section, to increase fertility, China has gradually relaxed the One-Child Policy since 2011 and introduced the universal Two-Child Policy in 2015 and Three-Child Policy in 2021, but the fertility rate almost did not rebound. This study suggests that preference for fewer births shaped by the previous population policies is a potentially important factor among other socioeconomic factors.

Since the effect of population policies can extend to the next generations, the implication is that policymakers should make policies more moderate to avoid overshooting the target. This study also implies that population projection can benefit from explicitly taking preference formation into account. As suggested by Kolk (2014), intergenerational transmission of fertility will result in an increase in fertility over time because the proportion of individuals with more children will increase.

The paper proceeds as follows. Section 2 introduces the institutional backgrounds of China's population policies. In Section 3, I introduce the data and explain the variables used in the empirical analyses. Section 4 is on the identification strategy. Section 5 presents the results. Conclusions are made in Section 6.

2 Institutional Backgrounds

China was one of the first countries that implemented population policies. After the great famine during 1959-1961, China's fertility rate bounced back, and the total fertility rate (TFR) exceeded 6 in 1962, as shown in Figure 1.[5] In 1962, China issued the No. [62]698

[4]There are also studies focusing on savings rate (Wei and Zhang, 2011; Curtis et al., 2015; Ge et al., 2018), labor supply (Wang et al., 2017), gender ratio (Li and Zheng, 2009; Ebenstein, 2010; Li et al., 2011), misreport of twin birth (Huang et al., 2016), and criminality (Edlund et al., 2013).

[5]The TFR data for China in this figure are from the United Nations World Population Prospects: 2019 Revision. Please refer to https://population.un.org/wpp/ for more details.

document to advocate “family planning in urban areas and densely populated rural areas” to control population growth (Peng, 1996). In 1964, the family planning commissions were gradually established firstly at the national level and afterward at the province, city, and county levels (Chen and Huang, 2020). However, the Cultural Revolution in 1966 promptly shut down most of the institutions.

At the end of the 1960s, China’s population exceeded 800 million. Meanwhile, economic growth stagnated. The leaders in China attributed the economic stagnation to the large population size instead of the economic institutions (Zhang, 2017). In early 1970, Premier Enlai Zhou stressed that the implementation of family planning policies should not stop (Chen and Huang, 2020). In 1971, a document was issued by the State Council requiring establishing family planning leading groups at the province level to promote family planning (Peng, 1996). A pilot trial was launched in 1970 in Shandong and Guangdong provinces, and by 1975 all provinces had established a leading group.[6] The leading group was an important and superior provincial organization. In most cases, its leader was also the chief leader of the party committee at the province level (Chen and Huang, 2020).

As summarized by Chen and Huang (2020) from Peng (1996), the main work of the leading group was to organize professionals to propagate family planning, which encouraged people to get married “later” (23 years for females and 25 for males), to have a “longer” interval between the second birth and the first one (more than three years), and to have “fewer” children (at most two for each couple). As part of the propaganda, the knowledge about contraception and sterilization and the benefit of birth control were broadcast. In addition, research on contraception and sterilization measures was conducted, relevant technology and equipment were introduced, and contraception pills and condoms were distributed. Finally, to guarantee a successful policy, a system of rewards and penalties was also designed. Specific examples included paid vacation after a sterilization operation and priority in housing

[6] According to the population chronicle for each province, the establishment year of the family planning leading group at the province level is 1970 in Shandong and Guangdong, 1971 in Tianjin, Shanxi, Jilin, Zhejiang, Hubei, Hunan, and Sichuan, 1972 in Hebei, Liaoning, Heilongjiang, Anhui, Fujian, Jiangxi, Yunan, Gansu, and Ningxia, 1973 in Beijing, Shanghai, Jiangsu, Henan, and Shaanxi, 1974 in Guangxi and Qinghai, and 1975 in Guizhou and Xinjiang. Such information is not found for Inner Mongolia.

arrangements.

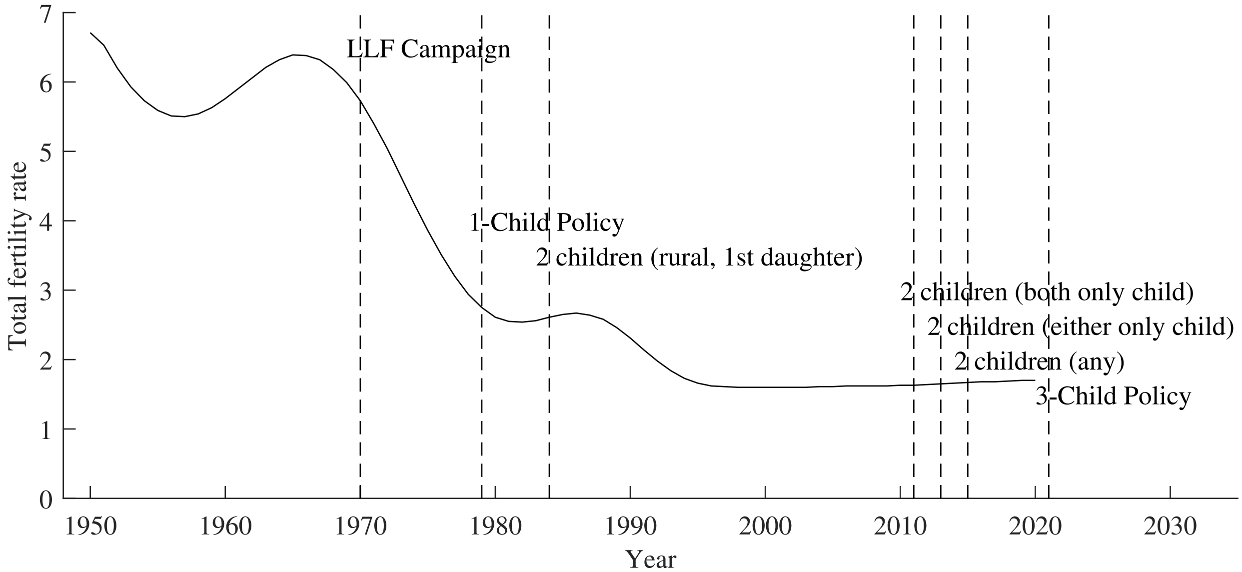

Figure 1 China's population policies

Although the LLF Campaign in the 1970s was voluntary in principle, it was effective in reducing the fertility rate (Babiarz et al., 2018). Chen and Huang (2020) find that the total fertility rate dropped earlier in provinces that formed a leading group earlier. Based on the difference-in-difference approach, they conclude that the campaign can explain about half of the decline in the total fertility rate from 5.7 in 1969 to 2.7 in 1978. The result suggests that the timing of the campaign can be exploited to identify the effects of declined fertility on other outcomes.

