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High Confucian familism adherence but low fertility intentions: evidence from the lowest fertility rate city in China

YALEI ZHAI

Center for Southeast Asian Studies, Kyoto University

46 Shimoadachi-cho, Yoshida Sakyo-ku, Kyoto 606-8501, Japan

Correspondence: zhai@cseas.kyoto-u.ac.jp

ORCID: 0000-0002-4792-2235

Abstract

Despite transitioning from a one-child policy (1979–2015) to a universal two-child policy in 2016 and a three-child policy in 2021, China's birth rate has continued to decline. These policy changes, rooted in the assumption of high-fertility preferences influenced by Confucian familism, did not result in an anticipated increase in birth rates. Using a three-level policy design, this study estimates the impact of Confucian familism on fertility intention using instrumental variables. Data were drawn from the “Tianjin Citizen Fertility Willingness Survey” of the Tianjin Academy of Social Sciences (n = 655 women, aged 15–49). First, the results reveal that although Confucian ideals that encourage childbearing have been widely accepted; however, fertility intentions (i.e., the expected number of children) remain low. Second, despite controlling for fertility burdens and policy changes in the estimations, we observed that stronger adherence to Confucian familism does not significantly predict greater fertility intentions. However, such strong adherence may be associated with a greater willingness to have only one child. The results suggest that the inclination to have a single child, even under incentive-based birth policies, arises from an ultracompetitive society that lacks comprehensive social welfare guarantees.

Keywords: low birth rate, family planning policy, Confucian familism indicator, fertility intentions, ultracompetitive society, instrumental variables

Statements and Declarations

- Competing Interests

There are no conflicts of interest to declare.

- Funding

This study was supported by JSPS KAKENHI grant number 21K13280 and the National Social Science Fund of China via the Tianjin University of Technology.

- Data availability

Raw data were generated at Tianjin University of Technology. Derived data supporting the findings of this study are available from the author upon reasonable request.

Acknowledgments

I am grateful for advice from Shanping Yan of Doshisha University.

Introduction

Over the past 30 years, the nationwide family planning policy (commonly known as the “one-child policy”) has significantly decreased the number of births. “*Zhishengyigehao*” (“the benefits of having only one child”) has been widely disseminated in Chinese society. Consequently, China progressively eased its fertility restrictions in 2013, 2016, and 2021, introducing the “two-child policy,”¹ the “universal two-child policy,” and the “three-child policy.” However, the effectiveness of these liberalized policies fell short of expectations². The number of newborns was only 14.65 million in 2019. Furthermore, the number of new births dropped sharply to 12 million in 2020 and 10.62 million in 2021. The sustained decline to historic lows could be considered a significant catalyst for the implementation of the “three-child policy” in 2021. However, the newborn population reached a record low of 9.56 million in 2022. Moreover, recent studies have predicted a low future birthrate (e.g., Morgan et al., 2009; Vollset et al., 2020; Guo et al., 2021). Policymakers anticipated that relaxing the birth policy would stimulate individual-level fertility intentions, thereby increasing birth rates. This anticipation is grounded in two convictions: first, individual-level fertility intentions significantly predict actual fertility behavior (Ryder & Westoff, 1969; Westoff & Ryder, 1977; Freedman et al., 1980; Miller & Pasta, 1995; Schoen et al., 1999). However, surveys conducted in major Chinese cities in 2021 revealed exceptionally low fertility intentions among individuals of childbearing age³. Second, attitudes and behaviors toward fertility in China are deeply embedded in filial piety originating from Confucian philosophies (Logan et al., 2019), with a strong historical correlation

¹ The “two-child policy” is applicable only to couples in which either the husband or the wife is from a single-child family.

² These liberalizations had some effects in 2016 when 17.86 million new births were recorded, peaking in 2000. However, this “baby boom” no longer continued, with new births dropping to 17.23 million in 2017 and 15.23 million in 2018. Subsequently, the abolition of three family planning departments in 2018 symbolized the “end of family planning” by the Chinese government.

³ For example, the Xi’an Survey, which was conducted by the National Bureau of Statistics in 2021, revealed that 2% of people of childbearing age choose not to have children, 67% are willing to have only one child, 23% are willing to have two children, and only 8% have interest in having three children. The results of the Ji’nan Survey were similar—no respondent in the 20–25 age group was willing to have three children; in the 25–30, 30–40, and 40 and above age groups, only 6.5%, 6.1%, and 7% of the respondents were willing to have three children, respectively (China Business Network, 2021).

between Confucianism and China's large population (Tang, 1995)⁴. However, there is an obvious contradiction between the recent low birth rates and traditional Chinese culture (e.g., Confucian familism) that advocates for larger families.

Recently, individual-level reasons for the low birthrate in China have been discussed, including the economic burden on families (Chen et al., 2020; Wang & Sun, 2020; Yu et al., 2021; Zhai & Jin, 2023), postponement of marriage (Yang et al., 2022b), gender inequality, and women's work–family conflict (Ji & Zheng, 2018), increase in educational investment for children (Yu et al., 2021), and conflict between raising children and caring for the elderly (Ji et al., 2020). These reasons are rooted in orthodox economics discussions: dominant reasons for “expecting fewer children” are the changing labor market and employment environment (e.g., large numbers of women entering the labor market; Becker, 1991), relatively decreasing household income (Easterlin, 1978), and childcare costs (which also include balanced consideration of the interaction between the quantity and quality of children) (Becker & Tome, 1976). However, these China-based studies ignored cultural factors such as Confucian familism.

Does Confucian familism have significance in influencing micro-level fertility intentions? Based on psychological theoretical approaches such as the Theory of Planned Behavior (Ajzen, 1991; Ajzen & Klobas, 2013), the Traits–Desires–Intentions–Behavior model (Miller, 1994; Miller et al., 2004), and the Theory of Conjunctural Action (Fishbein & Ajzen, 2010), the influence of traditional gender roles (Miller & Pasta, 1993) seems to be negative. Confucian familism not only shapes individual attitudes but also serves as a significant social and subjective norm in Chinese society, which is crucial in determining fertility intentions and subsequent behavior. Despite this perceived importance, studies specifically investigating how cultural factors, such as Confucian familism, shape fertility intentions using a microeconomic approach are notably lacking.

Scholars have explored an “East Asian pattern” to address this gap, using South Korea as a typical example (Park & Cho, 1995; Yang & Rosenblatt, 2008; Chang, 2010). This pattern explains the low birth rate based

⁴ Based on our initial survey conducted in Tianjin, the findings indicate a strong emphasis on “Xiao” (filial piety) among respondents. (Of the surveyed individuals and their parents, 98% indicated the importance of filial piety toward parents or from children, with none expressing that filial piety toward parents or from children is unimportant in the questionnaire.)

on the conflict between Confucian familism (e.g., the burdens of family relations and responsibilities; Yang & Rosenblatt, 2008; Chang, 2010) and modern society (e.g., a society of individualism, feminism, gender equality, and changing concepts of marriage and family; Lesthaeghe, 2010, 2014, 2020; Zaidi & Morgan, 2017). Similarly, gender inequality rooted in the Confucian family model is a key contributor to falling fertility (McDonald, 2009; Suzuki, 2013; Kan & Hertog, 2017; Myong et al., 2021). The aforementioned studies provide significant insights that are highly relevant to China.

Does China conform to the East Asian pattern? If yes, then there should be evidence indicating a preference for a lower adherence to Confucian familism but a higher endorsement of modern society among the Chinese. In this regard, Ji and Zheng (2018) emphasized the need to understand Chinese fertility from an institutional and cultural context, but they only focused on women's work–family conflict as the key to examining China's low fertility rate. Similarly, Yang et al. (2022b) pointed out that the norm of universal marriage and childbearing for Chinese women is changing and thereby affecting the decline in birthrate, but they still emphasized marriage postponement as the leading factor influencing this decline.

