

Educational Assortative Mating and Fertility Intentions in China

Zhong Fei^a, Jieyu Li^{b*}, Siqi Chen^a, Mingze Gao^a

^aSchool of Economics and Statistics, Zhejiang Gongshang University Hangzhou College of Commerce, Hangzhou, Zhejiang, China, ^bZhejiang Gongshang University Hangzhou College of Commerce, Hangzhou, Zhejiang, China

*Corresponding Author Email: 2249900183@qq.com

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Abstract

Against the backdrop of China's persistently low fertility rates despite progressive policy changes, understanding the determinants of fertility intentions at the micro-level has become a issue of paramount importance. Education is a key factor, yet prior research often overlooks the interactive nature of couples' decision-making. We provide a new perspective on the education-fertility relationship by using the 2021 Chinese Social Survey (CSS) data to investigate how educational assortative mating (EAM) can predict their fertility intentions. We focus on differences in two-child fertility intentions among couples with varying combinations of couples' education. The overall findings from China reveal that education-fertility has a negative gradient. Furthermore, when husbands are highly educated, highly educated wives exhibit a relatively higher willingness to have two-child than medium-educated wives, but lowly educated wives do not indicate intentions to have two-child. Our results highlight the need to consider the educational backgrounds of both partners to draw conclusions regarding the education-fertility association.

Keywords: Education, Educational Assortative Mating, Couples' Educational Pairing, Fertility, Fertility Intentions, China

Introduction

China is grappling with one of the most profound demographic transitions in modern history, characterized by a rapidly aging population and a persistently low fertility rate that has fallen below the replacement level for decades. Despite the sequential relaxation of the birth control policy—from the one-child policy to the universal two-child policy in 2016 and further to the three-child policy in 2021—the anticipated rebound in the birth rate has failed to materialize. The recent consecutive declines in the number of newborns, coupled with the first population decline in six decades, have escalated concerns over a potential “low-fertility trap” and its far-reaching implications for national economic vitality, social sustainability, and the structure of the welfare system. This looming demographic crisis underscores an urgent

need to move beyond macro-level policy analysis and delve into the micro-level decision-making processes within the family unit, where fertility intentions are ultimately formed.

In the quest to understand the drivers of low fertility, education has consistently emerged as a pivotal factor. A substantial body of literature has established a negative correlation between educational attainment, particularly for women, and fertility outcomes. However, a critical gap persists. The majority of these studies approach fertility decision-making from an individualistic perspective, focusing solely on the education of either the wife or the husband. This approach is inherently limited because childbearing is fundamentally a couple's decision—a complex interplay of two individuals' preferences, resources, and constraints. In contemporary Chinese society, where gender dynamics are evolving and decisions are increasingly made through mutual agreement, ignoring the dyadic nature of fertility choices can lead to a biased and incomplete understanding. Therefore, the lens of Educational Assortative Mating (EAM)—the educational pairing within a couple—provides a more realistic and nuanced framework to decipher the education-fertility puzzle in China.

China is not an exception to the general trend of a sharp decline in the total fertility rates (TFRs) of most developed and developing nations between the middle and late 1980s. The TFR has been declining since the late 1970s, when the one-child policy was put into effect and continued to be below the replacement threshold at the beginning of the 1990s (Guo et al., 2019; Zhao & Zhang, 2018). Since 2014, the government made an exception to the fertility policy of China by allowing families in which one parent was an only child to have two-child. This two-child policy was implemented nationwide at the beginning of 2016. The comprehensive three-child policy executed in 2021 has promoted childbearing among young couples. Nevertheless, the anticipated rise in TFR has yet to materialise, even with the government's gradual loosening of birth control regulations over the previous few years (Chen & Guo, 2022). Data from the Chinese National Bureau of Statistics released in January 2023 show that, for the first time in 61 years, a noticeable decline in population growth occurred, with 850,000 fewer people living in Chinese Mainland at the end of 2022. This population decline figure reaches 2.08 million by the end of 2023. This regression has increased academic concerns regarding China's demographics.

Despite a substantial number of studies examining the relationship between fertility intentions and education, the majority of the literature focuses solely on the educational attainment of either the husbands or wives (Samari, 2019). The educational level of wives is known to be strongly associated with fertility intentions; however, research on the educational level of men and its relationship to the fertility remains scarce. Only a few prior studies have taken the couples' perspective (Bauer & Jacob, 2009; Sun & Zhao, 2022). Including men's education in such studies is essential because fertility results from an interaction between two individuals (Begall, 2013; Doepke & Kindermann, 2019); even if fertility is not explicitly discussed by a couple, the characteristics of each partner may influence the other's childbearing decisions. This method of approaching couples is significant because, in contemporary society, fertility decisions are not made solely by husbands or wives but through mutual agreements that often involve trade-offs accepted as individual opportunity costs (Begall, 2013; Doepke & Kindermann, 2019). Due to possible prejudices that might result from approaching the matter from a standpoint of individual preference and the fact that the majority of fertility decisions take place within a marriage, the relevance of

examining fertility from a couple's point of view has been increasingly highlighted by researchers (Gustafsson & Worku, 2005; Nitsche et al., 2018; Van Bavel, 2012).

