

A Study on Education Level and the Fertility Desire of Second Child

—Based on CGSS2015 empirical test

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Abstract: Based on the CGSS (2015) data, this article explores the relationship between the level of education and the the fertility desire of second child from a microscopic perspective by constructing the Logit model. An empirical study found that there is a significant "U-shaped" curve relationship between education level and the fertility desire of second child. With the improvement of education level, fertility intention showed a trend of decreasing first and then rising, and the turning point was 10.77 years. The relationship between education level and fertility desire revealed by this research provides a decision-making reference for China 's fertility policy and related economic and social policies, and it points out that under the new social conditions, people 's fertility concept and fertility desire are given new connotation.

1. Introduction

In the new era, the report of the Nineteenth National Congress of the Communist Party of China proposed "strengthening the strategic study of population development." As an important part of human capital, the quantity and quality of the population play a vital role in the sustainable and healthy development of the social economy. Therefore, the academic community has long paid attention to the issue of population. In addition, the social problem of "ageing population", which has become more and more prominent in recent years, has also caused us to gradually turn our attention to the population. According to statistics, in 2018, China's population aged 60 and over was 249 million, accounting for 17.9% of the total population; the population aged 65 and over was 167 million, accounting for 11.9%. According to the "World Population Prospects (2019)" released by the United Nations Population Division, China's elderly population increased first and then declined within this century, peaking in 2055-2060, and the population aged 65 and over will reach 398 million. Under such a social background, with the increasing social problems such as the demographic dividends declining and rising labor costs, China's policies have also continuously changed, from "Birth control policy" to "two-child policy", and then from "Two-child policy" to the major transformation of the "The universal two-child policy", China's fertility policy has been continuously adjusted and relaxed with the development of the times. Under the conditions of rapid development and easy availability of fertility regulation technology, with the gradual relaxation of external policy restrictions on individual fertility decision-making, the key factor affecting individual fertility behavior——individual fertility desire, has become a topic of close attention from all walks of life. In recent years, the scissors difference between the declining birth rate and the increasing years of education makes us rethink the relationship between fertility and education, or how does education affect fertility?

Therefore, this paper uses the Logit model to analyze the China Comprehensive Social Survey Data (CGSS) in 2015. From a micro perspective, it explores the relationship between the education level of Chinese residents and the fertility desire of the second child, which enriches the research in related fields.

The structure of this paper is as follows: the second part puts forward the research viewpoint of this paper on the basis of reviewing the relevant literature; the third part explains the data sources and specific measurement indicators of the main variables studied in this paper and introduces the

measurement model and research methods; the fourth part reports the results of empirical analysis; the fifth part draws the main conclusions and puts forward relevant policy recommendations.

2. Literature review

The fertility desires of people in childbearing age are an important basis for examining the social fertility level in the future, and are also social issues that the government and academia have long paid attention to. Demographers use the "desire-behavior" model, assuming that an individual's fertility behavior is transformed from his/her fertility desire. By understanding the individual's fertility desire, one can predict the individual's fertility behavior, and thus the population's fertility level. It can be seen from this that exploring the influencing factors of fertility desire have a far-reaching practical significance for mobilizing fertility desire to influence fertility behavior, and then change the population structure by affecting the quantity and quality of the population and even affect the sustainable development of China's social economy. Scholars at home and abroad believe that changes in fertility desires are the result of a combination of factors.

In terms of income level, foreign scholars have used consumer choice theory to analyze family reproductive decision-making behavior, and put forward the conclusion that family income is positively related to fertility desire (Becker, 1960). In addition, scholars found a negative correlation between the two by establishing a "quality conversion model for children" (Becker and Lewis, 1973). Some scholars have found through empirical analysis that the relationship between the family's per capita income level and fertility desires shows a "U-shaped" change trend (He Mingshuai, Yu Miao, 2017).