Therefore, this study addresses the following three gaps identified by existing studies:

The first gap concerns the clarification of the contradiction between low birth rates and high-level fertility-preference Confucian familism. For this, we first determine whether women's fertility intentions are generally low under different policy levels. We then explore whether younger women have shifted from traditional Confucian familism (pronatalist values) to postmodern (antinatalist) values. These findings will help us discern China's alignment with the East Asian pattern.

The second gap relates to data quantification and variable measurement. Specifically, the Confucianism's measurement has not been discussed. To address this issue, we first assess women's endorsement of “Yangerfanglao” (bearing children for old-age security), “Chuanzongjiedai” (bearing children for the family's lineage), and “Duozi duofu” (more children, more blessings), which embody the quintessential Confucian ideals (particularly, filial piety). We then use principal component analysis (PCA) to combine these ideals into a singular Confucian familism indicator. We consolidate four fertility burdens (physical, financial, mental, and career burdens) into a unified fertility burden indicator.

The third gap focuses on identifying the effects of cultural factors using microeconomic methods. On the one hand, the endogeneity problem presents significant challenges. For example, unobserved family characteristics that influence women's values in Confucian familism are likely to affect fertility intentions.

To address this issue, we employ instrumental variables (IVs) in regressions to mitigate the endogeneity and simultaneity concerns caused by self-ratings. Conversely, fertility burdens and changes in birth policies, which are often overlooked, are meticulously controlled in our estimations. These efforts contribute to the empirical finding that a stronger adherence to Confucian familism does not significantly predict greater fertility intentions in contemporary China.

The rest of the article is organized as follows. First, the background section provides an overview of the survey and offers a detailed explanation of variable selection and measurement. Second, the data and methods section outlines the analytical strategy and the variables used. Third, the results section presents descriptive findings and examines the determinants of fertility intentions, with a focus on contexts where employment stability and essential social welfare are lacking. Finally, the discussion and conclusion section reviews the key findings, discusses implications and limitations, and suggests directions for future research.

Background

Survey site

Figure 1 shows a declining trend in birth rates among the four municipalities in China (Beijing, Shanghai, Tianjin, Chongqing) over the last two decades. In particular, Tianjin is considered a typical fertility-declining society; its birthrate dropped to the lowest among the four municipalities in 2007 and has remained low thereafter. Not surprisingly, Tianjin was one of the leading cities in the strict implementation of the one-child policy. In 1963, Tianjin established a family planning committee and took the lead in advocating for and implementing the policy (Lyle, 1980). According to the Tianjin Municipal Health Commission (2009), Tianjin was the first city in China that “achieved” the population reproduction transition from the “high birth, low death, high growth” pattern to the “low birth, low death, low growth” pattern. By examining the factors that affect Tianjin citizens’ fertility, it is possible to identify reasons for the declining birth rate in China over the past decade.

[Figure 1 about here]

Therefore, we chose Tianjin as the survey city and adopted data from the “Tianjin Citizen Fertility Willingness Survey” of the Tianjin Academy of Social Sciences (n = 2018 individuals)⁵. This survey captures fertility intentions and burdens, birth policies, and cultural values, focusing on the recognition of fertility. Based on 1,209 questionnaires from female respondents out of the total number of 2018 questionnaires, we built the dataset. One may argue that the women-only sample has limitations such as ignoring spouses’ intentions and may lead to an underestimation of the fertility intentions of a family (husband and wife). However, as pointed out by Thomson (1997), when couples disagree about wanting a child, each partner’s intentions shift toward not having a child, and disagreement in desires or intentions was reflected in birth rates that were lower than average. We posit that a women-only sample can accurately depict the current fertility situation in China. Although the sample size is not large, it is adequate for the type of analysis undertaken.

Depending on the categories of their age cohort and birth control policy differences, we first clarify the “expected number of children” of women (n = 655 women, aged 15–49 years). Second, we quantify women’s understanding of specific Confucian familism ideals. Third, we empirically examine the impact of Confucian familism on women’s fertility intentions, placing particular emphasis on the determinants of intention for more than one child. The following subsections provide a detailed introduction to quantifying fertility intentions, Confucian familism, and fertility burdens, respectively.

Fertility intentions

There is a long history of research on considering the number of expected children as a predictor of future fertility. However, the expected number of children usually exceeds the actual number (Coleman, 1996; Goldstein et al., 2003). In other words, people tend to have a greater fertility aspiration, yet for various reasons, this aspiration remains unfulfilled. Is it possible that the Chinese still have high-fertility intentions but they are not fulfilled?

⁵ The Tianjin Academy of Social Sciences has developed an online social survey system that conducts regular online questionnaire surveys. The samples were randomly selected from 16 districts of Tianjin City. The survey retrieved valid questionnaires in 2018 using the online social survey system of the Tianjin Academy of Social Sciences in 2020 and 2021.

There is an issue of overestimating fertility intentions in China, as pointed out by Zheng (2014) and Zhang and Wang (2015), some surveys and studies have overlooked the need to distinguish various indicators representing “fertility intentions.” For example, there is a gap between “ideal number of children” and the “expected number of children” (Suzuki, 1999), but the two conceptions are confusing, particularly in the Chinese language. To address these biases, we carefully identified the different definitions of these terms in the questionnaire responses. Second, considering that women may make certain adjustments to match different policies, we categorized three policy levels: Level 1: expectation under a family planning policy; Level 2: expectation without any family planning policy; and Level 3: expectation under a fertility-encouraging incentive policy ⁶.

Table 1 summarizes and compares the expected number of children born to women under 35 with those over 35 at the three degrees of policy relaxation. We used 35 years old as the age threshold for the following two reasons: (1) medically and statistically, women over 35 are generally classified as “advanced maternal age” and are no longer at the socially optimal age for reproduction in China; (2) Chinese women generally completed their first and second childbirths by the age of 35 years (Appendix Table 2 and Appendix Table 3).

[Table 1 about here]

The results first reveal that women’s fertility intentions are generally low. Overall policy relaxation and incentives could hardly motivate women’s fertility intentions. Even with the fertility incentive policy (Level 3), the increase was only approximately 0.29 people on average (from 1.42 persons to 1.71 persons). Second, the fertility intentions of young women aged 35 years and below were initially lower than the average of the entire sample. Although policy relaxation and fertility incentives led to a certain degree of improvement (increasing from 1.33 persons to 1.64 persons), the impact was not significant. We contend that there exists

⁶ The National People’s Congress has been officially discussing Level 3 incentive policy since 2019. Examples include setting up special fertility incentive funds, allowing employees to choose 1–2 days of telecommuting, enhancing the accessibility of kindergartens, and providing childcare service subsidies and financial rewards to families for giving birth to a second or third child (Beijing Youth Daily, 2022).

a tendency to avoid high-fertility intentions. Third, it is noteworthy that approximately 24% of women (159 women out of 655 women) did not exhibit any changes in their fertility intentions across the three policy levels. Thus, policy relaxation lacks incentive significance for these women. By excluding them, we explored policy-sensitive women (496 of 655 women) in Appendix Table 6.