While educationally homogamous couples have been thoroughly examined, there is limited data regarding their correlation with fertility. Huber and Fieder (2011) examined the impact of educationally homogamy on fertility concerning childlessness, utilizing U.S. Census data, and discovered that such marriages diminished the probability of remaining childless. Dribe and Stanfors (2010) discovered that, in contrast to other EAM couples in Sweden, those in highly educated homogamy exhibited a greater propensity to have a first child followed by a second kid. Trimarchi and Van Bavel (2020) assert that couples in highly educated homogamy exhibit the greatest second birth rate in Belgium. Morales (2020), along with Bueno and García-Román (2021), corroborate this assertion. Research conducted in Austria and Bulgaria (Osiewalska, 2017), Germany, the Netherlands, and Flanders (Bauer & Jacob, 2009) substantiates that couples in highly educated homogamous unions tend to have fewer children compared to those in lower educated homogamous unions. Uchikoshi (2018) further affirmed that highly educated homogamous married couples exhibited a reduced likelihood of conceiving a second child. Bagavos (2017) discovered that lower educated homogamous married couples exhibited comparatively elevated fertility rates. Nitsche (2017) substantiated the impact of EAM utilizing German socio-economic panel data, Cox regression, and cohort methodology; the effect was significant in the 1950-1965 and 1966-1975 birth cohorts, with couples transitioning to marriage experiencing a higher incidence of first births. Furthermore, research conducted by Wirth (2007) and Nitsche et al. (2018) indicated that in Germany, educated homogamous married couples had a lower likelihood of being childless compared to hypogamous couples, however they were less likely than hypergamous couples to have children. Pukuh and Wisana (2018) contended that educated couples in hypergamy had the greatest number of offspring. A study (Tsou et al., 2011) revealed that women married to husbands with higher or equivalent educational attainment had a greater number of children than those married to husbands with lower educational levels. Couples in hypergamy had elevated rates of second and third births in comparison to those in hypogamy (Trimarchi & Van Bavel, 2020). Moreover, research indicates that couples that engage in hypogamy exhibit the lowest reproductive rates. In Wirth's 2007 research of homogamous married couples, when at least one spouse possessed a high degree of education, the majority of couples with a wife more educated than her male counterpart remained childless. Trimarchi and Van Bavel's (2020) study reveals that in Bulgaria, Poland, and Romania, couples with a highly educated female spouse had the lowest rates of second births. Osiewalska (2017) identified that hypogamy adversely impacted fertility in Austria and Bulgaria. A study by Sun and Zhao (2022) established that in Hong Kong, China, hypogamous couples had fewer children than homogamous couples after having at least one kid, whereas hypergamous couples were more inclined to have and rear more children than homogamous couples.

This study presents three key contributions as outlined below. First, while a large body of literature discusses the effect of education on fertility intentions based on individual contexts, this study places the research squarely within the "family context of both spouses". This shift is crucial because fertility decision-making in modern China is increasingly a result of interaction and negotiation between husbands and wives. By adopting a couple-level analysis, this paper offers a breakthrough that more accurately reflects the reality of how families make decisions, thereby providing more reliable insights for policymakers. Second,

the findings of this study are highly pertinent for policy-makers in China and other East Asian societies facing similar low-fertility challenges. Understanding how different educational pairings respond to fertility incentives can inform the design of targeted and effective public policies. For instance, if highly educated homogamous couples are found to have specific constraints, policies can be tailored to alleviate their opportunity costs, thereby making the relaxation of fertility policies more effective in stabilizing the national fertility level. Third, this research addresses a significant geographical gap in the literature. While fertility research is abundant in Western contexts, studies in East Asia, particularly in mainland China, remain scarce. This study provides timely and representative empirical evidence from China, enriching the global academic discourse and offering a valuable comparative perspective for researchers and demographers worldwide.

The Background of China

The two-child fertility rate has increased significantly in recent years as a result of China's fertility policy being gradually relaxed. It stabilized at about 0.6 until 2011, at which point it started to climb, and after 2015, it increased significantly. After surpassing the one-child fertility rate in 2015, the two-child fertility rate increased to 0.94 in 2016 and even surpassed 1.0 in 2017. Due to the implementation of the universal two-child policy, the two-child total fertility rate in 2017 was higher than 1.0 in the setting of a low fertility rate. The adoption of the universal two-child policy, which results in the simultaneous delivery of two children by women of different ages, is solely to blame for this phenomena of fertility accumulation (Chen, 2023). However, because the decline in the one-child fertility rate more than outweighed the increase in the two-child fertility rate, the overall fertility rate did not increase much as a result of the two-child policy. But the two-child policy's effects quickly faded, and after 2017, China's fertility rate sharply decreased. The overall fertility rate dropped from almost 1.8 to 1.02 in just six years. However, since the release of the three-child policy (released in 2021), there has been no increase in the fertility rate. In 2021, the number of births was 10.62 million; in 2022, the number of births decreased to 9.56 million; and in 2023, the number of births decreased once again to 9.02 million.

Since the 1990s, there has been a clear trend of delayed first marriages in China, with the average age of first marriages among young people rising (He & Tan, 2021). In particular, the rate of first marriage postponement has accelerated again in the last decade. According to Census data, from 1990 to 2020, the average age of first marriage for Chinese women increased by 5.8 years (Chen, 2023). In East Asian societies, where marital childbearing is predominant, delayed age at first marriage directly leads to delayed age at first childbearing and further impacts fertility by compressing women's childbearing time and reducing the number of their potential children (Guo & Tian, 2017; Li & Zhang, 2021; Song & Zhang, 2017). The trend of not marrying and having children will be more significant than the trend of marrying later and having children later. The proportion of unmarried 30-year-old men will increase from 8.30% in 1990 to 29.09% in 2020, and the proportion of unmarried women will increase from 1.04% in 1990 to 13.95% in 2020 (Chen & Zhang, 2022).

The gender disparity in education has significantly reduced in China owing to the introduction of compulsory schooling and college expansion (Wu & Zhang, 2010). In addition, considerable research indicates that a sizeable portion of young people throughout East Asia, with China included, aspire to marriage and continue to value it (Raymo et al., 2015).

Moreover, educated women tend to prefer male partners with the same or higher levels of education as themselves (Hu, 2017). However, the number of women in tertiary education in China is already higher than that of men (Hong, 2004). Consequently, it may be more difficult for women to find husbands who have the same education (Jones, 2007; Pimentel, 2006; Qian & Li, 2020).

There are two strands of literature on the explanation of fertility decline in China. One attributes fertility decline to the intervention of family planning policies (Wang et al., 2017). The other emphasises the important role of socio-economic factors such as educational expansion and urbanisation (Lavelly & Freedman, 1990; Zhao & Zhang, 2018). Zhang and Zhao (2023) showed that each additional year of schooling for women reduces the number of children by about 0.09, delays the age of first birth by 0.7 years, and reduces the probability of having a second or more children by 0.18 for mothers whose first child was a girl. Ní Bhrolcháin and Beaujouan (2012) argue that education plays an important role in delaying childbearing. Chen (2023) argues that the dramatic declines in China's total first marriage rate and total first birth rate over the last decade are directly related to the increase in the educational attainment of Chinese women, and that 60 per cent of the decline in fertility can be attributed to changes in the structure of women's education.

