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Income Inequality, Human Capital Aspirations, and Fertility Decisions: Evidence from China

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Abstract: Income inequality and persistently low fertility are two major challenges to China's pursuit of common prosperity. Using both regional- and individual-level perspectives, this study examines the relationship between income inequality and fertility behavior. Income inequality is found to significantly increase fertility: individuals in regions with greater inequality or stronger relative deprivation tend to have more children, revealing a tension between reducing inequality and encouraging fertility. The study further identifies educational aspirations as a key mediating mechanism. Individuals' own educational goals and expectations for their children reflect perceived indirect and direct costs of childbearing. Higher inequality is associated with lower educational aspirations, which reduces the perceived cost burden of childbearing and raises fertility. These findings suggest that improving the quality and equitable distribution of public education resources is essential for addressing both income inequality and low fertility. Policymakers should therefore increase public education investment and strengthen the "double reduction" policy.

Keywords: Income inequality; Gini coefficient; Relative deprivation; Educational aspirations; Fertility behavior

1. Introduction

In recent years, China has witnessed a stark and troubling decline in fertility rates among its childbearing population. The Seventh National Population Census revealed a precipitous drop in the total fertility rate of women of childbearing age to an alarming 1.3 by 2020. Data from the National Bureau of Statistics confirmed a historic inflection point in 2022, marking the first instance of negative population growth since 1961. The inexorable realities of an aging population and the accelerated erosion of the demographic dividend have now become undeniable fixtures of the national landscape. In response, China has undertaken a series of progressive reforms to relax its birth control policies. These began with the "two-child policy for couples where both spouses are only children," followed by the "two-child policy for couples with at least one only-child parent," and eventually the "universal two-child policy," allowing all couples to have two children. Yet, contrary to expert predictions of a "fertility surge" or a "doubling of newborns," these measures fell far short of expectations. In 2021, the nation ushered in the "three-child policy," accompanied by a suite of support measures aimed at fostering a pro-natalist environment. However, these concerted efforts have yielded outcomes that remain disappointingly modest. Given the limited efficacy of institutional reforms, it becomes imperative to shift perspectives—

towards examining how objective environmental factors and subjective perceptions shape fertility intentions. This paradigm offers a novel and actionable approach to carry significant practical relevance for unlocking the potential of fertility policies and achieving a long-term balance between economic development and population dynamics.

The determinants of fertility have been extensively examined across two primary dimensions: external and internal. External factors are further divided into institutional exogenous influences, such as fertility policies, retirement systems, and social security mechanisms (De Silva & Tenreyro, 2017; Feng et al., 2020; Wang & Peng, 2015), as well as technological exogenous influences, including transformative advancements like mobile phones and the internet that have risen to prominence in recent years (Billari et al., 2020; Chen et al., 2022). Internal factors, meanwhile, encompass not only traditional variables like income levels, educational attainment, employment status, and intergenerational support (Zhou, 2018; Liu et al., 2018; Dupray & Pailhé, 2018; Hank & Kreyenfeld, 2003), but also delve into psychological dimensions such as subjective well-being and evolving perceptions of gender equality (Pu & Yao, 2023).

A review of the existing literature suggests that economic conditions stand out as a primary driver of fertility decisions, with most other socioeconomic factors—whether structural or behavioral—ultimately tracing back to one's financial circumstances. Empirical studies on the fertility-income nexus typically fall into two broad categories, distinguished by their use of macro or micro data. At the macro level, researchers have examined the relationship between economic development and fertility rates, yet their conclusions remain strikingly inconsistent—largely due to differences in geographic focus, temporal scope, and methodological design. While many studies have observed an inverse relationship between economic development and fertility or fertility intentions (Furuoka, 2013; Hou et al., 2014; Yu et al., 2021), others caution that this link is rarely linear and may be far more complex (Luci-Greulich & Thévenon, 2014; Zhong & Wang, 2022). Micro-level analyses, by contrast, delve into how household wealth or individual income levels shape reproductive choices. Some scholars argue that higher income correlates with stronger fertility intentions or larger family size (Brueckner & Schwandt, 2015; Zhou, 2018), while others report more ambiguous or even opposing trends. A compelling theoretical framework is offered by Leibenstein's "Marginal Child Rational Choice" theory, which suggests that under rational assumptions, parents will only choose to have additional children when the marginal utility of doing so exceeds the marginal cost. With rising income, however, this utility tends to diminish, while the perceived costs—financial, time-based, and emotional—intensify, leading to a potential decoupling of economic growth and fertility (Leibenstein, 1957). Macro-level studies are valuable in capturing large-scale trends and social contagion effects, but it is the micro-level investigations that bring us closer to the underlying logic of fertility behavior, uncovering its

deeply embedded links to economic incentives and constraints. Indeed, the various determinants of fertility seldom operate in isolation. Many are intricately connected, often through channels that reflect the mediating role of income—making it not just a factor, but a lens through which the fertility puzzle might be fundamentally understood.

Although a substantial body of domestic research has examined the relationship between income and fertility, few studies have approached the issue from the standpoint of income inequality. In contrast, international scholarship began exploring this dimension as early as the mid-20th century. Okun (1958) proposed the “relative income hypothesis,” positing that fertility decisions are shaped less by absolute income levels than by an individual’s relative position within their reference group. Building on this perspective, Bhattacharyya (1975) contended that commonly used indicators such as per capita income or average resource consumption obscure the distributive characteristics of income, and, based on data from 52 countries, found a positive association between urban–rural income inequality and fertility rates. Subsequent studies have produced similar findings. Repetto (1979), for example, observed that regions with more equal income distribution tend to exhibit lower fertility rates. More recent contributions from Gold et al. (2001), Chiavegatto Filho & Kawachi (2015), and Santelli et al. (2017), which focus on adolescent health outcomes, further corroborate the positive link between income inequality and fertility. Nonetheless, the empirical consensus remains unsettled. Flegg (1979) argued that although greater equality may reduce fertility in the long term—particularly in developing economies—its short-term effects may instead act as a stimulus. Likewise, Castro & Fajnzylber (2017) documented a negative relationship between income inequality and adolescent fertility in low-income countries. Beyond aggregate effects, a number of scholars have investigated how income inequality contributes to heterogeneity in fertility behavior across social groups, suggesting that higher inequality amplifies disparities in reproductive choices among different segments of the population (Kremer & Chen, 1999; De La Croix & Doepke, 2003).

The relationship between income inequality and fertility has yet to receive sustained scholarly attention in China, with only a limited number of studies addressing the issue empirically. Chen (2010) was among the earliest to provide evidence supporting the hypothesis that income inequality affects fertility. Drawing on data from the 2005 population sample survey, his analysis at the prefectural level found that regions with higher levels of income inequality tended to exhibit higher fertility rates. This conclusion, however, stands in direct contrast to the findings of Yu et al. (2021), who reported that income inequality exerts a suppressive effect on both total fertility rates and the ideal number of children. A similar line of inquiry can be found in the work of Wang and Shi (2022), who, from a community-level perspective, examined the impact of wealth inequality on fertility intentions. Their

results suggest that both relative income and relative assets are positively associated with individuals' willingness to have children. Guo and Yan (2017), meanwhile, focused on the effects of income inequality on fertility preferences across income groups. They argued that China's widening income gap has led to diverging reproductive behaviors, with low-income households more inclined to have more children. Overall, the domestic literature on this topic remains sparse. Although some studies touch upon income inequality in the context of fertility, few provide rigorous empirical analysis. The issue, while not entirely absent from scholarly discourse, has yet to be systematically explored.