Confucian familism

Confucian familism that prioritizes a high level of fertility is thoroughly specific and instructive: one who grows up in China cannot escape from being indoctrinated with ideals based on filial piety such as “Yangerfanglao” (bearing children for old-age security), “Chuanzongjiedai” (bearing children for the family’s lineage), and “Duozi duofu” (more children, more blessings). Quantification of the indicator measuring the three ideals is of great importance. In the questionnaires, a five-point self-rating scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree) was used to evaluate each Confucian family ideal. Therefore, we synthesized the three evaluation scores into one indicator, Confucian familism, using principal component analysis (PCA). The resulting indicator (Confucian familism value) was used for subsequent statistical analyses, eliminating the simultaneity among the three ideals. A modern fertility value indicator was synthesized using the same method (see Appendix Fig. 1)⁷. Moreover, we did not observe that young women (under 35) endorse modern values more than women over 35. This indicates that China should not conform to the East Asian pattern.

Figure. 2 depicts the distribution of the degree of women’s recognition of Confucian family values for women under 35 and those over 35. We found no significant differences between the two groups. In other words, the fact that women under 35 years of age have lower fertility intentions (Table 1) cannot be simply

⁷ Postmodern (antinatalist) values are reflected in the following recognitions: (1) “It is congratulatory to have either boys or girls,” (2) “Having children is a personal freedom,” (3) “Having a child (or not having a child) is a personal choice and the government and family should not interfere in it,” and (4) “Rearing a child is not an end in itself but a choice to shift one’s life role from an individual to a parent.”

attributed to whether (or to what degree) they accept Confucian familism⁸. On the one hand, these findings reconfirm previous findings that women of childbearing age have a lower fertility willingness. On the other hand, it supports the idea that younger women may not have transferred from so-called traditional Confucian familism (pronatalist values) to postmodern (antinatalist) values⁹. This could serve as another evidence that China does not conform to the East Asian pattern.

[Figure 2 about here]

Fertility burdens

Following Balbo et al. (2013), we categorized four fertility burdens: physical, financial, mental, and career burdens (5-point scale on how much one evaluates her burdens: 5 = very heavy, 4 = heavy, 3 = tolerable, 2 = light, 1 = not heavy at all). The statistics of the scores for each burden are presented in Table 2, using age 35 as the threshold. Similar to the Confucian familism indicator in previous section, we use principal component analysis (PCA) to synthesize the four burden scores into one indicator: burden.

Table 2 shows that physical, financial, and mental burdens are generally high, with a median value of 4. Meanwhile, the three abovementioned burdens do not differ significantly according to age. The career burden seems to be heavier for young women (age ≤ 35), but we consider that young women are generally on the rise in their careers, which makes them more anxious about possible stagnation or conflicts between their careers and childbirth and childcare. Regarding financial burden, women are more likely to feel stressed when they are younger and have a disadvantageous income level than women over 35. In this

⁸ Appendix Table 1 compares the three ideals separately by age group. However, the idea of “Yangerfanglao” (bearing children for old-age security) and “Chuanzongjiedai” (bearing children for the family’s lineage) is weaker among women under 35 than among women over 35, but surprisingly, women under 35 agree more on the idea of “Duozi duofu” (more children, more blessings). Therefore, it cannot be easily concluded that young women no longer approve of high-level fertility-preference Confucian family ideals.

⁹ For those interested in modern fertility values, check Appendix Figure 1. Although we describe different types of fertility values using traditional pronatalist and modern antinatalist values, the two are not mutually exclusive. Thus, the same woman may embody both values, at least some of them, or completely reject both. Figure. 2 in the main text and Fig. 1 in the Appendix provides a factual basis for subsequent regression analyses, but not for simple comparisons. In the Results Section, we discuss whether the degree to which traditional values are accepted affects the willingness to have children.

context, the comparison presented in Table 2 provides a relative age-based perspective and underscores similarities rather than highlighting divergent perceptions among age groups.

[Table 2 about here]

Data and Methods

In this section, we examine whether Confucian familism affects women's fertility intentions when fertility burdens and birth control policies are properly controlled. The benchmark regression equation for fertility intentions is as follows:

$$FI_i = \beta_0 + \beta_1 Value_i + \beta_2 Burden_i + \beta_3 Control_i + \varepsilon_{1i} \quad (1)$$

where FI_i represents the fertility intention (expected number of children) of woman i . $Value_i$ is the Confucian familism index of women of woman i . $Burden_i$ is the fertility burden index of woman i . $Control_i$ is a vector containing variables representing exogenous individual characteristics of woman i , and ε_{1i} is the error term.

However, concerns remain regarding the endogeneity and simultaneity of FI_i and $Value_i$, and of FI_i and $Burden_i$, which were all obtained through self-ratings in the questionnaires. For example, there are factors (for example, one's family harmony) that affect one's self-evaluation of $Value_i$ and $Burden_i$, and affect the dependent variable FI_i . Factors such as family harmony that cannot be quantified are merged into the error term. However, they might influence $Value_i$ and $Burden_i$, consequently affecting their fertility intentions. Therefore, we introduce an instrumental variable (IV) design, and the following regression equations are estimated in inductive form:

$$Value_i = \lambda_0 + \lambda_1 Z + \varepsilon_{2i} \quad (2)$$

$$Burden_i = \gamma_0 + \gamma_1 Z + \varepsilon_{3i} \quad (3)$$

where $\{Sibling, Nongrandparenting\} \in Z$.

Equations (2) and (3) specify explanatory variables ($Value_i$ and $Burden_i$) in the first-stage regressions and IVs (Z), including *Sibling* and *Nongrandparenting*. ε_{2i} , ε_{3i} are error terms of Equations (2) and (3), respectively.

The key assumption in the design and selection of instrumental variables is exogeneity, meaning that the instruments are correlated with explanatory variables $Value_i$ and $Burden_i$ and uncorrelated with the error term ε_{1i} . We first employed *Sibling* (number of siblings of sampled women) as an instrumental variable. Specifically, the number of siblings of women i is correlated to their decisions regarding marriage and fertility through the following mechanism: more siblings (larger family) → stronger Confucian family values → stronger fertility intentions. Importantly, as demonstrated by Kolk (2015), an individual's fertility intentions are not directly correlated with the number of their own siblings, implying that the number of a person's siblings does not directly influence marriage and fertility decisions (i.e., it does not create a direct mechanism such as [more siblings (larger family) → stronger fertility intentions]). The family size (number of siblings) of a woman i from childhood to adulthood influences her understanding of familism, which is one of the factors that affect a woman i 's marriage and fertility decisions (expected number of children). Simultaneously, we also use *Nongrandparenting* as an instrument, which represents the difficulty of cooperation by the parents of woman i in raising their grandchildren. The background for selecting this instrumental variable is that grandparenting has even become an unspoken agreement between young couples and their parents in Chinese society (e.g., Arpino et al., 2014; Ji et al., 2015; Mustillo et al., 2021; Zhang et al., 2022). With this premise, we can infer the mechanism as follows: difficulty of grandparents raising grandchildren → higher fertility burden → lower fertility intentions.

There are some weak instrument concerns regarding *Sibling* and *Nongrandparenting*. We conducted a rigorous weak instrument test, and the results indicated that they can serve as effective IVs in the derived equations. Although they may not be perfect instruments, in our analytical framework, they provide valuable information about the impact of family background and cultural factors on fertility intentions. One should be mindful of these potential limitations and interpret the results cautiously when using IVs (refer to Tables 5 and 6 and the weak IV Anderson–Rubin test results in Table 6 in the Appendix).

After considering the endogenous variables ($Value_i$ and $Burden_i$), the second stage structural equation is as follows:

$$FI_i = \rho_0 + \rho_1 \widehat{Value}_i + \rho_2 \widehat{Burden}_i + \rho_3 Control_i + \varepsilon_{4i} \quad (4)$$

In Equation (4), $\widehat{Value}_i$ represents the predicted values of the Confucian familism score, and $\widehat{Burden}_i$ represents the fertility burden score for woman i obtained from the first-stage regression.