Fertility intentions serves as the primary indicator for forecasting fertility behavior and offers critical parameters for estimating fertility levels, which assess the maximum potential of fertility behavior following the full liberalization of fertility policy (Jin Yongai et al., 2016; Zhang Xiaoqing et al., 2016). Fertility intentions denotes individuals' aspirations and pursuits regarding procreation, encompassing their preferences for the number, timing, gender, and quality of offspring. It reflects attitudes and perceptions towards fertility behavior, illustrating shifts in societal views on childbearing and its evolving trends (Gu Baochang, 2011). Fertility intentions denotes individuals' perceptions and attitudes regarding fertility, whereas fertility behaviour pertains to the actual number of children an individual has, representing the tangible realization of their fertility intentions and serving as an indicator of individual fertility levels (Song Jian & Chen Fang, 2010). A close and inevitable association exists between fertility intentions and fertility behavior; nevertheless, fertility intentions do not equate to fertility behavior, and the transition from intentions to behavior is influenced by numerous circumstances. Miller and Pasta (1995) indicated that the transition from fertility intentions to fertility behavior is a sequential decision-making process: fertility motivation → fertility intentions → fertility behavior → fertility rate. The motivation for fertility in individuals arises from a blend of intrinsic factors and life experiences, which subsequently evolve into fertility intentions. These intentions are progressively translated into fertility behavior through various stages, influenced by additional factors. The transition from fertility intentions to fertility behavior can be influenced by various factors, leading to three scenarios: intentions exceeding behavior, intentions aligning with behavior, and intentions falling short of behavior (Miller & Pasta, 1995). Bongaart's (2001) theory posits that discrepancies between fertility intentions and behavior arise from various factors, including the desire to compensate for a child's death and gender preferences. It asserts that unwanted childbearing, births following child mortality, and gender biases lead to fertility behavior that exceed fertility intentions, while delayed childbearing, involuntary infertility, and competing preferences result in fertility behavior that fall short of fertility intentions. Following the enactment of the 'three-child policy', scholars and governmental agencies have executed a number of sample studies

regarding fertility intentions. While the outcomes of these surveys do not directly reflect individuals' actual fertility behavior, they can nonetheless serve as robust predictors of such behavior and the prospective fertility rates within society.

Therefore, in this study, we aim to examine the variations in the fertility intentions of educationally homogamous couples (those with similar levels of education) and heterogamous couples (those with different levels of education). In addition, we further categorise heterogamous couples into hypergamous ones (where the husband has a higher level of education than his wife) and hypogamous ones (where the husband has a lower level of education than his wife).

Frameworks and Hypotheses

New Home Economics Framework

According to Becker (1993), marriages benefit most from having one partner focus on earning a living while the other handles caregiving and household duties. Partners rationally divide their responsibilities; thus, providing adequate financial resources is the responsibility of individuals who have better success in the workforce, while individuals who possess superior family-care skills are assigned household tasks. Since marriage benefits both partners in this situation, the husband possesses a comparative advantage in the labour market, whereas the woman enjoys a comparative advantage inside the household. Owing to couples' specialised roles and wives' lower opportunity costs of childbearing, conventional hypergamous unions between a highly educated husband and a lowly educated wife have long been predicted to be the hotbeds for fertility (Becker, 1993).

Hypogamy, which has grown in popularity in the past several years (De Hauw et al., 2017; Grow & Van Bavel, 2015). Hypogamy would imply that wives with higher earning power focus on paid employment, so husbands can spend more time caring for their children. Wives 'possess a relative advantage over men in the domestic sphere', Becker (1993) said. Because women perform most of the childcare labour, they bear the majority of the opportunity costs associated with having children in terms of the financial costs. Since these opportunity costs are higher for hypogamous couples where the wives has a higher earning power, hypogamous partners may be less likely to have children.

Hypothesis 1: Hypergamous partners are anticipated to have the highest fertility intentions; hypogamous partners are expected to have the lowest fertility intentions.

Low wages, unstable employment and unemployment are associated with reduced fertility intentions among young couples and are significant predictors of delayed or abandoned childbearing (Brauner-Otto & Geist, 2018; Busetta et al., 2019; Vignoli et al., 2020). Higher education means higher opportunity costs related to job interruption and income loss, implying lower fertility intentions. This is more likely to be the case if both partners are highly educated.

Hypothesis 2: In homogeneous couples, the higher the level of education of both spouses, the lower the fertility intentions.

Resource-Pooling Framework

In the context of structural changes in a globalised world, Oppenheimer (1994) contended that wives' contribution to the household economy is just as significant as that of

husbands, and sharing social resources between husband and wife is a crucial tactic for guaranteeing a household's financial stability. Highly educated homogamous couples are more likely to embrace gender equality and have more secure work circumstances together that help them pay for childbearing expenses and are better positioned to have children by pooling their resources compared to other types of EAM couples (Oppenheimer, 1994). In this context, the combined resources can act as a safeguard against financial instability for either spouse and empower the family to allocate resources toward household and childcare support, thereby assisting the simultaneous pursuit of parenting responsibilities and professional development (Oppenheimer, 1997).

Hypothesis 3: Highly educated homogamous partners are anticipated to have the highest fertility intentions than other types of EAM.

Data

We utilise information from the most recent national poll, the Chinese Social Survey (CSS), to provide a comprehensive, rigorous empirical examination of the connection between couples' educational levels and fertility intentions in China. The survey covered several regions, including 151 districts, and 604 villages or neighbourhood groups, spread throughout 31 provinces across China.