The OCP launched in 1979 was the last shot to curb population growth. This policy required each couple to have at most one child. Additional children would be excluded from free public education, and parents would be subject to monetary punishment (Ebenstein, 2010) and would lose their jobs if they were working in governments or state-owned enterprises (Zhang, 2017). However, this policy was strongly resisted by rural families, especially those having only one daughter, due to the traditional son preferences and large ideal family size. After a coercive abortion campaign in 1983 which caused civil unrest, China relaxed the policy in 1984 to make it less strict (Gu et al., 2007). Due to the geographic variation in demographic and socioeconomic conditions, the government enacted a localized population policy according to which inhabitants in different regions were subjected to different restrictions. In general, while urban couples were limited to have only one child, rural couples were allowed to have a second child if the first one was a daughter. In addition, couples in remote areas and other various groups, including ethnic minorities, could have a second or third child or even be exempted from such restrictions (Zhang, 2017).

Although the fertility decline after 1979 is partly due to the socioeconomic development (Cai, 2010; Guo et al., 2012), empirical studies suggest a significant negative effect of the OCP (McElroy and Yang, 2000; Ebenstein, 2010; Li et al., 2005). Overall, under the combined influence of the OCP and the socioeconomic development, the TFR declined from 2.75 in 1979 to 1.50 in 2000. The drop in fertility following the OCP suggests once again that the population policies can be exploited to identify the effect of the number of siblings on the number of children.

The Chinese government has been increasingly aware of the negative effects of the population control policies, including a rapidly aging population, a shrinking labor force, and an imbalanced gender ratio, which may threaten China's future economic growth (Hvistendahl, 2010; Peng, 2011; Banister et al., 2012; Basten and Jiang, 2015). The stringent policy has been gradually relaxed since 2011 when couples in which both the husband and the wife were only children themselves were allowed to have a second child. In 2013, the requirement became that either the husband or the wife was an only child. In 2015, the universal Two-Child policy was introduced, and any couple was allowed to have a second child afterward. In 2021, the Two-Child Policy was further replaced with the Three-Child Policy. However, the fertility rate remained sluggish, as shown in Figure 1. As will be discussed in this paper, the preference for fewer births shaped by the previous population policies can be a reason for the persistent low fertility.

3 Data and Variables

3.1 Data

The data used in the study are from the China Family Panel Studies (CFPS), which is a nationally representative, biennial longitudinal survey of Chinese households launched in 2010.[7] The baseline survey covers 144 counties/districts and 32 towns in 25 provinces in mainland China. Almost 15,000 households and almost 30,000 individuals aged above 9 were interviewed. Most respondents were tracked in the follow-up surveys. The dataset fits the study because it contains detailed information on parents, siblings, and children. Data from the 2010 and 2014 waves are used for the main analysis, and data from the other waves are used for robustness checks.

Since I seek to understand the intergenerational transmission of fertility, I divide couples into two generations based on women's birth cohort, the *parent* generation and the *grandparent* generation. The parent generation consists of couples where the wife was born during 1964-1994. Therefore, all the females were subject to the OCP once they started their fertile life (at the age of 15) and none of them were directly affected by the LLF Campaign. In the grandparent generation, wives were born during 1921-1963. They were exposed to the LLF Campaign in the 1970s and to the OCP after 1979. There is no overlap between the two generations. This analysis focuses on how the number of siblings in the parent generation, which was influenced by the population policies faced by the grandparent generation, affects the number of children of the parent generation.

Further restrictions are imposed on the sample. First, I restrict the parent generation to couples who were in their first marriage or cohabitation.[8] Second, I drop the top 0.2% observations for the key variables (the number of children and the number of siblings). With these restrictions, 4264 observations are left. Table A1 in Appendix A shows how the sample size and variable means change when these restrictions are imposed step by step.

[7]Please refer to http://www.isss.pku.edu.cn/cfps/ for more details.

[8]Fertility decisions might be made in different ways by families of other types.

3.2 Variables

3.2.1 Actual and Ideal Number of Children

The main variable of interest is the number of children of couples in the parent generation. In the survey, the information is not readily available. Instead, an adult respondent was asked about the basic information (birth year and month, sex, etc.) of each child whether or not the child is alive.[9] Based on this information in the 2010 survey, the total number of children can be easily counted.

In addition, the ideal number of children reported by both the husband and the wife is available in the 2014 survey, as an answer to the question "How many children do you think is best if there was no policy restriction?" Since the ideal family size was not measured before childbirth, one may be concerned that the number of children ever born may affect one's fertility preference. However, the concern can be alleviated considering that one's fertility preference is quite stable over time (Ray et al., 2018).

3.2.2 Number of Siblings and Parental Exposure to the Policies

For couples in the parent generation, the information on the number of siblings is readily available in the CFPS data. In the 2010 survey, CFPS asked the question, "How many siblings do you have, including those who have passed away?"[10]

For couples in the grandparent generation, I construct measures of exposure to the population policies, which can act as instrumental variables for the number of siblings of individuals in the parent generation. Following Wang (2016), Chen and Fang (2021), and Chen and Huang (2020), I define exposure based on women's birth cohort. More specifically, for the cohort in Province p and born in Year y, the exposure to a policy that started in Year

[9] Actually, few respondents reported the children who did not survive to age 5. However, this is not a concern since the number of surviving children is more relevant.

[10] One potential problem is that a respondent might not know an elder sibling if the sibling died before the birth of the respondent and therefore, the sibling was not counted. However, this is not an issue because an unknown sibling is not likely to have an impact on one's fertility behavior or preference.

$y_{p,0}$ and ended in Year $y_{p,1}$ is defined as,

$$PP_{p,y} = \sum_{a=15}^{49} AFR_p(a) \cdot I[y_{p,0} \leq y + a < y_{p,1}], \tag{1}$$

where $AFR_p(a)$ is the age-specific fertility rate in Province p before the policy, which measures the probability of childbearing at Age a. Notice that the fertility rate before the policy is used to guarantee its exogeneity. I is an indicator function that takes value 1 if the cohort was of childbearing age (15-49) and meanwhile the policy was effective. Hence I measures whether the cohort was exposed to the policy at Age a. Therefore, PP is the duration of exposure weighted by probabilities of childbearing.[11]

Two sets of measures are constructed, for the LLF Campaign and the OCP, respectively. For the LLF Campaign, the implementation year ranges from 1970 to 1975 for different provinces. For the OCP, the implementation year is 1979 for all provinces. Therefore, the age-specific fertility rate at the province level in 1969 and 1978 is used for the two policies, respectively.[12]

Figure 2 illustrates how to compute exposure to the policies taking the LLF Campaign in Guangdong province as an example. The LLF Campaign in the province was initiated in 1970 and replaced with the OCP in 1979. The age-specific fertility in 1969 is on the vertical axis. A female who was 38 years old in 1970 would be exposed to the campaign for 9 years until age 46. Her exposure can be measured by the light-grey area, the sum of age-specific fertility rates between ages 38 and 46. In contrast, a female aged 23 in 1970 would be exposed to the campaign until age 31 with high age-specific fertility rates during the period. Her exposure is measured by the dark-grey area, which is much larger than the light-grey area.