However, as pointed out in “Fertility intentions,” fertility intentions (expected number of children) among women remain consistently low across age groups and exhibit minimal variations despite changes in birth control policies. Figure. 3 depicts the distributions of the expected number of women’s children by age groups and Level 1–3 policies. This section discusses the expected number of children for the overall sample, women aged 35 and above, and women aged 35 and below.

First, across all age groups, the expected number of children was mostly one or two (“one child enough, two children maximum”). Second, regarding women aged 35 and below, most tend to have only one child, with the inclination to have two children only under an encouraging Level 3 policy. This is consistent with Duan and Chen (2022) study, which pointed out that China has formed a unique pattern of parity-specific fertility profile, with universal progression to the first birth, a very low but policy-sensitive progression to the second birth, and an extremely low progression to the third birth. Therefore, it is crucial to shift our focus from how many children one expects to have to whether one expects to have more than one child¹⁰.

[Figure 3 about here]

¹⁰ The “one child enough, two children maximum” intention has been widely observed in Chinese society. For example, Wang et al. (2019) found that the ideal number of children among urban working women was 2.03 ± 0.35 . Wang and Sun (2020) also considered the “one child enough, two children maximum” intention to have a mixed gender preference (to have a daughter and a son). Duan and Chen (2022) noted universal progression to the first birth, very low but policy-sensitive progression to the second birth, and extremely low progression to the third birth. Similarly, Su-Russell and Sanner (2023) demonstrated that having at least one child may be assumed to be inevitable, reflecting the lack of explicit decision-making. One may argue that son preference is motivation. Based on the results of the five-point self-rating statement “it is commendable to have either boys or girls” (Footnote 7 and Appendix Fig. 1), we did not find evidence of son preference among our observations. There are two possible explanations for the lack of significant son preference exist. First, the survey respondents were from the urban population of Tianjin, where there may be less prevalence of son preference. Second, respondents may have deliberately concealed their son preference bias while completing the questionnaire, as Jiang et al. (2016) noted that son preference might lead to a preference for sex-selective abortion. Therefore, we used whether the respondents already had a son (son dummy) as a control for son preference to confirm whether it influenced their further fertility intentions.

Therefore, we take the probability of expected fertility(PFI_i , expecting to have more than one child = 1, expecting to have only one child or remain childless = 0) as the dependent variable. Similar to equation (1), we reconstruct an IV probit model. The basic regression equation for the second stage of the IV probit model is as follows:

$$P(PFI_i = 1) = \Phi (\rho_0 + \rho_1 \widehat{Value}_i + \rho_2 \widehat{Burden}_i + \rho_3 Control_i) \quad (5)$$

In equation (5), $P(PFI_i = 1)$ is the probability that woman i will have more than one child (expecting to have only one child or remain childless = 0). $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution. $\widehat{Value}_i$ is the predicted value of the traditional values score for woman i after the first-stage regression. $\widehat{Burden}_i$ is the predicted value of the fertility burden score for woman i after the first-stage regression. Therefore, we examine whether Confucian familism has a positive effect on the probability of fertility intentions with more than one child.

Results

Statistics

Table 3 presents the mean, median, minimum, and maximum values for 655 women (full sample). The “Difference” column compares the values of women aged 35 and above (374 individuals) with those aged 35 and below (281 individuals). The dependent and main independent variables are explicitly explained during model construction in previous section. The control variables include the following characteristics of the surveyed women: (1) individual characteristics of health status (self-assessment) and education; (2) family characteristics of mother’s age, whether she already has a son, and the number of properties owned; (3) and socioeconomic characteristics of whether she has a Tianjin hukou, whether her occupation or position accommodates childbirth, and whether she lives in the inner six districts of the city (where the cost of living and education is relatively high).

[Table 3 about here]

The comparisons effectively validate the conjectures in Fig. 2a and Table 2 that there is no statistically significant difference in the perception and evaluation of traditional values and fertility burden between women aged 35 and above and those aged 35 and below. Thus, we can refute the following biases against young women: (1) young women are unwilling to have children because they are not sufficiently traditional, and (2) young women think that the fertility burden is too heavy and they are unwilling to have children.

Results for fertility intentions

We need to address a fundamental issue—whether significant differences exist in key characteristics between women who expect to have two or more children and those who only want to have one child or remain childless. We addressed this issue using the *t*-tests presented in Table 4. We find that women expecting to have two or more children (Group A) display stronger Confucian familism. In addition, Table 4 indicates that women who only want to have one or no child (Group B) may shoulder a heavier fertility burden. We empirically examine them in the Section below.

[Table 4 about here]

Determinants

As discussed in the data and methods section, we use IV probit analysis under a three-level fertility policy design to investigate the factors influencing women’s fertility intentions, where fertility expectations are defined as more than one intention (expecting to have more than one child = 1) or one or no intention (expecting to have one or no child = 0). The results are presented in Tables 5 and 6. The results in columns (1), (2), and (3) present the regression coefficients of the IV probit model, whereas the results in columns (4), (5), and (6) display the marginal effects (*dy/dx*) in both tables¹¹.

[Table 5 about here]

¹¹ Regarding the endogeneity test of *Value_i* , and *Burden_i*, we compare the results derived from the general Probit model without considering endogeneity, as shown in Tables 4 and 5, with Appendix Tables 4 and 5.

Table 5 presents the regression results of the determinants of more than one-child intention under the three-level policy design. In the results of policies Levels 1 and 3 (columns (1), (3), (4), and (6)), the model properly fits the data. We confirmed: 1) the regression results in column (6) indicate that when encouraged by an incentive fertility policy, women with stronger Confucian family values are more likely to have two or more children. 2) Compared with the results in column (4), the results in column (6) imply a substantial increase in the marginal effect of Confucian family values under the incentive policy (from 0.299 to 0.538). This implies that women with a strong adherence to Confucian familism might be encouraged with certain nudges to have a second child (or even a third child), highlighting the possible effects of incentive policies. Furthermore, fertility burdens are not likely to significantly affect the intention to have two or more children. Another interpretation is that the pressure of childrearing (especially for women unwilling to have a second or third child) does not arise solely from financial, physical, mental, or career burdens. This result implies that other fertility burdens and the causes of such burdens must be further explored. For instance, efforts to reduce the economic and opportunity costs of childbearing and to alleviate the burden of raising children (e.g., Yang et al., 2022a; Xu, 2023) do not seem effective.

Women expressed that they tolerate the current high financial, physical, and mental costs, such as childcare and education expenses, or the negative impact on their career. However, their worries revolve around the future well-being of their children¹². They worry that without dedicating substantial time, money, and effort to their children's education, there is a huge risk that their children may not gain admission to a reputable

¹² There is also a well-known Confucian statement from the Three Character Classic ("San Zi Jing,") that "a wayward child is the fault of the parent" ("Yangbujiao, fuzhiguo"). It aligns with the philosophy of "tiger parenting," which advocates strict education and high expectations (similar to the education fever in Korea mentioned by Anderson and Kohler (2013)).

school and then to college and thus may face challenges in securing a stable job¹³. Thus, the burden of childrearing does not occur in the present (for parents) but rather in the future (for their children)¹⁴.