A closer review of the literature reveals that existing domestic studies on the impact of income inequality on fertility remain largely situated at the macro level, with relatively limited efforts to unpack the underlying mechanisms from a multi-dimensional perspective. At the same time, both domestic and international scholars have predominantly relied on aggregate measures such as the Gini coefficient (Repetto, 1979; Chen, 2010; Filho & Kawachi, 2015; Castro & Fajnzylber, 2017) and the Atkinson index (Flegg, 1979) to quantify income inequality. Theoretically, these indices measure inequality within a given population based on the income distribution of its members, and thus function as group-level indicators. However, this approach implicitly assumes that all individuals within the group perceive inequality in the same way—an assumption that is, at best, tenuous. As a result, such measures may obscure the heterogeneous effects of inequality on individual fertility behavior. In this regard, relative deprivation indicators offer a more nuanced alternative. When income is used as the basis for measuring individual-level relative deprivation, the concept captures the extent to which individuals perceive themselves to be disadvantaged relative to their reference group. Given the economic assumption that individuals are inherently egalitarian (Fehr & Schmidt, 1999), relative income deprivation can be viewed as a micro-level expression of broader income inequality. In recent years, a growing number of domestic studies have adopted relative deprivation measures to assess income inequality, suggesting that widening income gaps tend to intensify individuals' feelings of relative deprivation (He & Pan, 2011). Though grounded in objective disparities, relative deprivation is, by nature, a subjective experience. Therefore, combining macro-level inequality indices with individual-level indicators of relative deprivation may allow for a more comprehensive understanding of how income inequality influences fertility—one that bridges structural disparities with perceived disadvantage.

It is also worth clarifying a set of frequently used—and often conflated—terms in fertility research: fertility motivation, fertility intention, fertility decision-making, and fertility behavior. While these concepts are not entirely interchangeable, they are closely related and often discussed in overlapping contexts. Among them, fertility intention and fertility behavior have received the most sustained scholarly attention. Fertility intention is a

multidimensional construct, generally referring to individuals' subjective attitudes and perceptions toward childbearing, including aspects such as desired number of children, preferred gender, timing, and underlying motivations (Yao et al., 2010). It has long been regarded as an important predictor of population fertility levels (Kuhnt & Trappe, 2016). However, in recent years, a growing body of research has raised concerns about the discrepancy between stated fertility intentions and actual reproductive outcomes (Chen & Jin, 2011; Mao & Luo, 2013). Unlike fertility intention, actual fertility behavior reflects the outcome of a rational decision-making process, wherein individuals of reproductive age assess the costs and constraints of childbearing—within the bounds of their social environment and economic resources—before determining the number and timing of births. Given the analytical focus of this study and its intrinsic connection to material and economic conditions, fertility behavior emerges as the most conceptually appropriate focal point—one that also aligns closely with the interpretive logic underpinning economic research.

Compared with existing studies, this paper aims to make three main marginal contributions. First, drawing on the 2014 wave of the China Family Panel Studies (CFPS), it adopts a dual-perspective approach—integrating both macro- and micro-level analyses—to examine how income inequality at the regional and individual levels shapes fertility behavior, thereby avoiding the generalization bias often introduced by relying solely on aggregate data. Second, this study addresses the relative absence of fertility cost indicators in prior empirical research. Individuals' expectations influence their forward-looking behavior and shape the resources they are willing to invest in realizing their intentions. In light of this, the paper uses indicators related to educational aspirations to quantify fertility costs—taking expectations for one's own and one's children's education as a proxy for anticipated investment in childrearing. Third, the study brings together income inequality, educational expectations, and fertility behavior within a unified analytical framework, revealing their potential interconnections. By incorporating individual-level psychological dimensions into the analysis of macroeconomic phenomena, this paper seeks to shed light on mechanisms that have been overlooked or under-theorized in the existing literature.

2. Mechanisms

2.1 Income Inequality and Educational Expectations

According to social comparison theory, individuals—by virtue of their inherently social nature—engage in spontaneous and often unconscious comparisons with others through everyday interactions, leading to reference effects that shape perceptions and behaviors (Festinger, 1954; Gilbert et al., 1995). The continued widening of income gaps inevitably intensifies such comparisons, reinforcing individuals' awareness of inequality, contributing

to class-based identity formation, and in turn influencing a range of psychological and behavioral tendencies—including educational expectations and investment in education. The question of how income inequality shapes educational expectations has attracted growing attention among domestic scholars. For instance, Zhou and Xia (2021), using CFPS microdata from 2010 to 2016, found that rising income disparities significantly increase parents' expectations for their children's educational attainment. While existing empirical evidence generally supports the view that rising inequality tends to elevate educational expectations, the theoretical logic underpinning this relationship is less conclusive. From a conceptual standpoint, the influence of income inequality on educational expectations may not be entirely unidirectional or predictable.

To begin with, it should be noted that in today's fiercely competitive society, educational attainment is widely regarded as a key determinant—and evaluation metric—of both income level and social status. Behind educational aspirations lies an implicit desire for class advancement; such expectations, rooted in the instinct to survive and to improve one's position, have increasingly become a driving force behind social mobility. Following this line of reasoning, the effect of income inequality on educational expectations may be understood as operating through individuals' perceptions of upward mobility. This connection has already drawn substantial attention in the literature. It is generally believed that rising income inequality leads to increased social stratification, which in turn gives rise to new forms of class mobility. However, the influence of inequality on people's expectations about mobility is not unidirectional—it contains both positive and negative aspects. According to Hirschman's "tunnel effect" theory, as economic development progresses and income disparities widen, some individuals begin to interpret others' rising incomes as a signal of opportunity. Rather than seeing themselves excluded, they believe they will soon benefit from growth as well (Hirschman & Rothschild, 1973). In such cases, the expansion of income gaps fosters more optimistic income expectations, strengthens the desire for status competition among lower-income groups, and motivates the upper class to pursue even higher goals.

Given that education is a primary channel through which the working class seeks upward mobility (Krauss, 1964)—and considering the deep cultural tradition in China that "learning leads to official success"—many individuals aspire to higher education in the hope of securing better incomes or enhanced social standing. Likewise, Chinese parents often project their mobility ambitions onto their children, placing high hopes on their educational achievement as a way to break the cycle of inherited class status. By contrast, Runciman's (1966) theory of relative deprivation offers a different interpretation. When individuals compare themselves with a reference group and find themselves relatively disadvantaged, they experience a psychological state of perceived loss. This sense of marginalization tends

to reduce confidence in future income growth and undermines belief in the long-term value of human capital investment. Consequently, those in a state of relative deprivation are less likely to expect much from their own education or career development. Due to the emotional burden, they may also hold lower expectations for their children's education, which ultimately hinders educational outcomes. Taken together, these dual theoretical pathways offer competing predictions: when income inequality triggers the tunnel effect, educational expectations for both self and child may rise; when it evokes relative deprivation, such expectations are more likely to decline.

2.2 Educational Expectations and Fertility

Fertility behavior, while fundamentally a social act, can also be viewed as an economic decision. In the current social context, many scholars have incisively pointed out that the high cost of childbearing is one of the key reasons why many families hesitate to expand their household. Fertility costs are commonly divided into direct and indirect components. Direct costs refer to the various expenses incurred from pregnancy through to a child's self-sufficiency, including spending on education, healthcare, and basic living needs such as food, clothing, and housing. Indirect costs, by contrast, refer to the opportunity costs associated with childbearing and caregiving—such as the loss of educational or occupational opportunities for parents, the exhaustion of time and energy, and the decline in consumption capacity due to the need to reallocate household resources. Notably, both categories of cost—whether tangible or intangible—are closely linked to education.

On the one hand, among the many direct costs associated with childbearing, the cost of education stands out not only in scale but in symbolic weight. It reflects a family's long-term investment in a child's future and encompasses far more than just financial expenditure—it includes the time, attention, and emotional labor that parents pour into their children's development. With rising living standards and shifting social values, fertility preferences in China have undergone a quiet but powerful transformation. The once-prevalent desire for “more children” has gradually given way to a growing preoccupation with “better children.” In this shift from quantity to quality, education has become the centerpiece of family planning. This logic is captured elegantly in Becker's (1960) Quantity–Quality Trade-Off Theory, which frames children as “durable consumer goods.” Within the framework of household utility maximization, parents—especially in resource-constrained environments—tend to favor investing more in fewer children, concentrating educational and developmental efforts where they are most likely to yield returns. Blake's (1981) Resource Dilution Hypothesis reaches a similar conclusion from a different angle. It holds that as the number of children increases, the amount of parental investment per child inevitably decreases. In this context, having fewer children becomes not merely a preference but a necessity—a practical strategy to protect each child's chances in an increasingly

competitive world.