Since the timing of the LLF Campaign varied across provinces, individuals in the same

[11] The strategy is also supported by La Ferrara et al. (2012) who test the heterogeneous effects of exposure to soap operas on fertility during different periods of a woman's life. More specifically, they compute the number of years a woman is exposed to soap operas at ages 10-19, 20-29, and so on in 10-year brackets until 40-49, and test the effect of duration of exposure on fertility in different age brackets. They find that the effect is much larger at ages with higher fecundity (20-29 and 30-39).

[12] The age-specific fertility rate is from Coale and Chen (1987). It is estimated for every five-year age interval (15-19, 20-24,..., 45-49) based on the One per Thousand Fertility Survey in 1982.

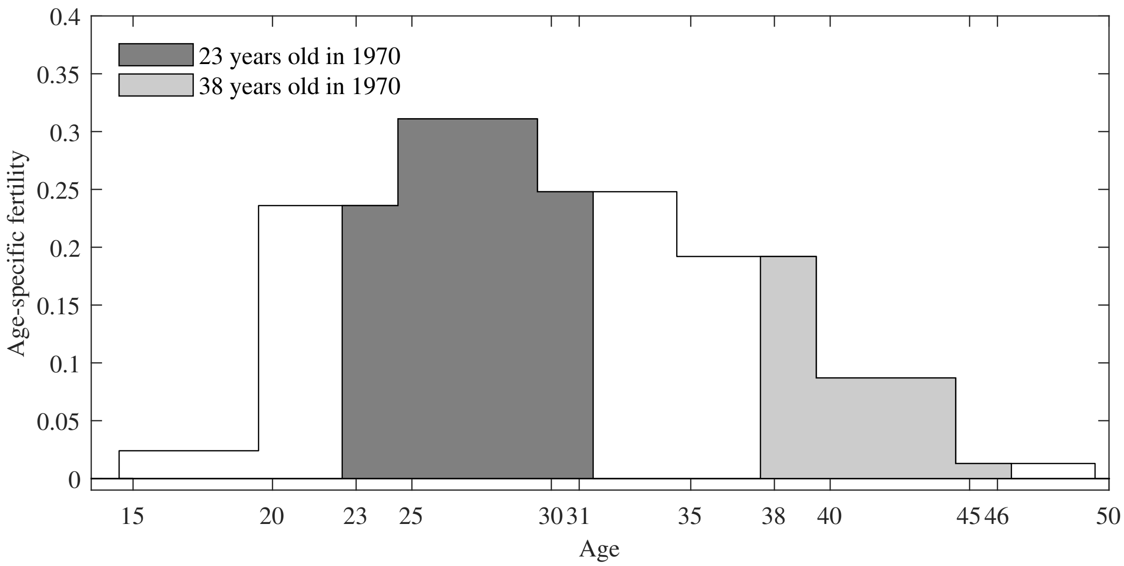

Figure 2 An example of exposure to the population policies

birth cohort might also be unequally exposed. This is illustrated in Figure 3, by taking Guangdong and Guangxi provinces as an example. While the LLF Campaign was started in 1970 in Guangdong, it was initiated four years later in Guangxi. Therefore, females born during 1921-1963 were more exposed to the campaign in Guangdong than in Guangxi. In contrast, the OCP was introduced in the two provinces at the same time. Therefore, individuals in the same birth cohort were almost equally exposed to the OCP no matter where they were living.

3.2.3 Control Variables

Some other variables that may affect fertility will be used in the analysis as control variables, including education, the age difference between the husband and the wife, birth quota, ethnic minority, and residential status. Previous studies show that education tends to reduce fertility (Caldwell, 1980; Axinn and Barber, 2001), so the number of years of education of both partners is controlled for. Since parents had still been subject to the OCP up to 2010, the birth quota is controlled for to capture the direct effect of the policy. The birth quota is computed simply according to the OCP, which takes value 1 for both urban couples and rural couples with a firstborn son and takes value 2 for rural couples

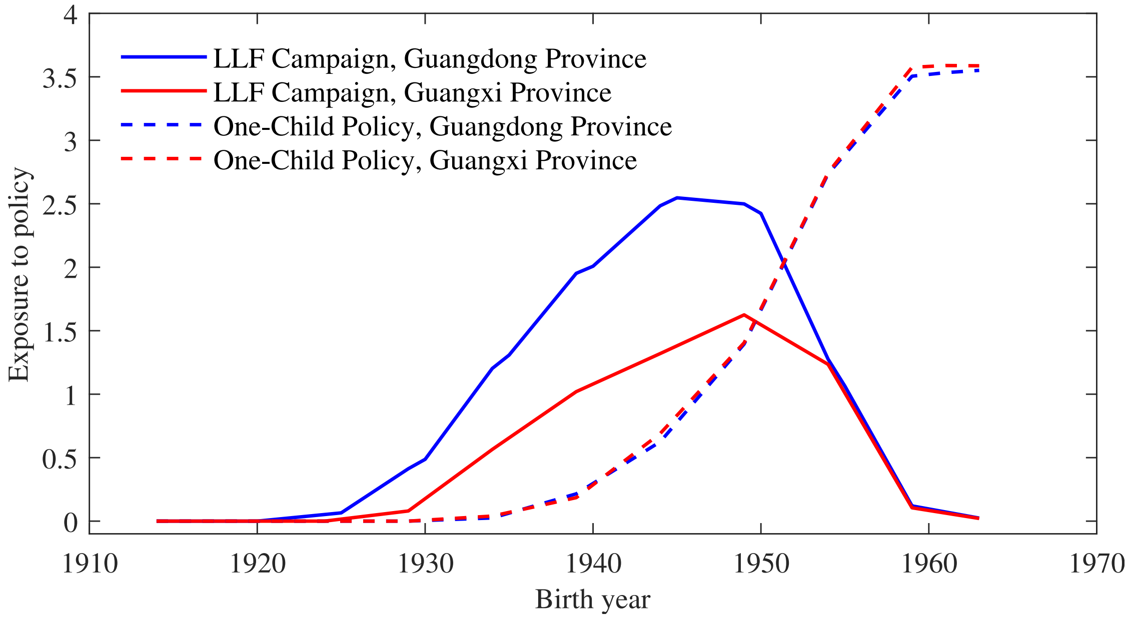

Figure 3 An example of exposure to the population policies across cohorts and regions

with a firstborn daughter. For rural couples with no child, the birth quota is assigned 1.5.[13] Considering that ethnic minority couples were subject to less stringent restrictions compared with their Han counterparts (Peng, 1996; Li et al., 2005; Li et al., 2011), a dummy variable is constructed, which equals 1 if either the husband or the wife belongs to an ethnic minority group. Finally, residential status (rural/urban) is controlled for as the enforcement of the OCP was more lenient in rural areas (Ebenstein, 2010). The summary statistics for all the variables are reported in Table A2 in Appendix A.