In terms of cultural concepts, some scholars believe that because people have different identifications with the values of children of different genders, gender preferences naturally arise (Das G.M., 2003); some domestic scholars have pointed out that traditions such as patriarchy, lineage generation, child care and the concepts of having children against age are still very common in society (Jin Xiaoyi et al., 2004; Tao Tao, 2012). In addition, on the issue of the second child, the gender structure of the child has also become an important factor affecting the reproductive decision of women in childbearing age. Driven by the preference of boys, women with only girls are more likely and motivated to have the next child than women with boys (Chen Wei, Jin Yongai, 2011). With the development of the times and the continuous updating of concepts, the one-child policy implemented for forty years has made people gradually accept the idea of "a couple should only have one child". Many young couples feel that the core family of three has little economic pressure and simple family relationships, which is in line with the fast pace of modern social life. In this way, the advanced fertility concept also affects the fertility decisions of contemporary young people.

In addition, some scholars pay attention to the relationship between social mobility and fertility desire. The "social capillary" theory holds that, because social individuals have a strong desire to move to a higher class, individuals tend to reduce the number of children to reduce the burden of upward mobility (Dumont, 1890). In contrast, some scholars believe that families with higher social classes have higher incomes and broader social networks, which can provide more resources for raising children (Boyd, 1973). However, some domestic scholars have suggested that there is a significant positive correlation between social mobility and fertility desire. As the children move to a higher social class than the father, Chinese residents will be more inclined to use the increased social resources to raise children and expand family size, which provides further empirical evidence for the views of scholars such as Boyd (He Mingshuai, Yu Miao, 2017).

Scholars at home and abroad have also analyzed other influencing factors. This includes that the population's fertility desire is influenced by the "child's gender structure" and "family economic constraints" (Li Rongbin, 2017); some scholars have proposed a "subjective sense of mobility" that considers women's personal income, education level, and housing ownership and subjective flow perception have a significant impact on the fertility desire of second child (Zhang Lina, 2018); urban and rural residents' subjective well-being and public education satisfaction have a significant positive correlation on the fertility desire of second child in the whole (Wei et al., 2019).

Regarding the relationship between education level and fertility desire, some scholars believe that

education level and fertility desire have a negative correlation, because education has an impact on cultural cognition and thus affects the fertility concept of young couples with high academic background, and they look forward to realizing their personal life value and thus reducing their fertility desire; and there will be brain drain in the society because women with higher education may hinder their career development due to childbirth (Li Tiantian, Guo Jun, 2019); there are also some views that education affects the "two children" willingness mainly through "Income-cost" which means that the individual's time value is improved and "culture-cognition" ("change in marriage and childbearing concept"), "social cognitive bias" and "traditional cultural fragmentation". It also concludes that the two are negatively related (Liu Zhangsheng et al., 2018); In addition, parents' education level affects their children's education level by influencing their willingness to invest in their children's education and their perceptions. When exploring the relationship between family per capita income, intergenerational mobility and fertility intention, some scholars found that individuals' fertility intention was negatively correlated with their education level, but different education levels had different influences on fertility intention (he mingshuai, yu miao, 2017); some scholars believe that there is a non-linear U-shaped relationship between education level and fertility wishes. Some studies have concluded that there is a u-shaped relationship between education level and fertility desire when exploring related influencing factors of urban and rural residents' fertility desire (zhang wanyi et al., 2016).

In summary, domestic and foreign scholars believe that the factors that affect fertility desires mainly include education level, income level, cultural concept, social mobility, children's gender structure, subjective mobility, subjective well-being, and public education satisfaction. In the related research on education level and the fertility desire of second child, most scholars believe that there is a negative correlation between the education level and the fertility desire of second child, and some scholars believe that the education level and the fertility desire of second child show a U-shaped curve relationship. Most of the literature evaluates the implementation and effectiveness of policies from a macro perspective, and focuses on the fertility wishes of women in childbearing age. Therefore, this article uses the Logit model to analyze the China Comprehensive Social Survey Data (CGSS) in 2015 from a micro perspective, to explore the relationship between the education level of Chinese residents and the fertility desire of second child. The intention is to explore how the new level of education will have a new impact on China's fertility desire at the current stage under the new policy background, and the reality of China's continuous economic development and people's increasing education.