On the other hand, from the perspective of indirect fertility costs, individuals' investments in their own education also constitute a significant component. These investments typically include two key elements: monetary input aimed at personal advancement, and the substantial time and energy required to achieve it. In recent years, the influx of external ideas has increasingly challenged traditional Chinese views on marriage and childbearing. A growing number of young people now place greater emphasis on self-realization, choosing to devote more of their time and resources to academic achievement or career development. In doing so, many opt to delay childbearing, limit the number of children they have, or forgo parenthood altogether. This shift in behavior can be understood through the lenses of life history theory and the theory of social capillarity. According to life history theory, when resources in the surrounding environment are perceived as scarce or uncertain, individuals are more likely to engage in slow life strategies—that is, they invest heavily in themselves in order to improve their long-term survival and competitive edge. Under this strategy, reproduction is often delayed or reduced as a calculated response to risk (Figueredo et al., 2006). A parallel logic is found in the theory of social capillarity proposed by sociologist Dumont (1890), which emphasizes the role of status-seeking behavior. In modern societies, individuals with strong career aspirations tend to allocate more resources toward social mobility. To facilitate upward movement, they actively seek to lighten their burdens—often by sacrificing reproductive opportunities in favor of career advancement, thereby contributing to declining fertility. At their core, both theoretical explanations converge on the concept of opportunity cost: that individuals, in the pursuit of self-development and competitive positioning, may rationally choose to suppress fertility behavior. Looking more closely, among the two most common paths to self-development—pursuing higher education and building a career—education remains a central pillar. In today's society, even career progression increasingly depends on educational input. Notably, this “education” extends beyond formal schooling to include lifelong learning, upskilling, and self-investment—endeavors that demand not only time and effort, but often financial resources as well.

In the existing body of literature, the relationship between education and fertility has been extensively explored from the perspective of educational costs. It is important to note that educational cost constitutes a key component of overall fertility cost. However, quantifying fertility cost remains a persistent challenge in empirical research. This difficulty stems from the fact that fertility costs—encompassing financial expenditures, time commitments, and emotional labor—are typically incurred only after the actual act of childbearing. For individuals who have not yet experienced parenthood, especially within the current context in which an increasing number of young people in China are not only

reluctant to have more children but hesitant to have children at all, the perception of such costs is often vague and imprecise. Many rely on social cues: they form expectations about the potential burden of childbearing based on available public resources and the observed experiences of others. These psychologically constructed expectations—although subjective—can subtly and powerfully shape fertility behavior. When linked to the domain of education, these expectations can be understood as educational aspirations. This paper argues that individuals' expectations regarding their own education and that of their future children may serve, respectively, as proxies for anticipated self-education costs and anticipated child-related education costs. In turn, these expectations influence actual investment behavior. This interpretation also finds partial support in recent studies, including those by Yu et al. (2021) and Wang & Shi (2024). From this perspective, individuals with higher expectations for their own education often exhibit a stronger drive for self-improvement. On the one hand, this may manifest as a desire to attain higher academic qualifications; on the other, it may reflect greater ambition in terms of career development. Thus, educational aspiration for the self—while nominally about academic goals—can also be seen as a broader expression of occupational aspiration.

An individual's fertility behavior is, to a large extent, influenced by their educational expectations—both for themselves and for their children. Compared with those who hold modest or vague aspirations, individuals with high educational expectations may experience greater psychological pressure. In today's society, the desire to achieve upward mobility through educational success can easily translate into education-related anxiety, which in turn suppresses the willingness to have children (Tao, 2023). Unlike most studies that focus directly on the impact of educational costs on fertility, Bian & Xiong (2023) offer a distinctive perspective by centering their analysis on families' educational expectations for their children. Their research provides a novel attitudinal lens for understanding the factors behind China's persistently low fertility rates. They find that heightened parental expectations for children's education tend to dampen fertility intentions. Similarly, Wang & Shi (2024) observe that families with stronger educational expectations are more likely to adopt a "quality over quantity" approach to childbearing. Although current scholarship still offers relatively few studies that directly examine the link between parental educational expectations and fertility behavior, there is broad consensus that such expectations positively influence family investment in children's education. Numerous studies, both in China and internationally, have shown that higher educational expectations lead to increased educational investment (Zhan, 2006; Yang & Zhang, 2019). At its root, this widespread behavioral pattern is often fueled by deep-seated parental aspirations—parents' psychological projections onto their children. In this light, the claim that parental educational expectations shape fertility behavior is far from unfounded. As for individuals' expectations regarding their own education, while few studies have explicitly addressed

their effect on fertility, a negative association can be reasonably inferred. The underlying logic lies in the trade-off between having children and pursuing self-development. In contemporary society, individuals—especially women—who hold high academic or career ambitions tend to invest more of their time and energy in personal advancement. This often leads to delayed marriage or missed fertility windows, ultimately reducing the likelihood or number of births. This pattern aligns with a consistent body of research showing a negative correlation between educational attainment and fertility.

2.3 Income Inequality, Educational Expectations, and Fertility

Synthesizing the above analysis, we may preliminarily infer—at least from a qualitative standpoint—the plausibility of a logical chain linking income inequality, educational expectations, and fertility behavior. Overall, the relationship between educational expectations and fertility tends to be negative, while the effect of income inequality on educational expectations is not one-directional. On one hand, under the positive stimulus of the tunnel effect, rising income inequality can enhance individuals' educational aspirations by reinforcing their belief in upward mobility. On the other hand, when the relative deprivation effect dominates, inequality may instead undermine educational expectations by diminishing individuals' confidence in the future and eroding their perceived returns to investment. This duality gives rise to two contrasting pathways within the same framework: “Income inequality $\uparrow$ $\rightarrow$ Educational expectations $\downarrow$ $\rightarrow$ Fertility $\uparrow$ ” and “Income inequality $\uparrow$ $\rightarrow$ Educational expectations $\uparrow$ $\rightarrow$ Fertility $\downarrow$ ”.

Another key point worth considering is the way fertility itself is defined. As previously discussed, the measurement of fertility can take many forms, among which the discrepancy between fertility intentions and actual fertility behavior has garnered the most scholarly attention. The conversion of intention into behavior is often constrained by real-world factors—chief among them, the perceived and actual cost of childbearing. Given that this study focuses on educational expectations as a proxy for individuals' anticipation of child-related costs—particularly educational expenses—it is conceptually consistent to treat fertility behavior, rather than mere intention, as the ultimate object of analysis. However, if we temporarily set aside educational expectations and analyze the issue from a more general perspective, fertility could just as well be examined at the level of intention, thereby opening up a broader spectrum of interpretive possibilities. For example, income inequality may lead some individuals to develop heightened optimism regarding future improvements in household financial conditions. In such cases, individuals may project their hopes for upward mobility onto their children and, unconstrained by considerations of cost, develop a stronger desire to have more children. Fertility, then, becomes a strategy of probability: the belief that “among many, one will succeed.” In this mindset, having more children is seen as increasing the odds of future socioeconomic advancement, with fertility serving as a hedge against

uncertainty. In such a scenario, income inequality may appear to enhance fertility intentions. But whether these intentions materialize into actual fertility behavior depends on a host of practical constraints. When educational expectations are reintroduced into the analysis—that is, when real costs are factored back in—fertility intention may give way to hesitation, or even inaction. This is the space where “wanting” meets “not being able.” The positive effect of income inequality on fertility, once filtered through the lens of cost, becomes far less certain.

Based on this conceptual logic, this paper constructs an analytical framework to illustrate how income inequality may influence fertility behavior (Figure 1).