The most recent data to represent the current state of affairs in China were collected in 2021. In total, 10,268 individuals completed the 2021 CSS questionnaire. We focus our analysis on participants in China who are between the ages of 20 and 49, in their peak of childbearing years. Since marriages still account for the majority of child birth in China, our research is limited to married couples (Raymo et al., 2015). We obtained a sample of 3442 after restricting the age of respondents to 20-49 years and marital status to first marriage with a spouse. After removing incorrect questionnaires and missing responses, the 2021 CSS had 3,290 data points.

Method

We use the respondents' general perception of the ideal number of children for a family to measure fertility intentions, replicating the analytical approach of relevant scholars (Kan & Hertog, 2017; Fan & Ling, 2022; Yu & Liang, 2023). Fertility intentions as the dependent variable, EAM as the independent variable, the sample's age, *hukou* (household registration), fertility status, children's gender, socioeconomic status (SES), survey location and birth cohorts as control variables. Since most Chinese families raise one child, this study wants to examine the intentions to have two or more children when comparing the level of intentions to have children. Therefore, the dependent variable is a binary variable that identifies whether an individual wants to have two and more children. In addition, China is a vast country with a large population, and different regions have different economic, social, and cultural characteristics, which leads to different educational levels and fertility intentions of people in different regions. Moreover, people in different birth cohorts have experienced different social development and the influence of different fertility policies, which also lead to different fertility intentions. Therefore we analyse the data by birth cohorts and region to better understand China. Regarding the analyses by birth cohorts and region, we replicate the analyses of Zhao (2019). Because fertility intentions (the dependent variable) are used as a binary variable, we used a binary logistic regression analysis to investigate the impact of the nine types of EAM (as shown in Table 1) on fertility intentions.

Table 1
Nine types of EAM

		Husband's education		
		Low	Medium	High
Wife's education	Low	Lowly educated homogamy	Hypergamy II	Hypergamy I
	Medium	Hypogamy III	Medium-educated homogamy	Hypergamy III
	High	Hypogamy I	Hypogamy II	Highly educated homogamy

Source: Author's own elaboration based on the CSS sample.

Measures

Dependent Variables

Fertility Intentions

Fertility intentions, the critical dependent variable, are measured as 'the ideal number of children for a family' in the 2021 CSS. Here, we present a family's fertility intentions in two different ways. First, we use a discrete variable with five possible values to represent a family's fertility intentions: 0 represents 0 children, 1 represents only one child, 2 represents two children, 3 represents three children and 4 represents four or more children. Second, we differentiate between fertility intentions in two ways: the intention to not have more than two children (zero children or one child, coded as 0) and the intention to have two and more children (coded as 1).

Independent Variables

Educational Attainment

The primary explanatory variable used in this analysis is the couples' educational accomplishments. The educational attainments of the husbands and wives are represented in our model. All these variables are discrete and take on nine possible levels of education: 1 denotes illiteracy; 2, primary school; 3, junior high school; 4, senior high school; 5, vocational secondary school; 6, vocational high school; 7, three-year college; 8, four-year college and 9, postgraduate. In addition, three classes are used to represent educational level in this analysis: the levels of junior high school, primary school and illiteracy are considered to be low levels of education (or 'lowly educated') (coded as 1). Furthermore, vocational secondary, high school and senior high school are examples of a medium level of education ('medium-educated') (coded as 2). Finally, three-year college, four-year college and postgraduate education are considered to represent a high level of education ('highly educated') (coded as 3).

EAM

Based on the educational attainment of the couples who participated in our study, we divide the total number of respondents into nine 'EAM' groups. Table 1 shows that highly educated homogamy including two highly educated couples, medium-educated homogamy involving two medium-educated couples and lowly educated homogamy involving two lowly educated couples. A lowly educated wife and a highly educated husband form hypergamy I; a lowly educated wife and a medium-educated husband form hypergamy II and a medium-educated wife and a highly educated husband form hypergamy III. Hypogamy I consists of a

highly educated wife and a lowly educated husband; hypogamy II comprises a highly educated wife and a medium-educated husband and hypogamy III consists of a medium-educated wife and a lowly educated husband.

Control Variables

The control variables are demographic properties, including age, *hukou* (household registration), fertility status, children's gender, socioeconomic status (SES), survey location and birth cohorts. The age of the respondents is verified again using the birth dates extracted from the CSS 2021 survey data. The average age of husbands was 35.57 years; the average age of wives was 33.80 years. The age range was 20 to 49 years. *Hukou* and children's gender are recorded as rural = 1 or non-rural = 0 and only son = 1 or other = 0. Utilising the recoded variables, the number of live births for each household is calculated from responses to the following questions: 'How many biological sons do you have now?' and 'How many biological daughters do you have now?'. The number of biological daughters and biological sons is added to obtain the present fertility status of each family. If a family has more than two children, it is coded as 1, and if a family has zero children or one child, it is coded as 0. In this investigation, we use self-assessed current socioeconomic status to symbolise subjective SES. The following question is used to gauge the respondents' present SES: 'Which SES level do you believe you presently hold'? The respondents self-rated this question, with a total of five ratings, namely 'high', 'upper-middle', 'middle', 'lower-middle' and 'low'. Three levels of classification are used for the same: 1 represents 'lower-middle' or 'lower', 2 denotes 'middle' and 3 indicates 'upper' or 'upper-middle'. The SES variables are continuous variables. The 4th Session of the 6th Chinese National People's Congress divided China into the eastern, central and western regions. The provinces and cities in the eastern sections were categorised based on economic development: areas marked with code 1 represent a high degree of economic development and were the first to implement the coastline opening strategy. The regions designated with code 2 in the centre are those that are less economically developed. The western region, denoted by code 3, represents the least economically developed areas. In our cohort of persons, age is likely to be the defining marker of within-sample variability among the other demographic factors. In this study, we consider age to be a grouping variable to investigate respondents' heterogeneity based on the examination of the demographic situation as a whole. For this reason, we separate the sample into three age brackets: 20–29 years (respondents born in 1992–2001), 30–39 years (1982–1991) and 40–49 years (1972–1981). In particular, it is important to note that those in the 1972–1981 cohort will be approximately 40–50 years old in 2021, and it is possible that this group of individuals will have completed their fertility behaviour (at the time, the fertility policy allowed for a maximum of two children). The implementation of the three-child policy in 2021 will have an unknown impact on the fertility intentions of this cohort, and therefore those in this birth cohort are also the subject of our study.