4 Empirical Strategy

The following empirical model is used to estimate the effect of the number of siblings of a couple on their fertility behavior,

$$Children_{i,p,y} = \beta_0 + \beta_1 SibH_{i,p,y} + \beta_2 SibW_{i,p,y} + \beta_3 X_i + \gamma_p + \eta_y + \epsilon_i, \tag{2}$$

[13]Birth quota is not computed accurately here. In fact, it is unfeasible to compute the exact birth quota for each couple, because the details of the policy varied across provinces and might change over time. As a compromise, this rule is more feasible and does not lose generality.

where $Children_{i,p,y}$ is the number of children of Couple i in Province p with the wife born in Year y. $SibH_{i,p,y}$ denotes the number of siblings of the husband, and $SibW_{i,p,y}$ the number of siblings of the wife. X_i is a set of control variables. Since couples in the sample are at different points of their life course, the wife's birth cohort fixed effect (FE) η_y is controlled for. The cohort FE and the age difference between the husband and the wife can capture the age structure of the family. Finally, the province fixed effect γ_p is controlled for.[14] ϵ is the error term. In all regressions, the standard errors are clustered at the wife's birth cohort-province level, and the sample weights for females are used.[15]

The ordinary least square (OLS) estimate might be biased because the intergenerational correlation of fertility could appear due to shared socioeconomic background (Kolk, 2014) or shared genes (Rodgers et al., 2001) of two successive generations. To identify the causal effect, I instrument the number of siblings of individuals in the parent generation with the exposure measures of his/her parents (in the grandparent generation). More specifically, two-stage least square (2SLS) regressions are performed with the first stage specified as,

$$\begin{aligned} SibH_{i,p,y} &= \alpha_{h,0} + \alpha_{h,1} PPH_i + \alpha_{h,2} X_i + \delta_{h,p} + \kappa_{h,y} + u_{h,i}, \\ SibW_{i,p,y} &= \alpha_{w,0} + \alpha_{w,1} PPH_i + \alpha_{w,2} X_i + \delta_{w,p} + \kappa_{w,y} + u_{w,i}, \end{aligned} \tag{3}$$

where PPH_i and PPW_i measure exposures to the population policies of the husband and the wife's parents respectively. The two variables are computed using the birth place and birth year of women in the grandparent generation, as shown in Equation (1). u is the error term. The 2SLS estimate will be compared with the OLS estimate to check the endogeneity of the number of siblings.

The validity of the instrumental variables relies on the fact that exposure to the population policies of one's parents reduced his/her number of siblings. Previous studies show that both the LLF Campaign (Babiarz et al., 2018; Chen and Huang, 2020) and the OCP (McElroy and Yang, 2000; Li et al., 2005; Ding and Hesketh, 2006; Ebenstein, 2010) were effective in reducing the fertility rate.

[14]When household income is controlled, the results are very similar. I prefer not to include household income as a control variable, because it may be affected by the number of children.

[15]Sample weights at the couple level are not available.

Figure 4 recaps the empirical strategy. The analysis focuses on the fertility outcome of the parent generation with the women born in 1964-1994. To identify the causal effect of the number of siblings, I exploit its exogenous variation induced by the population policies. Women in the grandparent generation were born in 1921-1963 and were exposed to the LLF Campaign and the OCP to different degrees. The unequal exposure resulted in the variation in the number of children of the grandparent generation, which is also the variation in the number of siblings of the parent generation.

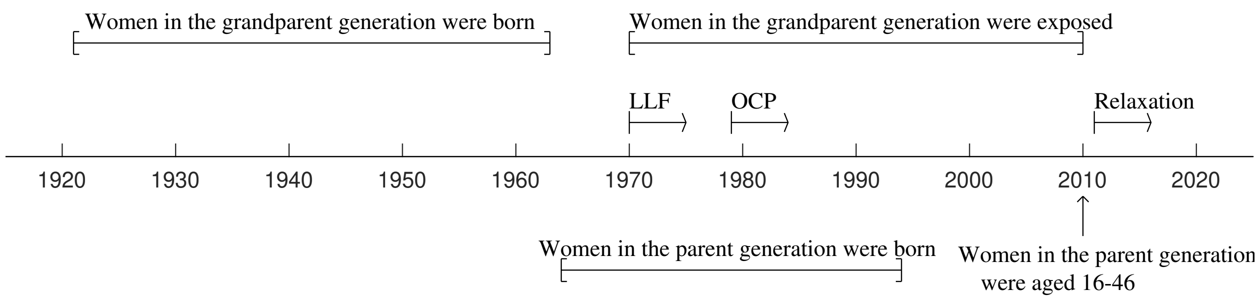

Figure 4 Empirical strategy

5 Results

The results are presented step by step. First, I show the effect of the number of siblings on the number of children, since fertility is the main outcome of interest. Next, I explore how the effect depends on the types of residence (rural or urban). Finally, I investigate the preference formation mechanism through which the number of siblings affects the number of children.

5.1 Effect of the Number of Siblings on the Number of Children

The OLS results are reported in Columns (1)-(3) of Table 1.[16] Since there is a strong positive correlation between the number of siblings of the husband and the number of siblings

[16]Since the dependent variable can only be non-negative integers, Poisson regressions are also performed as a robustness check. The results are in line with those in Table 1.

of the wife, they are put one by one in the regression, as shown in Columns (1) and (2). The results reveal a strong fertility transmission across generations. A man tends to have 0.020 more children on average if he has one more sibling, and the effect is 0.018 for a woman. In Column (3), the total number of siblings of the husband and the wife is taken as the key explanatory variable, and a similar effect is observed.