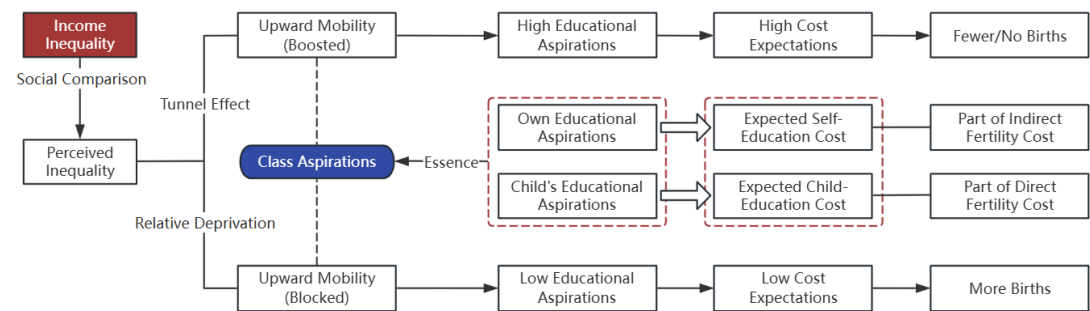


Figure 1. analytical framework

3. Variable Definitions and Model Specification

3.1 Data Source and Description

The micro-level data employed in this study are drawn primarily from the China Family Panel Studies (CFPS), a nationally representative longitudinal survey conducted by the Institute of Social Science Survey at Peking University. Initiated in 2010, the CFPS collects biennial data at the individual, household, and community levels, and to date, six waves of full-sample follow-up surveys have been completed. To minimize potential biases arising from the recent implementation of China’s two-child and three-child policies—and to better align with the analytical needs of this study while ensuring sufficient sample size—we focus on the 2014 wave of the CFPS. Cross-sectional data at the individual level were constructed by merging records from the adult questionnaire, the child proxy report, and the household economic module. In terms of sample selection, only respondents aged 16 to 40 were retained¹ to reflect the population of childbearing age. Observations with missing values on key variables were excluded. The final analytical sample consists of 9,423 valid observations. In addition, this study incorporates province-level macro data, obtained from the China Statistical Yearbook. These macro indicators were matched to the micro-level CFPS data

¹ Following data preprocessing, the final sample no longer contained individuals aged exactly 40; as a result, the descriptive analysis is conducted on individuals between the ages of 16 and 39.

based on province codes, allowing for integration across data levels.

3.2 Variable Definitions

3.2.1 Dependent Variable

The outcome variable of interest in this study is fertility behavior. In empirical demographic research, this is most commonly proxied by the actual number of children ever born to an individual—a convention that this paper also adopts. Following established practice, we derive this measure from the CFPS adult dataset by identifying the number of children linked to each respondent through unique child identification codes. As such, the variable is discrete in nature and functions as a behavioral manifestation of individual-level fertility outcomes.

3.2.2 Core Independent Variable

Income inequality serves as the central explanatory variable in this study and is measured at both the regional and individual levels. At the regional level, we calculate the Gini coefficient based on household samples within each county or district to capture intra-regional disparities in income. To ensure robustness, administrative units with fewer than ten valid observations are excluded, as small sample sizes may distort the reliability of inequality estimates. At the individual level, income inequality is represented through the concept of relative deprivation. Since certain demographic groups—such as students or full-time homemakers—may lack stable personal income, we use per capita net household income as a more consistent and representative measure, better capturing the financial environment that influences individual fertility behavior. Multiple approaches exist in the literature for operationalizing relative deprivation—including the Kakwani, Yitzhaki, and Podder indices, as well as income quantile rankings. Among these, this study adopts the Kakwani index for its well-recognized properties: it is dimensionless, normalized, and transfer-invariant, making it well-suited to capturing interpersonal inequality in a micro-level context.

3.2.3 Mechanism Variable

The study identifies educational expectation as the key mechanism variable, operationalized across two distinct dimensions: individuals' expectations for their own educational attainment and their expectations for their children's future education. The former draws from responses to the CFPS adult questionnaire item, "*What is the minimum level of education you think you should complete?*" The latter is sourced from the child proxy module, which asks, "*What is the minimum level of education you hope your child will attain?*" As this question is answered by a parent or guardian on behalf of the child, the variable can only be constructed for individuals who have children. Furthermore, as some

families have more than one child—and parental expectations may differ across children—the CFPS records a separate educational expectation response for each child. For ease of analysis, this study uses the average of parental educational expectations across all children within a household as a proxy. In practice, these values are rarely divergent: most parents report identical expectations for all children, suggesting limited within-family variation. A further consideration arises from the modular structure of the CFPS: while this study focuses on individuals aged 16 to 40, the child proxy responses may be recorded by fathers, mothers, or other household members. Relying solely on direct respondent identifiers to match educational expectations to individuals would yield a sharply reduced analytical sample—potentially undermining empirical power. To avoid this loss, we adopt the assumption that parental educational expectations are shared uniformly within each household.

3.2.4 Control Variables

To minimize potential bias stemming from omitted variables, this study incorporates a series of control variables informed by both prior literature and the specific structure of the CFPS dataset. These controls are designed to account for other factors that may influence individual fertility behavior. At the individual level, it includes gender, age, marital status, self-rated health, confidence in the future, and religious belief. At the household level, variables such as household size, net household assets, and perceived local social status are considered. In addition, regional population density is included to capture broader contextual influences. Detailed definitions and summary statistics for all control variables are presented in Table 1.

Table 1. Variable descriptions and summary statistics.

Category	Variable	Definition	Code	Observations	Mean	Min.	Max.
Dependent Variable	Fertility	Number of children ever born	Fertility	9423	0.885	0	0
Independent Variable	Income inequality	Gini coefficient at county/district level	Gini	9423	0.417	0.117	0.689
		Relative deprivation index at individual level	Kak	9423	0.507	0	1
Mechanism Variable	Educational expectation (self)	Min educational attainment expected for self (1 = No schooling, 8 = PhD)	Eduasp	9423	4.581	1	8
	Educational expectation (child)	Mean expected education level for all children in the household	Eduasp_c	6068	5.865	1	8
Control Variable	Gender	0 = Female, 1 = Male	Gender	9423	0.484	0	1
	Age	Age of respondent	Age	9423	27.80	16	39
	Marital status	1 = Single, 2 = Married, 3 = Cohabiting, 4 = Divorced, 5 = Widowed	Marri	9423	1.695	1	5
	Self-rated health	1 = Very poor, 5 = Very good	Health	9423	3.596	1	5
	Confidence in	1 = Not confident at all, 10 = Very	Faith	9423	4.208	1	5

	the future	confident					
	Religious belief	0 = No religion, 1 = Has religion	Religion	9423	0.236	0	1
	Household size	Number of household members	Famnum	9423	4.838	1	17
	Net household assets	Total assets minus liabilities (in million RMB)	Asset	9423	0.506	0	15.314
	Social status (perceived)	Self-reported social status within local community	Famsoc	9423	3.048	1	5
	Population density	Population per km ² at provincial level (in 10,000 persons/km ²)	Pop	9423	0.056	0.006	0.389

3.3 Model Specification

A widely adopted approach in the fertility literature is to treat the number of children ever born as a continuous outcome, estimated using Ordinary Least Squares (OLS), which offers simplicity and ease of interpretation. However, the number of children is inherently a non-negative integer, its distribution is unlikely to meet the normality assumption required by OLS. As a result, applying OLS may yield biased estimates, whereas a Poisson regression model is generally more appropriate for this type of count data. Some researchers alternatively regard fertility as an ordered discrete variable and adopt models such as ordered Probit (OProbit) or ordered Logit (OLogit). In this study, we employ the Poisson model. Let Y_i denote the fertility outcome for individual i ; the probability of observing $Y_i = y_i$ is assumed to follow a Poisson distribution with mean parameter λ_i , such that:

$$P(Y_i = y_i | x_i) = \frac{e^{-\lambda_i} \lambda_i^{y_i}}{y_i!} (y_i = 1, 2, 3, \dots) \quad (22)$$

Here, λ_i denotes the expected value of the Poisson distribution, which is constrained to be non-negative. It is modeled as a function of various covariates x_i that influence fertility behavior. The structural form used in this study is specified as:

$$E(Y_i | x_i) = \lambda_i = \exp(\beta_1 Inequality_i + \beta_2 X_i + \varepsilon_i) \quad (23)$$

In this equation, $E(Y_i | x_i)$ is the conditional expectation function of Y_i , In represents the level of income inequality faced by individual, captured through relative deprivation, X_i is a vector of control variables, and ε_i denotes the error term. The primary parameter of interest is β_1 , which captures the estimated effect of income inequality on fertility behavior.