3. Data sources, indicators and model construction

3.1 Data source

This article uses the latest data published by CGSS in 2015. The Chinese General Social Survey (CGSS) started in 2003 and is the earliest national, comprehensive, and continuous social survey project in China. The survey includes fertility intentions, number of children, income and consumption, health, family, attitudes, and personal information of respondents. The regional variables are derived from the statistical yearbook indicators of each province, all of which are at the provincial level. By systematically and comprehensively collecting the data of multiple levels of society, community, family and individual, the author summarizes the trend of social changes to discuss the issues of great scientific and practical significance. The 2015 CGSS project survey adopted in this paper covered 478 villages in 28 provinces/cities/autonomous regions in China. According to statistics, a total of 10968 valid questionnaires were completed. The data has high authenticity and accuracy.

3.2 Construction of the model

Because the dependent variable "second child's fertility desire" is a binary classification variable, this paper uses the Logit model for analysis, and the estimated prediction equation for fitting is:

$$P(Y_i = 1|X_i) = \frac{\exp(\beta_0 + \beta_1 edu_i + \beta_2 edu_i^2 + \dots + \beta_k x_i)}{1 + \exp(\beta_0 + \beta_1 edu_i + \beta_2 edu_i^2 + \dots + \beta_k x_i)} \quad (1)$$

Among them, $i=1,2,3,\dots,n$ represents a specific interviewed individual; $\beta_k (k=1,2,3,4,5,6,7,8,9)$ is the estimation of the regression coefficient about $x_i (i=1,2,3,4,5,6,7,8,9)$; p_i is the probability of the i -th individual's willingness to have two children. The key independent variables are edu (years of education), edu^2 (square of years of education), and the control variables are hinc (family income), reli (religion and religion), house (building area within the suite), urban (urban residence), age(Age), gdp (regional GDP per capita), tpop (total regional population).

3.3 Index selection and description

3.3.1 Dependent variable --- the fertility desire of second child

The dependent variable in this study is the fertility will, which comes from the question "If there are no policy restrictions, how many children do you want to have?". Considering that the group with two children and above who have fertility intentions in the answer has the fertility desire of second child, groups with two or more answers are classified as having the fertility desire of second child and assigned a value of 1, and those with less than two answers are assigned a value of 0.

3.3.2 Core explanatory variables---years of education

The number of years of education is measured by the question "What is your current highest level of education?". After excluding the "other" option, the number of years of education is assigned according to different levels of education, namely "literacy" = 0, "primary school" = 6, "Junior High School" = 9, "Vocational High School, High School" = 12, "University College" = 15, "University Undergraduate" = 16, "Graduate and above" = 19.

3.3.3 Other dependent variables

Other variables include age (continuous variable), belief in religion (belief and religion are assigned a value of 1, non-religious religion is assigned a value of 0), suite building area (continuous variable), household income (continuous variable), and urban residence (urban residence assigned to 1, non-urban residence assigned to 0), the total regional population, regional GDP per capita.

3.4 Descriptive statistics and correlation coefficients

3.4.1 Descriptive Statistics

The statistical description of the variable indicators used in this article is shown in Table 1. From the table, it can be seen that the sample size with the fertility desire of second child accounts for 77.5% of the total sample. The average age of the sample is about 10 years, and the average age of the sample is about 37, the average annual household income is 84,697 yuan, and 10% of the residents have religious beliefs. In addition, the table shows that the average building area of the residents is 116.5, 34.7% of the residents have urban residence, and the GDP per capita of the sample area is 55730 yuan.