Second, Table 6 focuses on women aged below 35 years. All findings indicate that a stronger Confucian family value does not predict a higher likelihood of expecting more than one child. In contrast, as presented in column (3), it is more likely that this Confucian family value may hinder some young women with initially high-fertility intentions from having more than one child. Combining these results with those presented in Fig. 2, we observe that young women still adhere to strong traditional Confucian familism values, but these values do not significantly encourage women to have children. Furthermore, there is no evidence that policy relaxation significantly stimulates fertility intentions.

[Table 6 about here]

Our findings present an intriguing paradox. We observed an overall adherence trend toward Confucian familism; however, strong Confucian familism may even contribute to an increased likelihood of expecting to raise only one child. To explain this paradox, we assume that women who strongly adhere to the ideals of “Yangerfanglao” (bearing children for old-age security), “Chuanzongjiedai” (bearing children for the family’s lineage), and “Duoaiduofu” (more children, more blessings) may overlap significantly with those who believe in “Yangbujiao, fuzhiguo” (a wayward child is the fault of the parent). Thus, we infer a trend toward preference for one child as the desire for an only “elite child.” An only “elite child” is seen as capable of pursuing a stable job with fundamental social benefits in the future, aligning with traditional Confucian familism ideals.

¹³ A stable job implies a job with fundamental social benefits (e.g., pension, medical insurance, unemployment insurance, work-related injury insurance, maternity insurance, and housing fund) such as civil servant, institutional staff, and state-owned enterprise employment. In Chinese, these benefits are known as “Wuxian yijin” (“five social insurances and one housing fund”). However, in our surveys, a substantial number of women did not have “*Wuxian yijin*.”

¹⁴ In Table 6 in the Appendix, we focus on the remaining 76% of policy-sensitive women to estimate the determinants of the intention to have more than one child. However, even when focusing on this subsample of policy-sensitive women, we do not find policy relaxation significantly stimulates fertility intentions.

Discussion and conclusion

This article begins by explaining the decrease in birth rates and trend for having only one-child fertility intentions in China. It then explores the influence of Confucian familism on the decision to have only one child, highlighting that strong adherence to Confucian familism does not significantly predict great fertility intentions. It further underscores the potential impact of this shift in motivating young women to aspire to raise an “elite child,” particularly in an environment where employment stability and essential social welfare are deficient. The article highlights significant attributes, as detailed below.

From the perspective of filling gaps in the literature, we have fronted the discourse surrounding the paradox between young women’s diminished fertility intentions and their robust adherence to Confucian familism. Moreover, we quantify Confucian familism and identify its effects on fertility intention to address endogeneity challenges in regression analysis. The lower fertility intentions of young women cannot be solely attributed to whether (or to what degree) they embrace Confucian familism.

From the perspective of the originality of the research design, although our primary focus is empirically studying the role of Confucian family values, we rigorously control for policy changes and four fertility burdens (physical, financial, mental, and career burdens). We first categorize birth policies and identify their effects. Then, we confirmed that even in the absence of a birth control policy, fertility intentions are low (≈ 1.5 children) in the over 35 year and below 35 year groups. This implies that the current policy, which relaxes birth control restrictions, rarely leads to a significant improvement in the fertility rate. Second, we hypothesized that the low birth rate of Chinese women may be associated with the abandonment of Confucian familism or the substantial burden of childbirth and childrearing. Unfortunately, we were unable to find support for these two hypotheses, and alternative explanations for the low fertility rate are discussed below.

From the perspective of empirical significance, we find that declining fertility intentions in China cannot be attributed to the abandonment of traditional fertility concepts. However, it seems to result from a recent preference for having only one child. Thus, it is crucial to shift our focus from how many children one expects to have to whether one expects to have more than one child. Second, so-called fertility burdens are unlikely to significantly impact the intention to have more than one child. We propose that the burden of childrearing should not occur in the present (for parents) but rather in the future (for their children). This

implies that Confucian familism values, such as “Yangerfanglao” (bearing children for old-age security) and “Chuanzongjiedai” (bearing children for the family’s lineage), may not effectively encourage childbirth. Confucian familism, which emphasizes filial piety, not only educates Chinese individuals to prioritize large families but also underscores the significant responsibility of parents (“Yangbujiao, fuzhiguo” (a wayward child is the fault of the parent)). Responsibility for parenthood motivates young women to aspire for raising an elite child. Only an elite child can adapt to the ultracompetitive Chinese society without fundamental social insurance and fulfill the goals of “Yangerfanglao” and “Chuanzongjiedai.” Consequently, the 2016 universal two-child policy, the 2021 three-child policy, or any prospective comprehensive relaxation of birth restrictions would not easily change the scenario of low birth rates in China.

The following are the implications of the study for readers and policymakers. Particularly, solely relying on birth incentivization measures without a comprehensive social welfare framework, such as financial rewards for second or third child and daycare service subsidies ((Beijing Youth Daily, 2022)), is unlikely to effectively counteract the downward trend in birth rates in urban China. Therefore, addressing low birth rates may require a combination of supportive social incentives (e.g., a system that includes education incentives, housing price regulation, tax relief, and childcare services, as mentioned by Chen et al. (2020) and Zhang et al. (2022)), including a robust overall social welfare system (e.g., “five social insurances and one housing fund” for all employees mentioned above).

Finally, this study acknowledges these three limitations and proposes directions for future research. First, as discussed in the introduction section, the mandatory enforcement of the 35-year family planning policy may have entrenched the notion of “the benefits of having only one child” within Chinese society. Further investigation is necessary because it seem to have been disseminated through various cultural channels (Knodel and Van de Walle (1979) and Watkins (1990)). Second, we assumed that employment instability and overall social welfare shortage are probable reasons for low fertility intention. However, sufficient data are lacking to support an empirical analysis of the correlation between employment instability and fertility intentions and between overall social welfare and fertility intentions. Future research should focus on identifying the employment environment and the role of overall social welfare (instead of fertility welfare). Third, this study conducts a microeconomic analysis of low fertility rates in prominent eastern metropolises, focusing on data from Tianjin. However, concerns about the prospects of offspring, particularly the pressure of raising an elite child, may have relatively less significance in western towns, small municipalities, and

rural areas. A comprehensive understanding of the influence of cultural factors is essential, considering precise contextual variables such as geographical factors, macroeconomic status, and industrial structures.

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Figure captions and legends:

Fig 1 China birthrate (‰) 2000–2022

Data source: China National Bureau of Statistics (<http://data.stats.gov.cn>)

Fig 2 Distribution of Confucian familism rating scores by age

Note: The upper histogram presents the frequency distribution of Confucian familism cores in women younger than 35 years, and the bottom histogram presents that of women older than 35 years.

Fig 3 Distribution of expected number of children under the three-level policy design

Note: 3a: Full sample; 3b Age > 35 years; 3c Age ≤ 35 years. Top: expectation under Level 1 policy design; middle: expectation under Level 2 policy design; bottom: expectation under Level 3 policy design). Level 1: expectation under a family planning policy; Level 2: expectation without any family planning policy; Level 3: expectation under a fertility-encouraging incentive policy. The horizontal axis represents the anticipated number of children, whereas the vertical axis indicates the frequency of the occurrences of the quantities presented on the horizontal axis.