4. Empirical Findings and Analysis

4.1 Baseline Regression Results

Table 2 reports the baseline estimates of the impact of income inequality on individual

fertility behavior. Columns (1) and (2) present results from Poisson regressions, where the key explanatory variable in column (1) is the individual-level relative deprivation index, and in column (2), the county-level Gini coefficient. Across both specifications, income inequality emerges as a statistically significant and positive predictor of fertility at the 1% level—regardless of whether inequality is measured at the individual or regional level. Specifically, column (1) suggests that individuals with higher levels of relative deprivation tend to have more children, whereas those with higher incomes—who are less affected by relative deprivation—report fewer births. Similarly, column (2) shows that individuals residing in counties with greater internal income disparity tend to exhibit higher fertility on average. To verify the robustness of the results, we also estimate models using Ordered Probit (OProbit) and Ordinary Least Squares (OLS). Columns (3) through (6) report these alternative specifications. In all cases, the coefficients associated with the core inequality measures remain positive and significant, consistent with the findings from the Poisson model.

Table 2. Baseline regression results.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Poisson		Oprobit		OLS	
Gini	0.5890*** (0.1006)		1.0089*** (0.1652)		0.5853*** (0.0908)	
Kak		0.3897*** (0.0352)		0.7733*** (0.0605)		0.4243*** (0.0292)
Gender	-0.1569*** (0.0158)	-0.1537*** (0.0157)	-0.2650*** (0.0265)	-0.2582*** (0.0267)	-0.1046*** (0.0133)	-0.0990*** (0.0132)
Age	0.0775*** (0.0014)	0.0772*** (0.0014)	0.1287*** (0.0028)	0.1297*** (0.0028)	0.0615*** (0.0015)	0.0619*** (0.0015)
Marri	0.4769*** (0.0279)	0.4738*** (0.0277)	1.0633*** (0.0559)	1.0648*** (0.0566)	0.4312*** (0.0223)	0.4283*** (0.0224)
Health	-0.0019 (0.0079)	-0.0012 (0.0079)	-0.0165 (0.0134)	-0.0160 (0.0135)	-0.0082 (0.0072)	-0.0076 (0.0072)
Faith	0.0388*** (0.0103)	0.0391*** (0.0103)	0.0547*** (0.0168)	0.0574*** (0.0170)	0.0156* (0.0087)	0.0167* (0.0087)
Religion	0.0571*** (0.0180)	0.0587*** (0.0179)	0.1059*** (0.0310)	0.1087*** (0.0311)	0.0535*** (0.0166)	0.0551*** (0.0166)
Famnum	0.1188*** (0.0050)	0.1109*** (0.0050)	0.2439*** (0.0083)	0.2251*** (0.0084)	0.1296*** (0.0046)	0.1174*** (0.0047)
Asset	-0.1042*** (0.0130)	-0.0697*** (0.0124)	-0.1734*** (0.0222)	-0.1225*** (0.0197)	-0.0867*** (0.0083)	-0.0582*** (0.0076)
Famsoc	0.0073 (0.0098)	0.0107 (0.0098)	0.0115 (0.0162)	0.0175 (0.0163)	0.0026 (0.0084)	0.0061 (0.0084)
Pop	-0.1518 (0.1145)	-0.0783 (0.1147)	-0.3239* (0.1835)	-0.1060 (0.1821)	-0.0888 (0.0789)	0.0244 (0.0776)
_Cons					-2.3836*** (0.0682)	-2.3443*** (0.0547)
N	9423	9423	9423	9423	9423	9423
R2/Pseudo R2	0.2251	0.2272	0.3545	0.3599	0.5340	0.5412

Note: ① For all Poisson regression results presented in this study, the reported values are average marginal effects. In contrast, since average marginal effects in OProbit models vary with different outcome levels of the dependent variable, the OProbit column reports regression coefficients instead. ② ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

and 10% levels, respectively. Robust standard errors are reported in parentheses. The same applies hereafter.

To isolate the influence of income inequality from that of household wealth, two strategies are adopted. First, net household assets are included as a control in all baseline regressions. Second, the full sample is stratified into high-income and low-income groups based on the median of per capita household income, enabling a comparison of how fertility responds to inequality across different income levels. Columns (1) and (2) of Table 3 report subgroup results using the county-level Gini coefficient to capture regional inequality. In both income groups, income inequality is found to exert a significantly positive effect on fertility, with no notable difference in magnitude. Columns (3) and (4) display analogous results using the relative deprivation index, which captures individual-level inequality. The positive and significant relationship between inequality and fertility persists across both groups. These findings lend further support to the conclusion that income inequality, rather than absolute income, serves as the principal force behind variations in fertility behavior.

Table 3. Grouped regression under household income level.

Variable	(1)	(2)	(3)	(4)
	High income	Low income	High income	Low income
Gini	0.4416*** (0.1159)	0.5035*** (0.1633)		
Kak			0.4539*** (0.0913)	0.2661*** (0.0812)
Gender	-0.1010*** (0.0187)	-0.2064*** (0.0248)	-0.0992*** (0.0187)	-0.2047*** (0.0249)
Age	0.0646*** (0.0018)	0.0902*** (0.0022)	0.0644*** (0.0018)	0.0900*** (0.0022)
Marri	0.4057*** (0.0333)	0.5517*** (0.0450)	0.4024*** (0.0326)	0.5506*** (0.0449)
Health	-0.0061 (0.0096)	-0.0001 (0.0120)	-0.0071 (0.0095)	0.0019 (0.0122)
Faith	0.0303** (0.0122)	0.0467*** (0.0158)	0.0321*** (0.0123)	0.0456*** (0.0158)
Religion	0.0352 (0.0228)	0.0803*** (0.0268)	0.0414* (0.0229)	0.0853*** (0.0269)
Famnum	0.1188*** (0.0062)	0.1145*** (0.0070)	0.1119*** (0.0065)	0.1156*** (0.0071)
Asset	-0.0682*** (0.0118)	-0.1326*** (0.0293)	-0.0511*** (0.0118)	-0.1281*** (0.0287)
Famsoc	0.0143 (0.0119)	0.0024 (0.0148)	0.0166 (0.0121)	0.0054 (0.0148)
Pop	0.0179 (0.1087)	-0.1189 (0.2785)	0.0060 (0.1096)	-0.1974 (0.2879)
N	4711	4712	4711	4712
R2/Pseudo R2	0.2094	0.2284	0.2098	0.2283

4.2 Robustness Checks

4.2.1 Alternative Dependent Variable

Given that existing literature has pointed out possible discrepancies between actual fertility behavior and fertility intention, the first test replaces the original dependent variable with an individual's ideal number of children, based on responses to the CFPS question: "*Disregarding policy restrictions, how many children do you consider ideal?*" The results are presented in columns (1) and (2) of Table 4. The estimates remain consistently positive and statistically significant, suggesting that income inequality exerts a similar effect on both fertility outcomes and fertility preferences. To further ensure robustness, an additional test is conducted using a subsample restricted to individuals who have already had children (i.e., fertility count > 0). This subsample better aligns with classical demographic assumptions, which typically presume a general willingness to have children, but hesitation toward having many. Results from this restricted sample are reported in columns (3) and (4) of Table 4. The estimated coefficients remain in line with the baseline results in both sign and significance level, reinforcing the validity of the main findings.