Table 1 Effects of the number of siblings on the number of children

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	0.020**			0.040*		
	(0.009)			(0.021)		
Siblings of wife		0.018**			0.031	
		(0.009)			(0.026)	
Total Siblings			0.017***			0.034**
			(0.006)			(0.016)
Education of husband	-0.018***	-0.018***	-0.018***	-0.018***	-0.017***	-0.017***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Education of wife	-0.032***	-0.032***	-0.032***	-0.032***	-0.032***	-0.030***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
Birth quota	0.317***	0.316***	0.317***	0.318***	0.314***	0.316***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)
Ethnic Minority	0.160***	0.160***	0.157***	0.157***	0.161***	0.155***
	(0.056)	(0.056)	(0.056)	(0.057)	(0.055)	(0.055)
Age difference	0.008*	0.010**	0.009*	0.007	0.010**	0.008
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Urban	-0.095***	-0.099***	-0.094***	-0.084**	-0.096***	-0.085**
	(0.034)	(0.034)	(0.034)	(0.035)	(0.034)	(0.035)
Wife's birth cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4264	4264	4264	4245	4236	4223
R^2	0.450	0.449	0.450	0.449	0.449	0.449
Endogeneity p value				0.324	0.569	0.247

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The results of the 2SLS regressions are shown in Columns (4)-(6) of Table 1. The effects are still statistically significant for the number of husband's siblings and the number of total siblings, although the estimation is less precise. For the number of wife's siblings, the effect is not significant at the conventional level but the direction is the same as in the OLS regression. The endogeneity tests suggest that the key explanatory variables are not endogenous in the OLS regressions. One possible reason is that the population policies were so stringent that they were the main determinants of the number of children in the grandparent generation. Therefore, the variation in the number of siblings in the parent generation is largely exogenous. This conjecture is verified by checking the first stage results in Table 2, which indicates that the effects of the policies are very significant both statistically and economically.

Table 2 First stage results

	(1) Siblings of husband	(2) Siblings of wife	(3) Total siblings
Exposure to LLF of husband's mother	-0.469***		-0.442***
	(0.048)		(0.065)
Exposure to OCP of husband's mother	-0.827***		-0.836***
	(0.060)		(0.075)
Exposure to LLF of wife's mother		-0.406***	-0.367***
		(0.050)	(0.078)
Exposure to OCP of wife's mother		-0.593***	-0.501***
		(0.047)	(0.071)
Controls	Yes	Yes	Yes
N	4245	4236	4223
R^2	0.449	0.449	0.449
Cragg-Donald F statistic	324.366	206.196	118.406

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Regarding the control variables, the education of both the husband and the wife reduces their number of children, with the education of the wife exhibiting a much larger effect. As expected, couples who were less restricted by the policy, as measured by having a higher birth quota and belonging to an ethnic minority group, tend to have more children. In contrast, couples dwelling in urban areas tend to have fewer children. Finally, the age difference between a couple tends to have a small positive effect on the number of children.

5.2 Effect of the Number of Siblings on the Violation of Birth Quota

Another perspective to look into the effect on fertility is to check the impact on violation of the ongoing OCP. I construct a dummy variable that takes value 1 if the number of children exceeds the birth quota and 0 otherwise. Then I check the effect of the number of siblings on this outcome. Table 3 shows that a couple tends to have more children than allowed by the policy if they have more siblings.[17] More specifically, Columns (3) and (6) suggest that the probability that a couple violates the policy would be increased by 2.4-5.6 percentage points if the husband and the wife have one more sibling each. Considering that only 30% of the couples in the parent generation have more children than allowed by the policy, this implies an 8.0-19.4% increase.

Table 3 Effects of the number of siblings on out-of-quota child

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	0.017***			0.030**		
	(0.005)			(0.013)		
Siblings of wife		0.012**			0.029*	
		(0.005)			(0.017)	
Total siblings			0.012***			0.028***
			(0.003)			(0.010)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	4264	4264	4264	4245	4236	4223
R^2	0.333	0.331	0.334	0.333	0.329	0.330

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Robustness checks are conducted by repeating the analysis using data from the 2012, 2014, 2016, and 2018 waves. The analysis focuses on couples who were successfully followed up. The results are presented in Tables A3-A8, and show that across different waves the number of siblings has a significant positive effect on fertility.

[17] Since the dependent variable is a dummy variable, Probit regressions are also performed as a robustness check. The results are in line with those in Table 3.

5.3 Heterogeneous Effect across Regions

This subsection explores whether the effect depends on the type of residence. During the period of the study, the OCP was still effective. However, the policy *per se* and its enforcement were different in urban and rural areas. First, as mentioned above, an urban couple was generally limited to have only one child, but a rural couple was allowed to have another birth if the first child was a daughter. Second, the policy was enforced less strictly in rural areas than in urban areas (Zhang, 2017). By controlling for the urban dummy, I can deal with the first fact. However, the second fact implies that the marginal effect itself may depend on the residence, as the lenient enforcement in rural areas left more room for the number of siblings to affect the number of children. Therefore, it can be expected that the number of siblings has a larger effect in rural areas. To test the heterogeneous effect, I introduce the interaction terms between the number of siblings and the urban dummy in the regressions and check their impacts.

The results are reported in Table 4. The effect is positive and significant in rural areas but is much smaller in urban areas. Take Column (3) for example, one more sibling increases the number of children by 0.022 on average in rural areas, but the effect is decreased by 0.016 in urban areas. The same pattern is observed when the instrumental variables are used, although the estimates are less precise.[18]

5.4 Mechanism of Preference Formation

When discussing the forces that may reinforce the fertility decline in Europe, Lutz et al. (2006) propose that the ideal family size for younger cohorts can decline as a consequence of the lower fertility they observe in previous cohorts. To verify the mechanism of ideal family size, analyses are conducted in three steps. First, I examine the effects of the number of siblings on one's ideal family size. Next, I examine how the ideal family size translates to

[18]Here the instrumental variables for the interaction terms are the interactions between the urban dummy and the exposure measures. The same strategy will be used when the heterogeneous effect across birth cohorts is discussed.

Table 4 Effects of the number of siblings on the number of children by residence

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Sibling of husband	0.027***			0.051**		
	(0.010)			(0.023)		
Siblings of wife		0.024**			0.032	
		(0.010)			(0.029)	
Total siblings			0.022***			0.039**
			(0.007)			(0.017)
Siblings of husband * Urban	-0.023			-0.048		
	(0.014)			(0.029)		
Siblings of wife * Urban		-0.020			-0.004	
		(0.015)			(0.034)	
Total Siblings * Urban			-0.016*			-0.023
			(0.009)			(0.018)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	4264	4264	4264	4245	4236	4223
R^2	0.450	0.449	0.451	0.449	0.449	0.450

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

the number of children. Finally, I check how the effects of the number of siblings on the number of children change when the ideal family size is controlled for.