Table 1. Statistics of the expected children by age group under a three-level policy design

	Sample	N	Mean	Median	Std. Dev.	Min	Max
Under family-planning policy (Level1)	Full	576	1.42	1	0.7	0	5
	age>35	329	1.49	2	0.72	0	5
	age<=35	247	1.33	1	0.66	0	4
No related policy (Level2)	Full	594	1.49	1.5	0.77	0	5
	age>35	340	1.56	2	0.77	0	5
	age<=35	254	1.4	1	0.77	0	5
Under incentive policies (Level3)	Full	591	1.71	2	0.83	0	5
	age>35	339	1.76	2	0.79	0	5
	age<=35	252	1.63	2	0.87	0	5

Table 2. Statistics of fertility burden rating scores by age group

	(1)	(2)	(3)	(4)	(5)	(6)
	N	Mean	Median	Std. Dev.	Min	Max
Physical burden						
All	655	4.39	5	0.822	1	5
Age > 35 years	402	4.43	5	0.794	1	5
Age ≤ 35 years	253	4.33	5	0.864	1	5
Financial burden						
All	655	4.22	4	0.952	1	5
Age > 35 years	402	4.24	4	0.958	1	5
Age ≤ 35 years	253	4.17	4	0.942	1	5
Mental burden						
All	655	3.93	4	1.000	1	5
Age > 35 years	402	3.91	4	0.995	1	5
Age ≤ 35 years	253	3.97	4	1.009	1	5
Career burden						
All	655	3.74	4	1.085	1	5
Age > 35 years	402	3.70	4	1.115	1	5
Age ≤ 35 years	253	3.79	4	1.035	1	5

Table 3. Summary statistics

Full sample					
VARIABLES	Mean	Median	Min	Max	Difference (<i>t value</i>)
Independent variables					
Confucian family values	3.230	3.36	1.241	6.203	0.071 (<i>-0.86</i>)
Burden	4.615	4.62	1.568	5.776	-0.052 (<i>0.91</i>)
Instrumental variables					
Sibling number	1.967	2	1	5	0.474 (<i>7.09***</i>)
Nongrandparenting	2.574	2	1	5	0.788 (<i>6.76***</i>)
Controls					
Individual-level characteristics					
Health status	3.821	4	1	5	-0.269 (<i>4.18***</i>)
Education level	4.830	5	1	8	-1.033 (<i>7.09***</i>)
Family-level characteristics					
Age of one's mother	63.59	64	40	96	12.55 (<i>-26.3***</i>)
Son dummy	0.624	1	0	1	-0.058 (<i>1.63</i>)
Estate	1.123	1	0	4	0.314 (<i>-4.77***</i>)
Socioeconomic level characteristics					
Tianjin Hukou dummy	0.944	1	0	1	0.038 (<i>-2.01*</i>)
Occupation dummy	0.026	1	0	1	-0.011 (<i>0.82</i>)
Location dummy	0.325	0	0	1	-0.021 (<i>-0.57</i>)

Note: (1) The full sample comprises 655 women aged 15–49 years. The “Difference” column shows the difference in the mean value between the values of women over 35 (374 individuals) and those under 36 (281 individuals). The values in parentheses represent the results of *t*-tests and *p*-values (***) $p < 0.01$; ** $p < 0.05$; * $p < 0.1$). (2) *Sibling number* is the number of siblings including the respondent herself (e.g., only child is 1, having one brother/sister is 2, and so on); *Nongrandparenting* is the difficulty of respondents' parents in providing help in raising grandchildren (5 = very difficult; 4 = difficult; 3 = neutral; 2 = slightly difficult; 1 = not difficult); *Self-rated health*: 1 = very unhealthy; 2 = quite unhealthy; 3 = average; 4 = quite healthy; 5 = very healthy; *Education level*: 1 = elementary school and below; 2 = junior high school; 3 =

senior high school (vocational school); 4 = college diploma (adult education); 5 = college diploma (regular higher education); 6 = bachelor's degree (adult education); 7 = bachelor's degree (regular higher education); 8 = graduate degree; *Age of one's mother*: the age of the respondent's mother; *Son dummy*: Has a son = 1 and No son = 0; *Estate*: the number of properties (units) owned by the respondent; *Tianjin Hukou dummy*: Tianjin hukou = 1 and other hukou = 0; *Occupation dummy* focuses on whether the occupation (or position) is relatively tolerant of childbirth: occupations and workplaces that are relatively intolerant of childbirth (= 1) are those working in general private enterprises or in managerial positions; in contrast, civil servants, state-owned enterprise employees, and freelancers are classified as occupations and workplaces that are more tolerant (= 0). *Location dummy*: living in the six main districts of Tianjin (Heping District, Nankai District, Hexi District, Hedong District, Hebei District, and Hongqiao District) = 1 and Other (Dongli District, Xiqing District, Beichen District, Jinan District, Binhai District, Jinnan District, Wuqing District, Baodi District, Ninghe District, Jizhou District, Others) = 0.

Table 4. Comparison between high (Group A) and low fertility intention women (Group B) under a three-level policy design

	Level 1		Level 2		Level 3	
	Difference	(<i>t value</i>)	Difference	(<i>t value</i>)	Difference	(<i>t value</i>)
	Groups A–B		Groups A–B		Groups A–B	
Independent variables						
Confucian family values	0.568	(6.087***)	0.573	(6.176***)	0.578	(5.943***)
Burden	−0.248	(−3.596***)	−0.248	(−3.589**)	−0.136	(−1.867*)
Instrumental variables						
Sibling number	0.344	(4.094***)	0.333	(4.007***)	0.449	(5.198***)
Nongrandparenting	0.099	(0.794)	−0.014	(−0.111)	0.096	(0.741)
Controls						
Individual-level characteristics						
Health status	0.031	(0.430)	−0.026	(−0.356)	0.062	(0.828)
Education level	−0.632	(−3.876***)	−0.360	(−2.208**)	−0.442	(−2.603**)
Family-level characteristics						
Age of one’s mother	0.591	(3.597***)	1.591	(4.135***)	2.591	(3.599***)
Son dummy	0.197	(3.158***)	0.167	(2.723***)	0.146	(2.237**)
Estate	0.136	(1.883*)	0.182	(2.559**)	0.123	(1.644)
Socioeconomic level characteristics						
The Tianjin Hukou dummy	−0.005	(−0.252)	0.003	(0.143)	0.011	(0.558)
Occupation dummy	−0.306	(−1.129)	−0.611	(−2.296**)	−0.038	(−0.137)
Location dummy	−0.248	(−6.466***)	−0.184	(−4.790***)	−0.181	(−4.496***)
Observations. (Group A)	274		292		376	
Observations. (Group B)	298		295		208	

Note: (1) Group A consists of women who expect to have two or more children, whereas Group B comprises women who desire to have one or no child. (2) Level 1: expectation under family planning policy; Level 2: expectation without any family planning policy; and Level 3: expectation under fertility-encouraging incentive policy. (3) The results of the *t*-tests are in parentheses (****p* < 0.01; ***p* < 0.05; **p* < 0.1).

Table 5. Determinants of more than one-child intention under a three-level policy design (IV probit)

Full sample	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient			Marginal effect		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
VARIABLES						
Confucian family values	0.703*** (0.203)	0.568 (0.450)	0.869*** (0.0925)	0.299** (0.1791)	0.214 (0.2001)	0.538*** (0.2848)
Burdens	−0.319 (0.787)	−0.0937 (0.951)	−0.315 (0.631)	−0.135 (0.370)	−0.035 (0.361)	−0.1951 (0.472)
Constant	−1.173 (3.677)	−3.256 (3.630)	−2.385 (3.680)			
Controls	YES	YES	YES			
Log-likelihood	−1908.287	−1968.854	−1935.966			
Wald chi ² (10)	49.44***	50.08***	11.56***			
Wald test of exogeneity: chi ² (2)	3.09	1.42	9.02**			
Anderson–Rubin Weak IV test chi ² (2)	4.8*	2.46	11.54***			
Observations.	572	587	584			

Note: (1) Dependent variable: Expecting two or more children = 1; Expecting only one child or childless = 0. (2) Standard errors are in parentheses; *p < 0.10; **p < 0.05; and ***p < 0.01. (3) Controls include the following variables: Health status, Education level, Age of one's mother, Son dummy, Estate, Tianjin Hukou dummy, Occupation dummy, Location dummy. Refer to Appendix Tables 7 for complete results.