4.2.2 Alternative Measures of Income Inequality

Three alternative specifications of the core explanatory variable—income inequality—are introduced to further assess the robustness of the main results. First, for the relative deprivation index, the baseline specification calculates deprivation based on comparisons across the full sample. However, individual perceptions of inequality are often shaped by local reference groups, given the variation in living standards across regions. To capture this nuance, the relative deprivation index is recalculated using smaller geographic units: comparisons are made separately within each county and within each province, based on per capita household income. This approach enhances the contextual relevance of deprivation while preserving comparability within subgroups. The results, presented in columns (5) and (6) of Table 4, show that relative deprivation at both the county and provincial levels continue to exert a significant positive effect on fertility behavior. Second, for regional-level inequality, the Gini coefficient at the county level is replaced by the provincial-level Gini coefficient. Column (7) reports the estimation result, which again reveals a positive and statistically significant association with fertility. Collectively, these robustness checks confirm that the positive relationship between income inequality and fertility behavior holds across a range of alternative measures—both at the individual and regional levels.

4.2.3 Alternative Age Range of the Sample

Given the rising trend of delayed childbearing in contemporary China, individuals at the lower end of the original sample age range (16–40 years) may not have yet entered the

typical childbearing window. To account for this possibility, the analysis is repeated using a narrower subsample restricted to individuals aged 25 to 40. Regression results using both the relative deprivation index and the Gini coefficient as alternative measures of income inequality are reported in columns (8) and (9) of Table 4. In both cases, the estimated coefficients remain positive and statistically significant, indicating that the main findings are robust under the adjustment towards the sample's age structure.

Table 4. Robustness test results.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gini	0.9656*** (0.1027)		1.0041*** (0.1154)					0.8334*** (0.1278)	
Kak		0.2427*** (0.0328)		0.5628*** (0.0362)					0.6224*** (0.0431)
Gini_p					0.9877*** (0.1392)				
Kak_p						0.2786*** (0.0316)			
Kak_c							0.2231*** (0.0300)		
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	9423	9423	5506	5506	9423	9423	9423	6237	6237
R2/Pseudo R2	0.0072	0.0063	0.0294	0.0312	0.2252	0.2260	0.2254	0.0832	0.0873

4.3 Endogeneity Concerns

4.3.1 Instrumental Variable Approach

Although a series of robustness checks have been conducted to validate the reliability of the baseline results, concerns about potential endogeneity between income inequality and individual fertility behavior remain. In general, endogeneity may arise from three main sources. First, measurement error—particularly relevant to the core explanatory variable—may occur, as respondents in household surveys often report income in rough intervals, making some degree of imprecision inevitable. Second, omitted variable bias is a concern, given that fertility decisions are influenced by a wide array of factors, not all of which can be fully captured in the empirical model. Third, there may be reverse causality between fertility and income: for example, individuals may choose to improve their earnings or accumulate wealth after having children, in anticipation of future expenditures. To mitigate these endogeneity concerns, an instrumental variable (IV) strategy is implemented as part of a formal identification test, allowing for cleaner estimation of the causal effect of income inequality on fertility.

In selecting a suitable instrument, this study draws on the insights of prior international literature, which identifies the relative size of the mature-age cohort as a powerful instrument for income inequality (Higgins & Williamson, 2002; Jong-Sung & Khagram, 2005;

Leigh, 2006; Krieger & Meierrieks, 2019). Following this line of research, the instrument is constructed as the proportion of working-age individuals aged 40–59 within the broader labor force aged 15–69 at the county level. The rationale behind this choice is twofold. First, according to the cohort size hypothesis, imbalances in the labor market—particularly an oversupply of workers from large age cohorts—can suppress wages. A disproportionately large cohort—often referred to as a fat cohort—tends to exert downward pressure on wages as it enters the labor market, due to the oversupply of similarly aged workers and the resulting intensification of competition. This effect becomes particularly pronounced if the cohort is concentrated in the prime earning years, where the age-earnings curve is near its peak and relatively flat. In such cases, the overall earnings dispersion narrows, leading to a decline in income inequality. Conversely, a demographic structure dominated by either very young or older individuals is typically associated with greater income dispersion, as these groups lie on the steeper portions of the age-earnings curve (Higgins & Williamson, 2002). This demographic mechanism gives rise to a systematic and negative correlation between the relative size of the mature-age cohort and income inequality, thereby fulfilling the relevance condition required for a valid instrumental variable. Second, the proportion of mature-age workers reflects local demographic structure, which, in theory, should not directly influence individual fertility decisions. Although unobserved channels of influence cannot be entirely ruled out, the variable plausibly meets the exclusion restriction by being exogenous to the fertility outcome. Taken together, these arguments suggest that the chosen instrument is both theoretically grounded and empirically appropriate.

Endogeneity is further addressed using three complementary estimation strategies to ensure the robustness of the results: Two-Stage Least Squares (2SLS), Conditional Mixed Process (CMP), and IV-Poisson. While the traditional 2SLS approach is more suited to models with continuous dependent variables, IV-Poisson offers a more appropriate specification when the outcome variable is discrete and count-based, such as fertility. Additionally, under the condition where the number of children is viewed as an ordered categorical variable, CMP serves as a suitable method for addressing potential endogeneity. The estimation results are summarized in Table 5. Columns (1)–(4) and (5)–(8) present results from the 2SLS and CMP models, respectively, while columns (9) and (10) report the IV-Poisson estimates. In each specification, two alternative measures of income inequality are examined: regional inequality (columns 1, 2, 5, 6, and 9) and individual-level inequality (columns 3, 4, 7, 8, and 10). In the 2SLS regressions, the first-stage F-statistics for all models exceed the critical value of 16.38 at the 10% significance level, suggesting that the risk of weak instruments is not a concern. The second-stage results consistently yield positive and statistically significant coefficients, reinforcing the core finding that income inequality promotes fertility. Similar patterns are observed in both the CMP and IV-Poisson models, indicating that the positive effect of income inequality on fertility persists even after

accounting for endogeneity. In addition, an alternative instrument is introduced based on prior work by Zhou et al. (2018), following a broader literature that links demographic structure to income inequality (Drabo, 2011; Qi & Lu, 2013; Zhou et al., 2018; Yin et al., 2020). Specifically, the ratio of individuals aged under 20 and over 60 to those aged 20–60 at the county level is used as an instrument. Estimation results using this alternative specification remain qualitatively consistent, offering additional support for the validity of the identification strategy².

Table 5. Instrumental variable test.

Variable	2SLS				CMP				IV Possion	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	1 st Stage	2 st Stage	1 st Stage	2 st Stage	1 st Stage	2 st Stage	1 st Stage	2 st Stage	Fertility	Fertility
	Gini	Fertility	Kak	Fertility	Gini	Fertility	Kak	Fertility		
Gini		5.1961*** (0.4214)				7.3169*** (0.3593)			3.9682*** (0.4144)	
Kak				2.4481*** (0.1999)				3.3581*** (0.1469)		1.9776*** (0.2011)
IV	-0.1626*** (0.0164)		0.3010*** (0.0152)		0.1418*** (.0056)		0.3010*** (0.0143)			
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firststep F	437.703		393.65							
DWH test	181.611***		143.891***							
atanhrho_12					-0.6720*** (0.0485)		-0.7211*** (0.0571)			
N	9423		9423		9423		9423		9423	9423

4.3.2 Propensity Score Matching (PSM)

The analysis employs propensity score matching (PSM) as an additional robustness check to further mitigate potential biases stemming from sample selection. The treatment group is defined as individuals exposed to income inequality levels above the sample mean, while those below the threshold form the control group. Based on the set of covariates used in the baseline regressions, three matching methods are implemented: nearest-neighbor matching (1:4), radius matching, and kernel matching. To enhance the credibility of the findings, the grouping is redefined using alternative thresholds—the median and the 75th percentile of the income inequality distribution—and the matching procedure is repeated accordingly. As shown in Table 6, the estimated Average Treatment Effects on the Treated (ATT) remain statistically significant across all matching methods and thresholds³.

² Omitted here due to space limitations; available upon request.