Table 5 shows the effects of the number of siblings on one's ideal family size. Columns (1)-(3) show that the number of siblings has a positive effect on the ideal number of children for men, while Columns (4)-(6) show that the effect is much larger for women. In particular, a woman would like to have 0.062 more children herself if she has one more sibling. The same pattern can be observed when the instrumental variables are used, as shown in Table A9 in Appendix A.[19]

Table 6 reports the effects of ideal family size on the number of children. Column (1) shows that an increase in the husband's ideal family size by one leads to 0.193 more children. The effect is much larger for the wife. As demonstrated in Column (2), the number of children

[19]In Table A9, the effect for men is not significant, but the number of wife's siblings still has a significant and sizable effect on wife's ideal number of children. Here I rely mainly on the OLS estimates, as the previous results do not suggest that the OLS estimates suffer the endogeneity problem in the analysis and that the 2SLS estimates are less precise.

Table 5 Effects of the number of siblings on ideal family size

	Ideal number of children of husband			Ideal number of children of wife		
	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	0.028**			0.039***		
	(0.012)			(0.014)		
Siblings of wife		0.021*			0.062***	
		(0.012)			(0.014)	
Total siblings			0.022**			0.043***
			(0.009)			(0.010)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	3238	3238	3238	3382	3382	3382
R^2	0.160	0.158	0.161	0.160	0.168	0.171

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

increases by 0.244 if the ideal family size of the wife increases by one. The pattern of positive effects for both partners and a larger effect for the wife is further verified in Column (3), where the ideal number of children is considered simultaneously for both the husband and the wife.

Table 6 Effects of ideal family size on the number of children

	(1)	(2)	(3)
Ideal number of children of husband	0.193***		0.107***
	(0.037)		(0.031)
Ideal number of children of wife		0.244***	0.216***
		(0.031)	(0.036)
Controls	Yes	Yes	Yes
N	3254	3398	3046
R^2	0.472	0.478	0.495

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7 shows how the effects of the number of siblings on the number of children change before and after controlling for the ideal family size. Columns (1)-(3) replicate the results in Table 1 and show that the number of siblings has positive effects on the number of children for both the husband and the wife. These effects, however, disappear once the ideal family sizes are controlled for, as shown in Columns (4)-(6), which verifies that the ideal family size is exactly the channel through which the number of siblings affects the number of children.

Table 7 Effects of the number of siblings and ideal family size on the number of children

	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	0.020**			0.004		
	(0.009)			(0.010)		
Siblings of wife		0.018**			0.001	
		(0.009)			(0.009)	
Total siblings			0.017***			0.002
			(0.006)			(0.007)
Ideal number of children of husband				0.107***	0.107***	0.107***
				(0.031)	(0.031)	(0.031)
Ideal number of children of wife				0.215***	0.215***	0.215***
				(0.036)	(0.036)	(0.036)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	4284	4284	4284	3046	3046	3046
R^2	0.449	0.449	0.450	0.495	0.495	0.495

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

One interesting pattern is that the effect of the number of siblings on the ideal family size is larger for the wife (Table 5) and that the effect of the ideal family size on the number of children is larger for the wife as well (Table 6-7), suggesting that women play a more important role in the process of intergenerational transmission of fertility. A similar phenomenon is observed by Reher et al. (2008), who find that fertility is transmitted mainly through the female line rather than the male line in Spain during its period of demographic transition.

Another interesting pattern is that the number of siblings has much larger effects on the ideal family size than on the number of children (Table 1 and 5). The reason is that one unit increase in the ideal family size can only translate to 0.107-0.244 more births (Table 6-7), suggesting that the OCP might have constrained people from achieving their ideal family size. Therefore, one can infer that the intergenerational transmission of fertility could be more substantial if the OCP is less restrictive for the parent generation. In this sense, the pattern is in line with the previous finding that the effect on the number of children is only significant in rural areas where the policy was less strictly enforced.

Having identified the role of ideal family size, it is worth revisiting the heterogeneous effect of the number of siblings on fertility across rural and urban areas. There are two possible reasons for heterogeneity. First, the effect of the number of siblings on the ideal family size can be smaller in urban areas. Second, the OCP was enforced more strictly in urban areas, reducing the effect of other factors, including the number of siblings. In Table 8, I explore how the effects of the number of siblings on the ideal family size depend on the rural-urban division. The results lend supports to both arguments. It is evident that the effect on the ideal family size is much smaller in urban areas, which can lead to a smaller effect on fertility in these areas. However, the number of siblings still has a significant effect on ideal family size for females in urban areas, which implies that the relatively small effect of the number of children on fertility in urban areas can be partly attributed to the strict implementation of the OCP.

Table 8 Effects of the number of siblings on ideal family size by residence

	Ideal number of children of husband			Ideal number of children of wife		
	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	0.039***			0.047***		
	(0.013)			(0.016)		
Siblings of wife		0.030**			0.070***	
		(0.013)			(0.016)	
Total siblings			0.030***			0.050***
			(0.010)			(0.012)
Siblings of husband * Urban	-0.040**			-0.028		
	(0.017)			(0.017)		
Siblings of wife * Urban		-0.042*			-0.035*	
		(0.024)			(0.021)	
Total siblings * Urban			-0.031**			-0.025**
			(0.013)			(0.012)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	3238	3238	3238	3382	3382	3382
R^2	0.162	0.160	0.163	0.161	0.169	0.173

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6 Conclusions

This paper examines the causal effect of the number of siblings on fertility. The analysis draws on the experience of China, a country that implemented stringent population policies in the last several decades. By exploiting the timing of the policies, I show that couples who have more siblings because their parents were less exposed to the population policies tend to have more children themselves and that they are more likely to violate the One-Child Policy. Moreover, the effect on fertility is stronger for couples living in rural areas where the One-Child Policy was enforced less strictly and is also stronger for the old cohorts than the young cohorts.

Previous studies have proposed various explanations for intergenerational transmission of fertility. The commonly cited explanations include shared genes (Rodgers et al., 2001; Pluzhnikov et al., 2007; Kosova et al., 2010) and shared socioeconomic status (Kolk, 2014) by two consecutive generations. Other explanations include transmitted culture and preferred family size (Fernández and Fogli, 2006, 2009; Blau et al., 2013). In this paper, it is shown that preference for fertility can indeed be shaped by the youthhood family environment and that preference formation is an important mechanism through which the number of siblings affects the number of children.