Results

Descriptive Statistics

Descriptive statistics of the dependent, independent and selected control variables of our analyses are shown in Table 2. In total, there were 3,290 couples in the analytical sample. Regarding fertility intentions, the mean ideal number of children for a family was found to be 2.03. The average age of the husbands was 35.57, and the average age of the wives was 33.80. Of the sample, 64.86% comprised those with rural *hukou* and 35.14% non-rural *hukou*.

Regarding fertility status, 40.33% in our sample had stayed childless or had only one child, while 59.67% of the sample had two or more than two children. Only 33.65% of the sample had at least one son in the family. The distribution of the SES was 6.47% above average, 41.73% on the average level and 51.79% below average. The survey location covered in the eastern, central and western regions were 42.85%, 31.96% and 25.23%, respectively. Most of the participants belonging to the sample were born between 1972 and 1981 (45.87%) and between 1982 and 1991 (42.07%), with a small portion born between 1992 and 2001 (12.07%).

Table 2

Descriptive statistics on selected variables (N = 3,290)

Variables	Mean (SD) or %
<i>Dependent variables</i>	
Fertility intentions (ideal number of children for a family)	2.03 (0.62)
<i>Independent variables</i>	
Husband's (or Wife's) educational attainment	
Lowly educated	54.75 (or 58.2)
Illiterate	1.22 (or 3.92)
Primary school	12.28 (or 15.59)
Junior high school	41.25 (or 38.69)
Medium-educated	21.85 (or 18.54)
Senior high school	12.22 (or 10.27)
Vocational secondary school	7.72 (or 7.36)
Vocational high school	1.91 (or 0.91)
Highly educated	23.41 (or 23.26)
Three-year college	11.95 (or 12.04)
Four-year college	10.03 (or 9.82)
Postgraduate	1.43 (or 1.40)
EAM	
Homogamy	74.40
Lowly educated homogamy (husband low, wife low)	47.02
Medium-educated homogamy (husband medium, wife medium)	9.78
Highly educated homogamy (husband high, wife high)	17.60
Hypergamy	14.93
Hypergamy I (husband high, wife low)	2.07
Hypergamy II (husband medium, wife low)	9.12
Hypergamy III (husband high, wife medium)	3.74
Hypogamy	11.67
Hypogamy I (husband low, wife high)	1.70
Hypogamy II (husband medium, wife high)	3.95
Hypogamy III (husband low, wife medium)	6.02
<i>Control variables</i>	
Age	
Husband's age	35.57 (7.34)
Wife's age	33.80 (7.13)
Hukou	
Rural	64.86
Non-rural	35.14
Fertility status	

Childless or one child	40.33
More than two children	59.67
Children's gender	
Only son	33.65
Socioeconomic status	
Above average	6.47
Average	41.73
Below average	51.79
Survey location	
Eastern regions	42.80
Central regions	31.96
Western regions	25.23
Birth cohorts	
1972–1981	45.87
1982–1991	42.07
1992–2001	12.07

Source: Author's own elaboration based on the CSS sample.

In our sample, as shown in Tables 1 and 2, the proportions of homogamy, hypergamy and hypogamy are 74.40%, 14.93% and 11.67%, respectively. An additional analysis of the EAM reveals that the percentage of lowly educated homogamy (47.02%) is the highest in the nine types of EAM, with the second highest being highly educated homogamy (17.6%) and the lowest including hypergamy I (2.07%), hypergamy III (3.74%), hypogamy I (1.7%) and hypogamy II (3.95%).

The left side of Fig. 1 shows the relationship between the nine types of EAM and the birth cohorts. The proportion of lowly educated homogamy in the 1972–1981 birth cohort was 58.71%, whereas this percentage was only 30.23% in the post-1992 birth cohort, which is a reduction of nearly half. In the 1972–1981 birth cohort, the percentages of medium-educated homogamy and highly educated homogamy were 7.55% and 11.27%, respectively, compared to 14.11% and 23.43% in the post-1992 birth cohort, an increase of nearly double. The proportions of the three types of hypogamy remained essentially unchanged as the birth cohort changed. Curiously, the balance of the three types of hypogamy increased year on year as the birth cohort changed. Hypogamy I, in particular, increased by nearly tenfold.