³ Given space constraints, only the results based on the Gini coefficient as the measure of income inequality are reported here. Results using the relative deprivation index yield similar conclusions and are available upon request.

Furthermore, the matched samples are re-estimated using the same regression framework, and the results are reported in Table 7, where each coefficient corresponds to the estimated effect of income inequality. The coefficient remains consistently positive and statistically significant, indicating that the findings are not materially different from those of the baseline model.

Table 6. Propensity scores matching results.

Criterion	Matching Method	Sample	Treatment Group	Control Group	ATT	Standard Error	T-Statistic
Mean	nearest-neighbor matching (k=4)	Matched	0.9670	0.9189	0.0481**	0.0224	2.14
	radius matching (r=0.05)	Matched	0.9670	0.8951	0.0719***	0.0203	3.55
	kernel matching	Matched	0.9670	0.8968	0.0703***	0.0203	3.46
Median	nearest-neighbor matching (k=4)	Matched	0.9492	0.8988	0.0503**	0.0224	2.24
	radius matching (r=0.05)	Matched	0.9492	0.8846	0.0645***	0.0201	3.21
	kernel matching	Matched	0.9492	0.8862	0.0629***	0.0201	3.13
75th percentile	nearest-neighbor matching (k=4)	Matched	1.0052	0.9289	0.0763***	0.0273	2.80
	radius matching (r=0.05)	Matched	1.0052	0.9161	0.0891***	0.0249	3.59
	kernel matching	Matched	1.0052	0.9175	0.0877***	0.0249	3.53

Table 7. Regression results based on PSM-matched samples.

Matching Method	Based on Mean Split	Based on Median Split	Based on 75th Percentile Split
nearest-neighbor matching (k=4)	0.5139*** (0.1065)	0.5559*** (0.1078)	0.5710*** (0.1145)
radius matching (r=0.05)	0.5892*** (0.1006)	0.6005*** (0.1005)	0.5705*** (0.1006)
kernel matching	0.5892*** (0.1006)	0.6013*** (0.1005)	0.5705*** (0.1006)

5. Further Discussion

5.1 Mechanism Analysis

As outlined in the earlier theoretical section, income inequality may influence individual fertility behavior either positively or negatively through its effects on educational expectations—both self-oriented and child-oriented. To empirically test this channel, the analysis first applies the conventional three-step mediation method.

5.1.1 Traditional Mediation Analysis

(1) Self-Educational Expectation

The first step examines whether individuals' expectations regarding their own educational attainment mediate the relationship between income inequality and fertility

behavior. The results are presented in columns (1) to (4) of Table 8. Columns (1) and (3) show that income inequality tends to suppress individuals' expectations for their own education. That is, respondents experiencing stronger relative deprivation—or residing in regions with higher levels of income inequality—report lower desired educational attainment. This finding is intuitive: in the face of large income gaps, individuals—particularly those from disadvantaged backgrounds—may become disillusioned with education as a means of upward mobility. Financial constraints may further diminish any aspiration toward higher degrees. In general, individuals who hold higher expectations for their own education are more likely to achieve correspondingly higher educational outcomes. Even when ideal and actual attainment diverge, lofty aspirations typically signal ambition and a strong orientation toward personal and professional development. Columns (2) and (4) report the results after introducing the mediator into the baseline regression. The coefficient for income inequality remains statistically significant, and the individual's self-educational expectation exhibits a negative correlation with fertility. These results confirm the existence of the causal pathway: Income Inequality → Self-Educational Expectation → Fertility Behavior. More specifically, stronger feelings of relative deprivation suppress self-oriented educational expectations, which in turn increase fertility levels. Similarly, in regions with greater income inequality, residents tend to hold lower expectations for their own education—ultimately contributing to higher overall fertility rates within those regions.

(2) Child-Educational Expectation

Beyond setting goals for their own education, individuals form expectations about their children's educational attainment—a proxy that, to some extent, reflects their anticipations of child-rearing costs. Columns (5) through (8) of Table 8 present the mediation analysis results along this dimension. As shown in Columns (5) and (7), both measures of income inequality—the individual-level relative deprivation index and the regional Gini coefficient—are negatively associated with expectations for children's education. That is, greater inequality correlates with lower educational expectations for offspring, and, in turn, a higher number of children. This finding suggests that individuals experiencing stronger relative deprivation or living in highly unequal regions are less likely to internalize the long-term value of education. In environments where income gaps are stark and persistent, people may develop a sense of futility regarding social mobility through education. Instead of placing hope in their children's educational advancement as a route to elevate the family's socioeconomic status, they may default to traditional beliefs—valuing larger families as a form of security or prosperity.

Taken together, the two mediation pathways—via expectations for both self and child—reveal a consistent logic: in contexts of pronounced income inequality, elevated fertility tends

to coexist with suppressed educational aspirations. A simple correlation test further supports this pattern: individuals who hold higher expectations for their own education are also more likely to have higher expectations for their children's education. This positive association highlights an intergenerational linkage in educational ambition, reinforcing the interpretation of education as both a personal and familial investment outlook.

Table 8. Mediation effect test results.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Eduasp	Fertility	Eduasp	Fertility	Eduasp_c	Fertility	Eduasp_c	Fertility
Gini	-0.8670*** (0.1567)	0.4985*** (0.1000)			-1.0936*** (0.1718)	0.7277*** (0.1247)		
Kak			-0.8465*** (0.0613)	0.3161*** (0.0356)			-0.6684*** (0.0623)	0.4310*** (0.0412)
Eduasp		-0.0786*** (0.0066)		-0.0717*** (0.0066)				
Eduasp_c						-0.0379*** (0.0104)		-0.0305*** (0.0104)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
N	9423	9423	9423	9423	6068	6068	6068	6068
R2/Pseudo R2	0.0138	0.2296	0.0155	0.2309	0.0013	0.0995	0.0018	0.1009

5.1.2 Endogenous Mediation Effects

Given the potential bias introduced when endogeneity is present, traditional mediation analysis may yield unreliable estimates. To address this concern, the current study draws on the approach proposed by Dippel et al. (2020) and adopts the instrumental variable mediation method (IVmediate) to more rigorously account for underlying endogeneity. Unlike standard mediation techniques, the IVmediate framework incorporates instrumental variables into each stage of the causal pathway, allowing identification of mediation effects under endogeneity. Specifically, this method is implemented through two-stage least squares (2SLS), in which the instrument is used not only for the treatment variable (income inequality) but also for the mediator (educational expectation), thereby ensuring valid inference across the full causal chain.

Table 9. Endogeneity test for mediation effects.

Variable	Dependent Variable: Fertility Behavior			
	Mediator: Eduasp		Mediator: Eduasp_c	
	(1)	(2)	(3)	(4)
	Gini	Kak	Gini	Kak
Total effect	5.3273*** (0.5584)	4.2451*** (0.6190)	7.0346*** (0.7462)	5.7907*** (0.6606)
Direct effect	-0.1691 (0.2032)	-0.3532** (0.1637)	-0.1391 (0.2137)	-0.0354 (0.1057)
Indirect effect	5.4964***	4.5983***	7.4607***	3.8865***

	(1.3740)	(1.2453)	(1.4240)	(0.8045)
Control variable	YES	YES	YES	YES
F-statistic (T on Z)	244.266	59.356	244.094	59.314
F-statistic (M on Z T)	32.472	30.054	66.244	68.226
N	9243	9243	6068	6068

Table 9 presents the results of the endogeneity-robust mediation analysis. Columns (1) and (2) use self-educational expectation as the mediator, while Columns (3) and (4) employ child-educational expectation. Across all specifications, both the total effect and the indirect effect of income inequality on fertility behavior remain statistically significant. Although the significance of the direct effect varies somewhat, this very instability reinforces the explanatory power of educational expectations as a mediating mechanism—clarifying how income inequality ultimately shapes individual fertility behavior. Moreover, the F-statistics in all columns exceed the conventional threshold of 10, indicating that the selected instrumental variables are both relevant and valid. Taken together, these results provide robust evidence that the education-based transmission channel from income inequality to fertility behavior holds even when endogeneity is addressed using instrumental variable techniques.