The findings in the paper help to understand the persistence of China's low fertility. In order to increase fertility, China introduced the universal Two-Child Policy in 2015, but the fertility rate did not rebound as intended. In addition to various socioeconomic factors suppressing fertility, this study suggests that changed fertility preference is one cause that should not be neglected.

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Appendices

A Data

Table A1 Sample restriction

	No Restriction		+ Restriction 1		+ Restriction 2		+ Restriction 3		+ Restriction 4	
Variable	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean
Children	9893	1.808	5581	1.523	4451	1.564	4274	1.566	4264	1.562
Siblings of husband	9893	2.997	5581	2.659	4451	2.716	4274	2.707	4264	2.698
Siblings of wife	9893	3.112	5581	2.724	4451	2.803	4274	2.805	4264	2.795
Total siblings	9893	6.109	5581	5.383	4451	5.519	4274	5.511	4264	5.493
Ideal number of children of husband	7319	2.020	4083	1.960	3379	1.956	3247	1.957	3238	1.955
Ideal number of children of wife	7549	2.051	4238	1.979	3524	1.976	3392	1.974	3382	1.971
Exposure to LLF of husband's mother	8597	0.849	5206	1.206	4432	1.274	4255	1.279	4245	1.280
Exposure to OCP of husband's mother	8597	0.532	5206	0.862	4432	0.746	4255	0.758	4245	0.759
Exposure to LLF of wife's mother	8543	0.874	5079	1.217	4420	1.305	4246	1.303	4236	1.305
Exposure to OCP of wife's mother	8543	0.628	5079	1.033	4420	0.928	4246	0.934	4236	0.935
Education of husband	9893	7.155	5581	7.731	4451	7.821	4274	7.840	4264	7.847
Education of wife	9893	5.565	5581	6.486	4451	6.566	4274	6.559	4264	6.564
Birth quota	9893	1.314	5581	1.353	4451	1.354	4274	1.355	4264	1.354
Ethnic minority	9893	0.101	5581	0.124	4451	0.121	4274	0.119	4264	0.119
Age of wife	9893	44.967	5581	35.929	4451	36.608	4274	36.602	4264	36.594
Age difference	9893	2.034	5581	2.087	4451	1.915	4274	1.821	4264	1.816
Urban	9893	0.320	5581	0.274	4451	0.282	4274	0.278	4264	0.278

Notes: Restriction 1: drop if the wife was born before 1964. Restriction 2: drop if either the husband or the wife's mother was born after 1963. Restriction 3: restrict to couples who were in their first marriage or cohabitation. Restriction 4: drop if the key variables (the number of children and the number of siblings) are among the top 0.2%.

Table A2 Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Children	4264	1.562	0.785	0	6
Siblings of husband	4264	2.698	1.757	0	9
Siblings of wife	4264	2.795	1.676	0	9
Total siblings	4264	5.493	2.845	0	16
Ideal number of children of husband	3238	1.955	0.659	0	10
Ideal number of children of wife	3382	1.971	0.68	0	10
Exposure to LLF of husband's mother	4245	1.28	0.733	0	2.584
Exposure to OCP of husband's mother	4245	0.759	0.912	0	4.654
Exposure to LLF of wife's mother	4236	1.305	0.732	0	2.584
Exposure to OCP of wife's mother	4236	0.935	1.018	0	4.687
Education of husband	4264	7.847	4.37	0	19
Education of wife	4264	6.564	4.779	0	22
Birth quota	4264	1.354	0.472	1	2
Ethnic minority	4264	0.119	0.323	0	1
Age of wife	4264	36.594	6.413	17	46
Age difference	4264	1.816	2.875	-9	35
Urban	4264	0.278	0.448	0	1

B Additional Results

Table A3 Effects of the number of siblings on the number of children in *2012*

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	0.028***			0.052**		
	(0.009)			(0.020)		
Siblings of wife		0.028***			0.027	
		(0.010)			(0.027)	
Total Siblings			0.024***			0.039***
			(0.007)			(0.015)
Education of husband	-0.018***	-0.017***	-0.017***	-0.017***	-0.017***	-0.016***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Education of wife	-0.031***	-0.031***	-0.030***	-0.030***	-0.031***	-0.029***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)
Birth quota	0.348***	0.349***	0.349***	0.349***	0.351***	0.352***
	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
Ethnic Minority	0.152**	0.146**	0.145**	0.154**	0.151**	0.146**
	(0.062)	(0.061)	(0.060)	(0.062)	(0.062)	(0.062)
Age difference	0.005	0.007*	0.006	0.004	0.007*	0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Urban	-0.074*	-0.074*	-0.070*	-0.068*	-0.072*	-0.062
	(0.038)	(0.038)	(0.039)	(0.039)	(0.039)	(0.040)
Wife's birth cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
N	3573	3573	3573	3558	3555	3543
R^2	0.415	0.414	0.417	0.413	0.414	0.415

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4 Effects of the number of siblings on the number of children in *2014*

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	0.030***			0.067***		
	(0.010)			(0.025)		
Siblings of wife		0.034***			0.026	
		(0.011)			(0.033)	
Total Siblings			0.028***			0.050**
			(0.008)			(0.020)
Education of husband	-0.012**	-0.011**	-0.011**	-0.011**	-0.011**	-0.009*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Education of wife	-0.041***	-0.041***	-0.040***	-0.040***	-0.042***	-0.039***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)
Birth quota	0.383***	0.383***	0.382***	0.380***	0.378***	0.373***
	(0.038)	(0.039)	(0.038)	(0.038)	(0.038)	(0.038)
Ethnic Minority	0.154**	0.153**	0.149**	0.147**	0.158**	0.143**
	(0.069)	(0.068)	(0.067)	(0.068)	(0.068)	(0.066)
Age difference	-0.006	-0.004	-0.006	-0.008	-0.004	-0.006
	(0.007)	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)
Urban	-0.041	-0.043	-0.039	-0.034	-0.045	-0.034
	(0.044)	(0.044)	(0.044)	(0.045)	(0.044)	(0.045)
Wife's birth cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
N	2882	2882	2882	2874	2866	2859
R^2	0.399	0.399	0.402	0.393	0.399	0.398

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5 Effects of the number of siblings on the number of children in *2016*