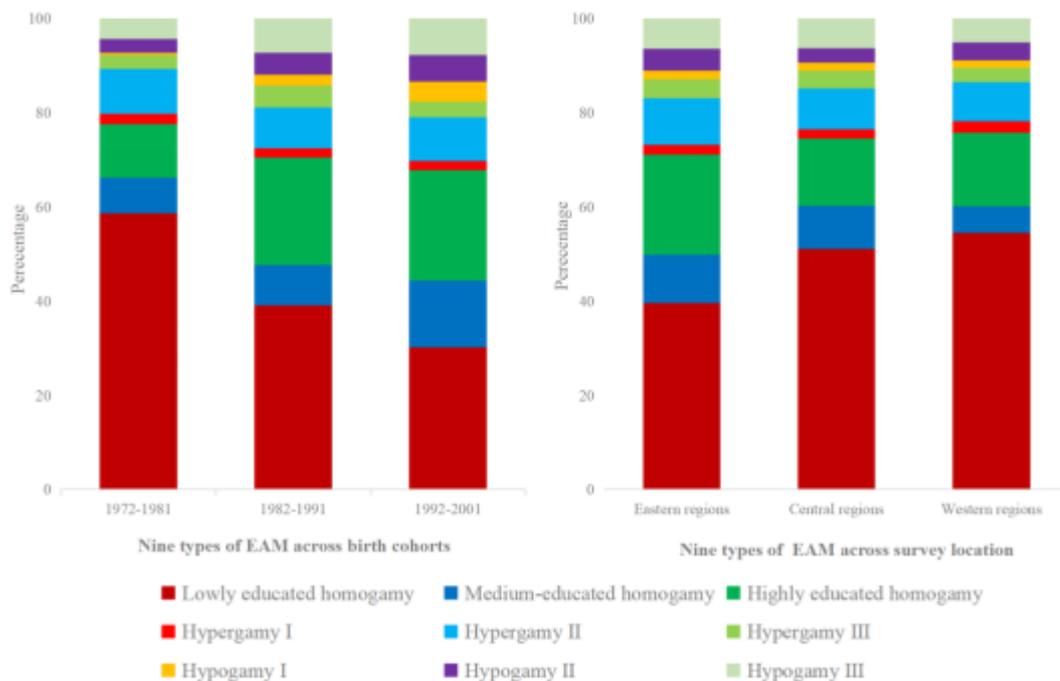


Fig. 1 Nine types of EAM across birth cohorts and survey locations

The right side of Fig. 1 shows the relationship between the nine types of EAM and the survey locations. In general, the proportion of homogamy, hypergamy and hypogamy did not change drastically from one survey location to another. The proportion of lowly educated homogamy was 39.56% in the eastern regions, which is significantly low compared to 51.14% in the central regions and 54.46% in the western regions. Both medium-educated and highly educated homogamy are higher in the eastern regions than in the central and western regions. In addition, the proportion of the three types of hypergamy and three types of hypogamy did not differ significantly across survey regions.

Fig. 2 shows that couples belonging to the groups of highly educated homogamy and hypergamy III had the lowest fertility intentions. Conversely, couples in the lowly educated homogamy, hypogamy I and hypogamy III categories had the highest fertility intentions. Hypogamy III had the highest fertility intentions among the nine types of EAM. In addition, hypogamous couples had higher fertility intentions than homogamous and hypergamous couples.

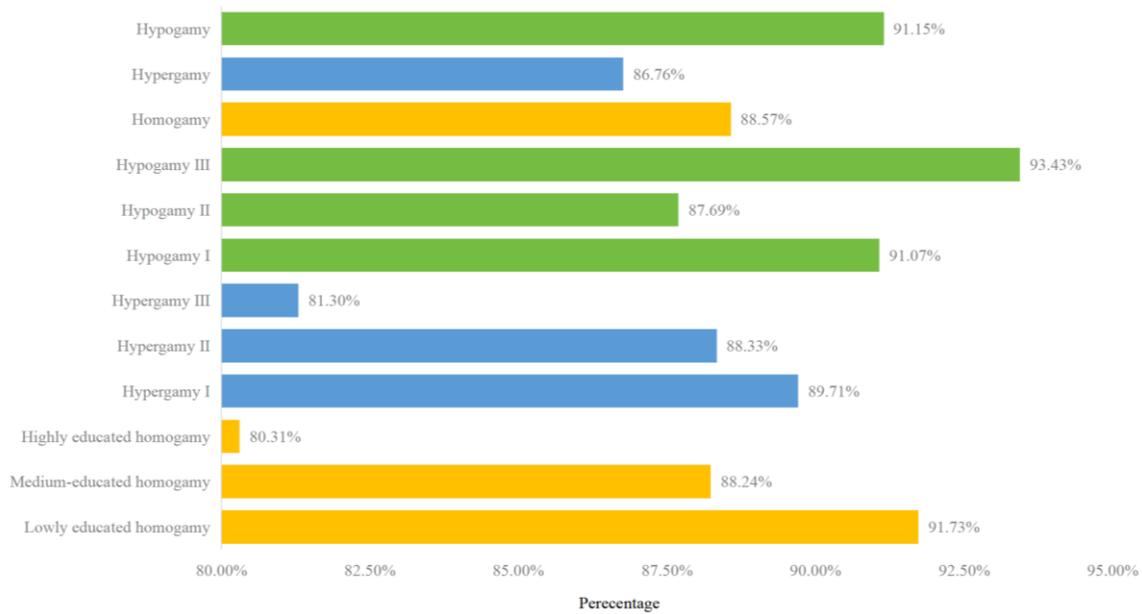


Fig. 2 Two-child fertility intentions in different types of EAM

Regression Estimates

To explore the effect of EAM on fertility intentions, four multivariate binary logistic regression models were estimated, in which intentions to have two children (hereinafter ‘two-child fertility intentions’) were used as the dependent variable, nine types of EAM were used as the independent variables and the highly educated homogamy category was used as the reference group (Tables 4 and 5).

Table 3

Results of logistic models predicting fertility intentions among EAM

Variables	Model 1		Model 2	
	Coef.	S.E.	Coef.	S.E.
EAM				
Lower-educated homogamy	0.853**	0.163	0.306	0.173
Medium-educated homogamy	0.567**	0.214	0.379	0.220
Highly educated homogamy	Ref.	Ref.	Ref.	Ref.
Hypergamy I	0.679	0.417	0.414	0.429
Hypergamy II	0.533*	0.219	0.185	0.227
Hypergamy III	0.047	0.257	-0.191	0.268
Hypogamy I	0.876	0.483	0.781	0.496
Hypogamy II	0.485	0.290	0.365	0.298
Hypogamy III	1.153**	0.310	0.750*	0.318
Age				
Husband’s age	-0.016	0.019	-0.021	0.020
Wife’s age	0.019	0.020	0.016	0.020
Hukou				
Rural	0.327**	0.126	0.207	0.130
Non-rural	Ref.	Ref.	Ref.	Ref.
Children’s gender				
Only son	-0.142	0.116	0.408**	0.125

Other	Ref.	Ref.	Ref.	Ref.
SES				
Average	Ref.	Ref.	Ref.	Ref.
Above average	0.186	0.249	0.196	0.255
Below average	-0.228	0.117	-0.232	0.120
Fertility status				
Childlessness or one child			Ref.	Ref.
More than two children			1.773**	0.141

* $p < 0.05$; ** $p < 0.01$. Odds = $(\exp(\text{Regression coefficient}) - 1) \times 100\%$.