Table 6. Determinants of the more than one-child intention of young women (age ≤ 35 years) under a three-level policy design (IV probit)

Age ≤ 35	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient			Marginal effect		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
VARIABLES						
Confucian family values	−0.611 (0.742)	−0.707** (0.314)	−0.710* (0.427)	−0.914 (5.793)	−1.069 (2.504)	−1.415 (2.839)
Burdens	0.761 (0.572)	0.555 (0.742)	0.625 (0.863)	1.139 (6.225)	0.846 (2.474)	1.247 (2.455)
Constant	0.031 (4.119)	0.730 (3.411)	0.606 (4.678)			
Controls	YES	YES	YES			
Log-likelihood	−810.394	−821.197	−820.177			
Wald chi ² (10)	105.64***	120.16***	144.23***			
Wald test of exogeneity: chi ² (2)	7.11**	21.82 ***	85.63***			
Anderson–Rubin Weak IV test chi ² (2)	0.42	2.02	5.54*			
Observations.	245	250	248			

Note: (1) Dependent variable: Expecting two or more children = 1; Expecting only one child or childless = 0. (2) Standard errors are in parentheses; * $p < 0.10$; ** $p < 0.05$; and *** $p < 0.01$. (3) Controls include the following variables: Health status, Education level, Age of one's mother, Son dummy, Estate, Tianjin Hukou dummy, Occupation dummy, Location dummy. Refer to Appendix Tables 8 for complete results.

Appendix figures and tables

Appendix Fig 1. Distribution of postmodern fertility value rating scores according to age

Note: The left graph depicts the results of women under 35 years of age, and the right graph depicts those of women over 35 years of age.

Appendix Table 1. Degree of acceptance of each traditional view of fertility by age group

	Sample	Observations	Mean	Median	Std. Dev.	Min	Max
Yangerfanglao	All	662	2.98	3	1.05	1	5
(bearing children for old-age security)	Age > 35 year	377	3.03	3	1.04	1	5
	Age ≤ 35 year	285	2.91	3	1.07	1	5
Chuanzongjiedai	All	662	2.30	2	1.11	1	5
(bearing children for the family's lineage)	Age > 35 year	377	2.34	2	1.12	1	5
	Age ≤ 35 year	285	2.24	2	1.11	1	5
Duoziduofu	All	662	2.77	3	1.11	1	5
(more children, more blessings)	Age > 35 year	377	2.73	3	1.11	1	5
	Age ≤ 35 year	285	2.81	3	1.11	1	5

Appendix Table 2. First child birth rates according to maternal age in China

Year	First child							
	birth rate (‰)	Birth rate according to mother's age (‰)						
		14 <	19 <	24 < Age	29 < Age	34 < Age	39 < Age	44 < Age
		Age <	Age	< 30	< 35	< 40	< 45	< 50
		20	< 25					
2003	26.12	4.99	111.73	70.86	11.82	1.73	0.28	0.12
2004	26.53	5.14	111.69	75.95	13.51	2.30	0.41	0.12
2005	21.68	6.01	103.09	56.88	9.12	1.53	0.34	0.17
2006	23.02	4.25	92.68	68.75	14.85	4.34	2.05	1.27
2007	25.04	3.58	85.39	73.53	19.65	6.95	3.52	3.20
2008	26.22	4.96	84.51	70.08	22.16	8.92	5.84	4.40
2009	24.24	5.57	77.80	64.57	19.60	6.95	4.69	4.20
2011	19.75	5.69	57.34	51.74	15.45	3.10	1.13	0.63
2012	23.38	6.43	60.23	65.68	22.21	4.80	1.51	0.75
2013	22.96	7.32	58.17	61.22	22.84	5.96	1.52	0.80
2014	21.50	10.06	60.46	54.13	17.01	4.30	0.75	0.17
2015	16.43	7.99	40.17	41.55	14.98	4.63	1.85	1.25

Note: Survey data for 2005 and 2015 are for 1% of the total population and 1‰ for other years. Since 2016, the government has discontinued public release of these data.

Data source: China National Bureau of Statistics (<http://data.stats.gov.cn>)

Appendix Table 3. Second child birth rates according to maternal age in China

Second child birth rate (‰)		Birth rate according to mother's age (‰)						
Year		14 < Age < 20	19 < Age < 25	24 < Age < 30	29 < Age < 35	34 < Age < 40	39 < Age < 45	44 < Age < 50
2003	10.10	0.20	9.04	27.68	22.78	5.37	1.00	0.23
2004	10.44	0.30	8.10	28.55	26.11	6.50	0.93	0.14
2005	10.90	0.31	10.33	30.40	26.89	7.41	1.06	0.31
2006	10.62	0.31	8.02	27.77	29.23	9.95	1.83	0.72
2007	11.05	0.25	7.68	27.90	28.53	11.71	2.72	1.58
2008	11.18	0.27	9.35	28.25	28.03	11.31	3.33	1.96
2009	10.60	0.57	8.29	29.33	27.62	10.92	2.16	1.22
2011	8.72	0.44	8.58	22.80	21.77	7.66	1.69	0.52
2012	10.92	0.25	11.78	28.44	24.46	9.91	2.88	0.58
2013	11.11	0.50	10.73	29.75	24.15	9.95	2.35	0.61
2014	13.40	0.89	17.96	34.77	25.74	9.71	2.22	0.54
2015	12.30	1.12	13.39	28.80	25.42	10.96	2.45	1.23

Note: Survey data for 2005 and 2015 are for 1% of the total population and 1‰ for other years. Since 2016, the government has discontinued public release of these data.

Data source: China National Bureau of Statistics (<http://data.stats.gov.cn>)

Appendix Table 4. Determinants of the more than one-child intention of women under a three-level policy design (probit)

Full sample	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient			Marginal effect		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
VARIABLES						
Confucian family values	0.238*** (0.0504)	0.262*** (0.0499)	0.242*** (0.0506)	0.083*** (0.0165)	0.092*** (0.0162)	0.081*** (0.0160)
Burdens	-0.227*** (0.0683)	-0.240*** (0.0662)	-0.117* (0.0678)	-0.792** (0.0165)	-0.083*** (0.0224)	-0.388* (0.0224)
Constant	-0.228 (0.712)	-1.690** (0.708)	-2.103*** (0.730)			
Controls	YES	YES	YES			
Log-likelihood	-349.75664	-359.9427	-342.02585			
Pseudo R ²	0.1167	0.1153	0.1006			
Observations.	572	587	584			

Note: (1) Dependent variable: Expecting two or more children = 1; Expecting only one child or childless = 0. (2) Standard errors in parentheses; * p < 0.10; ** p < 0.05; and *** p < 0.01. (3) Controls include the following variables: Health status, Education level, Age of one's mother, Son dummy, Estate, Tianjin Hukou dummy, Occupation dummy, Location dummy.