As an additional robustness check, the same mediation framework is applied using fertility intention—rather than behavior—as the outcome variable. The results remain consistent: rising income inequality leads to lower educational expectations for both self and children, which in turn exerts a positive influence on fertility intention, much like its effect on actual fertility behavior⁴. This finding not only underscores the stability of the mediation results, but also suggests a degree of generality: the conclusion does not appear to be undermined by the often-debated gap between fertility intentions and fertility outcomes.

5.2 Heterogeneity Analysis

To capture the nuanced ways in which income inequality may channel its effects on fertility, the analysis proceeds with subgroup regressions across three key dimensions: individuals' assessments of the severity of China's educational problems, the level of public education investment in their region, and household-level engagement in private educational savings. Given that overlapping confidence intervals may compromise the validity of direct coefficient comparisons, formal tests for intergroup coefficient differences are employed to ensure interpretive rigor.

The first dimension draws on respondents' perceptions of systemic issues within the

⁴ For brevity, results of the mediation analysis with fertility intention as the dependent variable are omitted but available upon request.

Chinese education system⁵—ranging from resource disparities and prohibitive costs to diminished returns on educational attainment. These structural shortcomings have long fueled heightened competition and widespread anxiety, thereby reshaping parental attitudes toward childrearing and long-term investment in human capital. As shown in Columns (1) and (2) of Table 10, the fertility-enhancing effects of income inequality are more pronounced among individuals who perceive educational challenges as more acute. This pattern holds under both regional-level Gini coefficients and individual-level indices of relative deprivation. Such heterogeneity may reflect a broader psychological recalibration. Where education is no longer regarded as a reliable vehicle for upward mobility—particularly under widening income gaps—individuals may begin to discount its future returns. In turn, the reduced salience of anticipated educational costs may soften the economic constraints on fertility, giving rise to a preference for larger families that is less burdened by long-term investment concerns.

Columns (3) and (4) of Table 10 divide the sample according to the level of public education investment in the respondent's region, measured by the ratio of provincial government education expenditure to local GDP. According to the test for coefficient differences across groups, interpersonal income inequality does not exhibit significantly divergent effects on fertility behavior between the two subgroups. However, regional income inequality shows a markedly stronger positive effect on fertility in areas where public investment in education is relatively low. This pattern may be interpreted through the lens of a substitution effect between public and private educational investment. In regions where basic public education services are inadequate, households are compelled to allocate more private resources to secure access to quality education. As a result, the anticipated cost of childrearing—particularly with respect to education—rises, leading to a reduction in fertility. This hypothesis finds further support in Columns (5) and (6) of Table 10, which group respondents based on whether their household has already started saving for their children's education⁶. The data indicate that the positive impact of income inequality on fertility is more pronounced among families who have begun saving—suggesting heightened sensitivity to educational costs in their reproductive decisions.

Together, the heterogeneous patterns observed across these three dimensions underscore the centrality of education in mediating the relationship between income

⁵ The indicator for perceived severity of educational problems in China is derived from the CFPS Adult Questionnaire, specifically the item: “Overall, how serious do you think education problems are in China?” Respondents rated their answers on an integer scale from 0 to 10, where 0 indicates “not serious at all” and 10 represents “extremely serious.” To minimize potential bias stemming from imbalanced subgroup sizes, a cut-off score of 7 was adopted to bifurcate the sample into two groups: those perceiving a high level of severity and those perceiving a low level of severity.

⁶ The indicator “saving for children's education” is derived from the CFPS Child Questionnaire and matched at the household level. Given that a household may have more than one child, the response is coded as “yes” as long as the family has savings for the education of at least one child, in order to simplify the analysis.

inequality and fertility. These findings lend additional support to the proposed mechanism in which educational expectations serve as a key conduit through which inequality shapes fertility behavior.

Table 10. Heterogeneity analysis results.

Grouping		No.	Gini	P-value for Coefficient Difference (Gini)	Kak	P-value for Coefficient Difference (Kak)	Controls Included	N
Perceived Severity of Educational Problems in China	High	(1)	0.7413*** (0.1374)	0.048**	0.4793*** (0.0504)	0.003***	YES	4405
	Low	(2)	0.4175*** (0.1397)		0.3105*** (0.0485)		YES	5018
Level of Public Education Investment in Region	High	(3)	0.3647** (0.1547)	0.005***	0.3665*** (0.0541)	0.153	YES	4711
	Low	(4)	0.7818*** (0.1185)		0.3725*** (0.0434)		YES	4712
Whether Household Saves for Children's Education	YES	(5)	1.2071*** (0.2263)	0.007***	0.5517*** (0.0786)	0.061*	YES	1725
	NO	(6)	0.5763*** (0.1513)		0.4163*** (0.0488)		YES	4315

Note: Columns (5) and (7) report the Fisher combination test p-values (based on 1,000 bootstrap samples) when the Gini coefficient and the Kakwani index are used as the explanatory variables, respectively.

6. Conclusion and Future Directions

Income inequality and persistently low fertility represent two of the most pressing structural challenges facing contemporary China—both of which pose considerable constraints on the country's pursuit of common prosperity. Motivated by this dual concern, the present study draws on data from the 2014 wave of the China Family Panel Studies (CFPS) and examines the relationship between income inequality and fertility behavior from both regional and individual perspectives. Employing Poisson regression as the core empirical strategy, the analysis yields three principal findings. First, income inequality exerts a positive overall effect on fertility: individuals residing in regions with higher levels of income inequality—or those experiencing stronger feelings of relative deprivation—tend to report higher fertility. This result echoes the earlier work of Chen (2010). A range of robustness checks, including alternative variable specifications and sample adjustments, confirm the empirical reliability of this finding. Second, educational expectations serve as a key transmission mechanism through which income inequality affects fertility outcomes. Higher levels of regional inequality or more acute individual deprivation are associated with lower expectations regarding both one's own and one's children's educational attainment. This finding suggests that in contexts of intensified inequality, individuals tend to underestimate the direct and opportunity costs of childrearing, especially those tied to education. With diminished anticipations of long-term investment, individuals may perceive fewer economic constraints and become more inclined to have additional children. Third, the

effect of income inequality on fertility exhibits clear heterogeneity across three contextual dimensions: (i) individuals' perceived severity of educational problems in China, (ii) levels of public education investment at the regional level, and (iii) household-level private educational savings. These differentiated patterns offer additional support for the proposed mechanism, underscoring the central role of educational expectations in shaping the inequality–fertility nexus.

This study carries important policy implications. While economists often advocate stronger income redistribution to reduce inequality, the findings here suggest that income inequality may, under certain conditions, increase fertility. This indicates a potential tension between promoting social equity and encouraging population growth. The mechanism identified in this paper helps explain this paradox: in areas with greater income inequality, individuals tend to lower educational expectations for themselves and their children, thereby underestimating the costs of childrearing and facing weaker psychological and financial barriers to having more children. By contrast, in more equal regions, where competition for educational opportunities is more transparent and returns to education are perceived as higher, families tend to prioritize child quality over quantity.

These findings suggest that education policy may serve as a key lever for reconciling equity and fertility goals. On the one hand, improving the quality and equal distribution of public education can promote equal opportunity, raise returns to education, and help disadvantaged groups maintain higher educational aspirations. This requires stronger public funding and more effective implementation of the “Double Reduction” policy. Although China has increased public education spending and curbed off-campus tutoring, spending remains below the global average, and policy effects may differ across income groups, potentially widening disparities if not carefully managed.

On the other hand, reducing education costs can sustain educational aspirations while easing the burden of childbearing. If greater public provision crowds out private spending, it may reduce households' education-related pressures and help align China's long-standing cultural emphasis on educational achievement with higher fertility intentions.

Overall, enhancing the provision and equity of public education is crucial for addressing both rising income inequality and persistently low fertility. Still, this study has limitations, including endogeneity concerns and the use of only one cross-sectional dataset from 2014. Future research with better identification strategies and longitudinal data is needed.

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