Table 4
Results of logistic models predicting fertility intentions of EAM among birth cohorts and survey locations

Variables	Model 3						Model 4					
	Eastern regions		Central regions		Western regions		Birth cohorts 1972–1981		Birth cohorts 1982–1991		Birth cohorts 1992–2001	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
EAM												
Lowly educated homogamy	0.855**	0.234	0.319	0.307	1.536**	0.404	0.597*	0.289	0.866**	0.241	1.314**	0.451
Medium-educated homogamy	0.803**	0.298	0.333	0.415	0.183	0.485	0.109	0.333	0.988**	0.381	0.803	0.496
Highly educated homogamy	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Hypergamy I	0.827	0.638	-0.115	0.674	1.346	1.065	0.620	0.648	0.926	0.758	-0.506	0.906
Hypergamy II	0.719*	0.314	-0.019	0.396	0.947	0.547	-0.011	0.329	0.938*	0.389	1.314	0.688
Hypergamy III	0.625	0.411	-0.955*	0.424	0.444	0.667	-0.142	0.428	0.445	0.410	-1.058	0.673
Hypogamy I	0.158	0.382	-0.236	0.682	0.129	0.809	0.226	1.107	1.240	0.747	0.584	0.822
Hypogamy II	0.062	0.349	0.908	0.770	1.916	1.050	0.717	0.566	0.602	0.432	-0.058	0.595
Hypogamy III	2.461**	0.734	0.738	0.529	0.152	0.518	1.346*	0.636	1.167*	0.454	0.670	0.610
Age												
Husband's age	-0.009	0.030	-0.039	0.033	-0.026	0.045	0.016	0.031	-0.025	0.032	-0.081	0.064
Wife's age	0.025	0.031	0.042	0.034	0.005	0.046	0.009	0.030	0.053	0.040	-0.015	0.077
Hukou												
Rural	0.469*	0.186	0.054	0.217	0.323	0.305	0.322	0.207	0.447*	0.197	0.197	0.315

Non-rural	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Children's gender												
Only son	-0.374*	0.167	0.036	0.207	0.096	0.283	-0.123	0.172	-0.360	0.184	0.628	0.362
Other	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
SES												
Average	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Above average	0.074	0.333	0.266	0.496	0.621	0.639	1.082*	0.478	-0.436	0.344	-0.557	0.713
Below average	-0.343*	0.175	-0.287	0.201	0.035	0.274	-0.015	0.171	-0.193	0.189	-1.050**	0.352

* $p < 0.05$; ** $p < 0.01$. Odds = $(\exp(\text{Regression coefficient}) - 1) \times 100\%$.

We examined two-child fertility intentions for different control variables using separate models. Specifically, Models 1 and 2 were estimated for the control variable of fertility status, whereas Models 3 and 4 excluded the control variable of fertility status. Furthermore, in Models 3 and 4, two-child fertility intentions were estimated among different birth cohorts and survey regions.

Table 3 presents the results from Models 1 and 2. Model 1 suggests that compared to highly educated homogamy, couples in the lowly educated and medium-educated homogamy categories were more likely to intend to have two children, with odds ratios of 134.67% and 76.30%, respectively, which are more than that of the reference group. Thus, the results of the analysis of Model 1 support Becker's opportunity cost framework (Hypothesis 2). Nevertheless, Model 2 contains the control variable of fertility status, and the results show that only Hypogamy III is significantly correlated with the reference group with respect to two-child fertility intentions. Furthermore, all the other EAM categories are no longer significantly correlated with the reference group, likely due to the influence of the strong correlation with fertility status.

For this reason, in Table 4, we exclude the control variable of fertility status. Although this variable controls the effects of post-rationalisation to some extent, the fact of having two children also reflects fertility intentions. Model 2 in Table 3 has already confirmed that this variable is likely to be strongly correlated with the sample's educational attainment, and its direct inclusion in the model may not be suitable for exploring fertility intentions. If the control variable is directly included in the model, it may pose challenges in terms of exploring the differences in fertility intentions among different EAM types. Therefore, to investigate the connection between the nine types of EAM and fertility intentions across other regions and birth cohorts in China, Table 4 does not take into account the effect of fertility status. Model 3 further divides the sample into eastern, central and western regions of China according to the difference in survey locations; Model 4 breaks the sample down into the 1972–1981, 1982–1991 and 1992–2001 periods according to the birth cohorts of the sample. Models 3 and 4 use the highly educated homogamy category as the reference group.

Table 4 presents the results from Models 3 and 4. In Model 3, the eastern regions' results indicate that compared to highly educated homogamous couples, lowly educated and

medium-educated homogamous couples were significantly more likely to have additional children, with their odds ratios being 135.14% and 123.22% higher than the reference group, respectively. This shows that the eastern regions' results from the analysis of Model 3 support Becker's opportunity cost framework (Hypothesis 2). In Model 3, the results from the central regions suggest that hypergamy III has a significant negative correlation with the two-child fertility intentions of highly educated homogamous couples, but hypergamy I and II did not have a substantial correlation with highly educated homogamy. This indicates that when husbands are highly educated, highly educated wives have a higher willingness to have a second child than medium-educated wives. These findings show that the conclusions of the sample analysis of central regions in Model 3 partially support Oppenheimer's resource-pooling framework (Hypothesis 3). In Model 3, the results received from the western regions suggest that lowly educated homogamy has a significant positive correlation with the highly educated homogamy. By contrast, medium-educated homogamy did not have a substantial correlation with the reference group. The results of the sample analysis of western regions in Model 3 partially support Becker's opportunity cost framework (Hypothesis 2).

The results of Model 4 for the birth cohorts of 1972–1981 and 1992–2001 suggest that compared to highly educated homogamy, lowly educated homogamous couples were significantly more likely to intend to have more children, but medium-educated homogamous couples did not have a significant correlation with the reference group. This finding shows that the results of the sample analysis of the 1972–1981 and 1992–2001 birth cohorts in Model 4 partially support Becker's opportunity cost framework (Hypothesis 2). Lowly educated and medium-educated homogamous couples have a significant positive correlation with the highly educated homogamy in the birth cohort of 1982–1991, with odds ratios being 137.74% and 168.59% higher than the reference group, respectively. These results indicate that the homogamous couples of the 1982–1991 birth cohorts in Model 4 do not support any of the hypotheses, and the willingness of couples to have two children with an increasing educational level forms an inverted 'U' gradient.