Appendix Table 5. Determinants of the intention to have more than one child among young women under a three-level policy design (age ≤ 35 years, probit)

Age ≤ 35	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient			Marginal effect		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
VARIABLES						
Confucian family value	0.174** (0.0747)	0.179** (0.0761)	0.178** (0.0738)	0.061** (0.0254)	0.061** (0.0252)	0.064** (0.0257)
Burdens	-0.254** (0.110)	-0.384*** (0.113)	-0.241** (0.110)	-0.089** (0.0375)	-0.131*** (0.0360)	-0.087** (0.0385)
Constant	-0.276 (1.172)	-1.433 (1.170)	-1.695 (1.166)			
Controls	YES	YES	YES			
Log-likelihood	-151.02221	-149.69236	-156.06294			
Pseudo R ²	0.0884	0.1181	0.0811			
Observations.	245	250	248			

Note: (1) The dependent variable: Expecting two or more children = 1; Expecting only one child or childless = 0. (2) Standard errors in parentheses; * $p < 0.10$; ** $p < 0.05$; and *** $p < 0.01$. (3) Controls include the following variables: Health status, Education level, Age of one's mother, Son dummy, Estate, Tianjin Hukou dummy, Occupation dummy, Location dummy.

Appendix Table 6. Determinants of the more than one-child intention of young women under a three-level policy design (policy-sensitive women, IV Probit)

Policy-sensitive subsample	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient			Marginal effect		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
VARIABLES						
Confucian family values	0.213	−0.130	1.208	0.069	−0.042	0.209
	(0.450)	(0.554)	(0.813)	(0.145)	(0.177)	(0.140)
Burdens	0.555	0.506	0.794	0.1798	0.1615	0.1371
	(0.865)	(0.949)	(1.171)	(0.279)	(0.302)	(0.201)
Constant	−2.114	−2.752	−8.922**			
	(3.335)	(3.344)	(4.330)			
Controls	YES	YES	YES			
Log-likelihood	−1338.0589	−1392.587	−1272.9992			
Wald chi ² (10)	47.15***	34.02***	119.83***			
Wald test of exogeneity: chi ² (2)	1.43	1.23	12.44**			
Anderson–Rubin Weak IV test	1.62	0.37	8.06**			
chi ² (2)						
Observations.	413	428	425			

Note: (1) Dependent variable: Expecting two or more children = 1; Expecting only one child or childless = 0. (2) Standard errors in parentheses; * $p < 0.10$; ** $p < 0.05$; and *** $p < 0.01$. (3) Controls include the following variables: Health status, Education level, Age of one's mother, Son dummy, Estate, Tianjin Hukou dummy, Occupation dummy, Location dummy.

Appendix Table 7. Determinants of more-than-one-child intention under a three-level policy design (Full sample, IV probit)

Full sample	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient			Marginal effect		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
VARIABLES						
Confucian Family Value	0.703*** (0.203)	0.568 (0.450)	0.869*** (0.0925)	0.299** (0.1791)	0.214 (0.2001)	0.538*** (0.2848)
Burdens	-0.319 (0.787)	-0.0937 (0.951)	-0.315 (0.631)	-0.135 (0.370)	-0.035 (0.361)	-.1951 (0.472)
All controls						
Occupation dummy	-0.755* (0.406)	-0.775 (0.477)	-0.732** (0.350)	-0.321* (0.178)	-0.292 (0.196)	-0.453* (0.261)
Health status	-0.0560 (0.109)	-0.0397 (0.139)	-0.0409 (0.100)	-0.0238 (0.0524)	-0.0150 (0.0538)	-0.0254 (0.0727)
Age mother	0.00821 (0.00685)	0.0276*** (0.00805)	0.0168* (0.00869)	0.00349 (0.00306)	0.0104*** (0.00298)	0.0104** (0.00412)
Education level	0.0283 (0.0533)	0.0649 (0.0652)	0.102*** (0.0295)	0.0120 (0.0260)	0.0244 (0.0277)	0.0632 (0.0423)
Son dummy	-0.0708 (0.134)	0.00114 (0.177)	-0.130 (0.120)	-0.0301 (0.0624)	0.000431 (0.0664)	-0.0806 (0.0994)
Tianjin hukou dummy	0.115 (0.225)	0.0659 (0.227)	0.0998 (0.211)	0.0490 (0.0940)	0.0248 (0.0854)	0.0618 (0.122)
Estate	-0.00510 (0.124)	0.0311 (0.146)	-0.107 (0.0755)	-0.00216 (0.0532)	0.0117 (0.0536)	-0.0665 (0.0747)
Location	-0.453 (0.305)	-0.474* (0.250)	-0.132 (0.228)	-0.192** (0.0747)	-0.178** (0.0744)	-0.0817 (0.105)
Constant	-1.173 (3.677)	-3.256 (3.630)	-2.385 (3.680)			
Log-likelihood	-1908.287	-1968.854	-1935.966			
Wald chi2(10)	49.44***	50.08***	11.56***			
Wald test of exogeneity: chi2(2)	3.09	1.42	9.02**			
Anderson-Rubin Weak IV test chi2(2)	4.8*	2.46	11.54***			
Observations.	572	587	584			

Note: (1) Dependent variable: Expecting two or more children = 1; Expecting only one child or childless = 0. (2) Standard errors are in parentheses; * $p < 0.10$; ** $p < 0.05$; and *** $p < 0.01$.

Appendix Table 8. Determinants of the more-than-one-child intention of young women (age ≤ 35 years) under a three-level policy design (IV probit)

Age ≤ 35	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient			Marginal effect		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
VARIABLES						
Confucian Family Value	-0.611 (0.742)	-0.707** (0.314)	-0.710* (0.427)	-0.914 (5.793)	-1.069 (2.504)	-1.415 (2.839)
Burdens	0.761 (0.572)	0.555 (0.742)	0.625 (0.863)	1.139 (6.225)	0.846 (2.474)	1.247 (2.455)
All controls						
Occupation dummy	-0.287 (1.138)	-0.360 (0.654)	-0.388 (0.593)	-0.429 (0.985)	-0.545 (0.826)	-0.774 (1.117)
Health status	0.0479 (0.0943)	0.0105 (0.104)	0.0357 (0.106)	0.0717 (0.355)	0.0159 (0.173)	0.0713 (0.211)
Age mother	-0.0270 (0.0245)	-0.0142 (0.0364)	-0.0184 (0.0286)	-0.0405 (0.232)	-0.0214 (0.0942)	-0.0366 (0.0907)
Education level	-0.0569 (0.0827)	-0.0770 (0.0679)	-0.0738 (0.0806)	-0.0851 (0.528)	-0.117 (0.249)	-0.147 (0.316)
Son dummy	0.272 (0.193)	0.326** (0.159)	0.318** (0.145)	0.407 (1.945)	0.494 (0.936)	0.634 (0.999)
Tianjin hukou dummy	-0.288 (0.295)	-0.205 (0.262)	-0.190 (0.272)	-0.431 (2.058)	-0.310 (0.812)	-0.379 (0.825)
Estate	0.142 (0.139)	0.163 (0.103)	0.148* (0.0875)	0.213 (0.962)	0.246 (0.441)	0.295 (0.451)
Location	-0.282 (0.662)	-0.286 (0.297)	-0.222 (0.161)	-0.422 (1.262)	-0.433 (0.566)	-0.442 (0.662)
Constant	0.0308 (4.119)	0.7303 (3.411)	0.6056 (4.678)			
Log-likelihood	-810.3937	-821.1974	-820.1773			
Wald chi2(10)	105.64***	120.16***	144.23***			
Wald test of exogeneity: chi2(2)	7.11**	21.82 ***	85.63***			
Anderson-Rubin Weak IV test chi2(2)	0.42	2.02	5.54*			
observations.	245	250	248			

Note: (1) Dependent variable: Expecting two or more children = 1; Expecting only one child or childless = 0. (2) Standard errors are in parentheses; * $p < 0.10$; ** $p < 0.05$; and *** $p < 0.01$.