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	0.044***			0.064**		
	(0.012)			(0.025)		
Siblings of wife		0.027**			-0.003	
		(0.013)			(0.036)	
Total Siblings			0.031***			0.037**
			(0.009)			(0.018)
Education of husband	-0.018***	-0.019***	-0.018***	-0.018***	-0.019***	-0.017***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Education of wife	-0.040***	-0.041***	-0.039***	-0.039***	-0.042***	-0.039***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Birth quota	0.427***	0.425***	0.428***	0.427***	0.421***	0.425***
	(0.041)	(0.042)	(0.041)	(0.041)	(0.042)	(0.041)
Ethnic Minority	0.294***	0.290***	0.283***	0.290***	0.311***	0.286***
	(0.090)	(0.090)	(0.088)	(0.090)	(0.091)	(0.089)
Age difference	-0.006	-0.003	-0.005	-0.007	-0.004	-0.005
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Urban	-0.018	-0.023	-0.016	-0.011	-0.021	-0.011
	(0.045)	(0.045)	(0.045)	(0.046)	(0.046)	(0.047)
Wife's birth cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
N	2458	2458	2458	2453	2445	2441
R^2	0.397	0.392	0.397	0.396	0.391	0.399

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6 Effects of the number of siblings on the number of children in *2018*

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	0.023**			0.054**		
	(0.011)			(0.024)		
Siblings of wife		0.016			-0.020	
		(0.013)			(0.032)	
Total Siblings			0.017**			0.027
			(0.008)			(0.017)
Education of husband	-0.018***	-0.018***	-0.018***	-0.018***	-0.020***	-0.017***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Education of wife	-0.033***	-0.033***	-0.033***	-0.033***	-0.034***	-0.033***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Birth quota	0.400***	0.400***	0.400***	0.399***	0.393***	0.394***
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Ethnic Minority	0.160***	0.160***	0.157***	0.157***	0.161***	0.155***
	(0.056)	(0.056)	(0.056)	(0.057)	(0.055)	(0.055)
Age difference	-0.004	-0.002	-0.003	-0.006	-0.003	-0.004
	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)
Urban	-0.034	-0.040	-0.034	-0.024	-0.042	-0.032
	(0.045)	(0.045)	(0.045)	(0.046)	(0.045)	(0.046)
Wife's birth cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
N	2536	2536	2536	2527	2522	2515
R^2	0.373	0.372	0.373	0.369	0.369	0.374
Endogeneity p value				0.324	0.569	0.247

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A7 First stage results using the *2012, 2014, 2016, and 2018* data

	(1) Siblings of husband	(2) Siblings of wife	(3) Total siblings
Panel A. 2012 survey data			
Exposure to LLF of husband's mother	-0.469***		-0.489***
	(0.057)		(0.075)
Exposure to OCP of husband's mother	-0.865***		-0.916***
	(0.070)		(0.087)
Exposure to LLF of wife's mother		-0.404***	-0.345***
		(0.056)	(0.088)
Exposure to OCP of wife's mother		-0.582***	-0.472***
		(0.049)	(0.081)
Controls	Yes	Yes	Yes
N	3558	3555	3543
R^2	0.405	0.340	0.471
Panel B. 2014 survey data			
Exposure to LLF of husband's mother	-0.488***		-0.491***
	(0.059)		(0.081)
Exposure to OCP of husband's mother	-0.768***		-0.803***
	(0.082)		(0.099)
Exposure to LLF of wife's mother		-0.384***	-0.308***
		(0.058)	(0.088)
Exposure to OCP of wife's mother		-0.583***	-0.418***
		(0.053)	(0.091)
Controls	Yes	Yes	Yes
N	2874	2866	2859
R^2	0.391	0.356	0.473
Panel C. 2016 survey data			
Exposure to LLF of husband's mother	-0.532***		-0.585***
	(0.068)		(0.095)
Exposure to OCP of husband's mother	-0.877***		-0.939***
	(0.088)		(0.110)
Exposure to LLF of wife's mother		-0.397***	-0.432***
		(0.068)	(0.100)
Exposure to OCP of wife's mother		-0.610***	-0.551***
		(0.060)	(0.087)
Controls	Yes	Yes	Yes
N	2453	2445	2441
R^2	0.348	0.310	0.413
Panel D. 2018 survey data			
Exposure to LLF of husband's mother	-0.605***		-0.598***
	(0.063)		(0.091)
Exposure to OCP of husband's mother	-0.885***		-0.970***
	(0.086)		(0.106)
Exposure to LLF of wife's mother		-0.430***	-0.473***
		(0.062)	(0.099)
Exposure to OCP of wife's mother		-0.659***	-0.540***
		(0.066)	(0.102)
Controls	Yes	Yes	Yes
N	2527	2522	2515
R^2	0.422	0.341	0.477

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses. 2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A8 Effects of the number of siblings on out-of-quota child in *2012, 2014, 2016, and 2018*

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. 2012 survey data						
Siblings of husband	0.019***			0.039***		
	(0.006)			(0.014)		
Siblings of wife		0.013**			0.014	
		(0.006)			(0.019)	
Total siblings			0.014***			0.029***
			(0.004)			(0.010)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	3573	3573	3573	3558	3555	3543
R^2	0.326	0.324	0.327	0.323	0.324	0.323
Panel B. 2014 survey data						
Siblings of husband	0.014**			0.040**		
	(0.007)			(0.017)		
Siblings of wife		0.012*			-0.001	
		(0.006)			(0.022)	
Total siblings			0.011***			0.027*
			(0.004)			(0.014)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	2882	2882	2882	2874	2866	2859
R^2	0.320	0.319	0.321	0.313	0.320	0.319
Panel C. 2016 survey data						
Siblings of husband	0.020***			0.023		
	(0.007)			(0.017)		
Siblings of wife		0.011			-0.021	
		(0.007)			(0.024)	
Total siblings			0.014***			0.009
			(0.004)			(0.012)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	2458	2458	2458	2453	2445	2441
R^2	0.320	0.317	0.320	0.322	0.311	0.323
Panel D. 2018 survey data						
Siblings of husband	0.011*			0.029*		
	(0.006)			(0.017)		
Siblings of wife		0.001			-0.036*	
		(0.007)			(0.021)	
Total siblings			0.005			0.008
			(0.004)			(0.012)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	2536	2536	2536	2527	2522	2515
R^2	0.292	0.291	0.292	0.290	0.283	0.296

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A9 Effects of the number of siblings on ideal family size (2SLS)

	Ideal number of children of husband			Ideal number of children of wife		
	(1)	(2)	(3)	(4)	(5)	(6)
Siblings of husband	-0.035			0.012		
	-0.028			-0.03		
Siblings of wife		-0.001			0.088***	
		-0.041			-0.031	
Total siblings			-0.022			0.031
			-0.025			-0.02
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	3226	3217	3208	3368	3361	3350
R^2	0.144	0.155	0.143	0.159	0.167	0.172

Notes: 1. Standard errors clustered at the wife's birth cohort-province level are in parentheses.
2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.