Summary and Discussion

We contend that it is crucial to expand the amount of research on the education–fertility relationship by examining whether notable differences exist in how couples' educational attainments and fertility intentions relate to each other given that later marriage and parenthood have become commonplace and that the gender disparities in education have significantly narrowed in China. Although researchers in most European countries have examined the relationship between EAM and fertility intentions, this research has been less well documented in Asia. No study representative of the entire population of China currently exists, and this inadequacy needs to be addressed. Our research attempts to bridge this gap using the 2021 CSS data to explore how EAM can provide insights into couples' fertility intentions and pools as well as differentiates participants by survey location and birth cohorts.

This study yields three notable findings. First, the overall findings reveal that, in China, education–fertility has a negative gradient. Lowly educated homogamous couples have a higher probability of having two children than highly educated homogamous couples. Second, the results of the eastern and western regions are consistent with those at the national level. The central region shows a positive education–fertility correlation, and when husbands are highly educated, highly educated wives exhibit a relatively higher willingness to have two

children than medium-educated wives, but lowly educated wives do not indicate intentions to have two children. Third, the results for the 1972–1981 and 1992–2001 birth cohorts have a negative gradient in the education–fertility relationship. The findings from the 1982–1991 birth cohort suggest an inverted U-shaped gradient in this relationship.

For the most part, our results regarding two-child fertility intentions support Becker’s new home economics framework and the opportunity cost of the couples’ participation in fertility decision-making. This finding is consistent with the results of the majority of previous research, such as Sun & Zhao (2022) and Osiewalska (2017). In particular, in the Hong Kong region, as part of China, one recent study on the couple–education–fertility nexus has produced verifiable hypotheses using the new home economics framework. Specifically, Sun and Zhao (2022) used the 2016 Hong Kong Census data to investigate the effects of EAM on fertility in Hong Kong, and their empirical results are also consistent with Becker’s new home economics framework, which predicts a negative relationship between EAM and fertility.

Oppenheimer’s framework may still partly apply to the central regions, while eastern regions and western regions support Becker’s new home economics framework. In fact, many other national- and regional-level studies support Oppenheimer’s hypothesis, such as in the United States (Morales, 2020), Spain (Bueno & García-Román, 2021), Europe (Nitsche et al., 2018), Nordic countries (Nitsche et al., 2021) and Belgium (Trimarchi & Van Bavel, 2020). Several studies (Bueno & García-Román, 2021; Dribe & Stanfors, 2010; Nitsche et al., 2018) that emphasised the highly educated subset of couples, found that such couples have the highest rates of second and third births in the early 21st century. This evidence supports the resource-pooling framework. However, at least in the Finnish context, resource pooling has been found to be essential for second-birth progressions among those with low levels of education (Nitsche et al., 2021). The latest research posits that Oppenheimer’s resource-pooling model performs better than the gender-specialisation model. Bueno and García-Román (2021) provided a two-part hypothesis based on the interplay of spouses’ educational backgrounds. Their results validate the shift from a gender-specialisation model to a resource-pooling model by showing a reversal of the negative education–fertility gradient among homogamous partners, with highly educated partners having a greater likelihood of becoming parents than lowly educated partners. Nevertheless, we were unable to isolate the underlying processes that caused diverse fertility intentions across the central, eastern and western areas in our study, which future research should address.

The conclusions for the 1972–1981 and 1992–2001 birth cohorts may partly support the predictions derived from Becker’s new home economics framework, except that of the 1982–1991 birth cohort, which suggests an inverted U-shaped gradient in the education–fertility relationship. In further depth, the two-child fertility intentions in the 1982–1991 birth cohort of lowly educated and medium-educated homogamous couples are contrary to those of the other two birth cohorts. In this study, we explain that lowly educated homogamous couples, often dual-earners, require both spouses to work and raise their families together. Therefore, the opportunity cost of parenthood is equally high for lowly educated women as it is for highly educated women (Budig & Hodges, 2010; Killewald & Bearak, 2014), which suggests that fertility decisions by lowly educated homogamous couples may also be influenced by the opportunity cost of having children. Therefore, among the 1982–1991 birth cohort, medium-educated homogamous couples had the highest two-child fertility intentions.

As stated earlier, our study has certain limitations. First, the primary focus of this study is on fertility intentions, which can overestimate or underestimate the size of a complete family, although, as previously indicated, they often correctly predict fertility rates at the macro level (Ajzen & Klobas, 2013; Goldstein et al., 2013). Future studies should employ more intricate modelling to investigate if the impact of educational pairing on fertility intentions will influence the ultimate size of a family. Second, we did not consider the potential time-varying effects of educational pairing on fertility intentions because of the cross-sectional design of the study. In-depth measures on the dynamics, such as partnership histories, traits of prior partners, assessments of relationship conflict and satisfaction and both spouses' fertility wishes, should ideally be considered in such investigations. This information would enable us to determine the mechanisms underlying such trends and confirm whether our conclusions are influenced by time, or selection effects. Unfortunately, there is a lack of research on China that addresses all gap. Owing to this lack, comparing countries is challenging; as a result, it is difficult to grasp how structural social contexts may influence the relation between couples' socioeconomic resources and fertility. Future studies should examine the underlying mechanisms, even if the present findings are novel and confirm several theories. Future research will require longitudinal designs and dynamic investigations to gain an in-depth understanding of the fertility decision-making process. This article is merely a starting point.

These limitations, however, do not necessarily mean that our efforts to comprehend the relation between EAM and fertility intentions are in vain; rather, theoretically advanced studies should be developed and conducted to evaluate a larger volume of data using improved research designs. Building on the existing literature, our research has demonstrated that the educational attainment of both partners has a favourable impact on a family's intentions to have more children. In summary, this study's depiction of EAM and fertility intentions offers fresh perspectives that could inspire further in-depth research using comprehensive cohorts and fertility data across China.

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