Table1 Descriptive statistics

Variable	Sample Size	Mean	Standard Deviation	Minimum value	Maximum value
the fertility desire of second child	5390	0.775	0.417	0	1
years of education	5535	10.390	4.089	0	19
household income	5068	84697	277827	0	2650000
belief in religion	5485	0.101	0.302	0	1
suite building area	5549	116.500	85.640	3	1248
urban residence	5546	0.347	0.476	0	1

age	5549	36.550	9.421	18	50
regional GDP per capita	5549	55730	23331	26165	107960
total regional population	5549	5478	2746	588	10849

3.4.2 Correlation coefficient

Table 2 shows the correlation coefficients between the variables. The correlation coefficients between the variables are all less than 0.5, indicating that there may not be multiple collinearity, that is, the model will not appear to be distorted or difficult to estimate accurately.

Table 2 correlation coefficients

	the fertility desire of second child	years of education	household income	belief in religion	suite building area	urban residence	age	regional GDP per capita	total regional population
the fertility desire of second child	1								
years of education	-0.087	1							
household income	-0.010	0.131	1						
belief in religion	0.048	-0.077	-0.007	1					
suite building area	0.107	-0.127	-0.008	0.027	1				
urban residence	-0.118	0.463	0.083	-0.009	-0.173	1			
age	0.045	-0.396	-0.039	0.045	0.036	-0.065	1		
regional GDP per capita	-0.123	0.300	0.113	-0.008	-0.211	0.257	-0.069	1	
total regional population	0.085	-0.025	-0.006	-0.082	0.134	-0.107	-0.001	-0.103	1

4. Pirical analysis

4.1 Logit regression analysis

The Logit regression analysis results of this study are shown in Table 3.

The first column is the regression result of the Logit model when no control variables are added. The years of education are significantly negative at the 1% significance level. The regression coefficient before the square of years of education is positive. The years of education and fertility desire are U-shaped relationship.

The second column shows the regression results of the Logit model when the control variables are added. The regression coefficient before the square of years of education is positive, and the regression coefficient of years of education is negative. The relationship between years of education and fertility intention is U-shaped. It can be further calculated that the axis of symmetry is 10.766, that is, when the years of education is less than 10.766, the fertility desire of second child decreases with the increase of the education period, and when the years of education is greater than or equal to 10.766, the fertility desire of second child increases with the increase of educational years.

In addition, through calculation, the average marginal effect of years of education is -0.022, and the average marginal effect of square of years of education is 0.001; The percentage of correct prediction of the model is 77.60%, and the fitting effect is better.

In terms of control variables, family income is positively correlated with the fertility desire of second child, and as the family income increases, the fertility desire of second child increases; belief in religion is positively related to the fertility desire of second child, that is, whether people believe in religion will affect their conception of fertility and thus their willingness to have a second child; the suite building area is positively correlated with the fertility desire of second child; age and the total population of the region are positively correlated with the fertility desire of second child, both age and the total population of the region will affect people's concept of fertility, thus changing people's

fertility wishes. As the age increases, people will realize the significance of the second child to the first child and the family, the concept of fertility will change somewhat, and the increase of the total population in the region will also promote people's desire to have a second child; urban residence and regional per capita GDP have a negative correlation with the fertility desire of second child. There are many domestic literatures that study the difference between the fertility desire of second child. The living environment, income level and conception of fertility are different between urban and rural areas, and the fertility desire of second child of regions with low per capita GDP in non-urban areas will increase accordingly.

Table 3 Logit regression analysis results

	Logit Model	Logit Model
Years of education	-0.126***	-0.130***
	(-3.50)	(-3.38)
Square of years of education	0.004**	0.006***
	(2.13)	(3.36)
Log of household income		0.085**
		(1.97)
Religious Belief		0.442***
		(3.35)
Suite building area		0.002***
		(4.23)
Urban residence		-0.428***
		(-4.95)
Age		0.008**
		(1.99)
Log of GDP per capita in the region		-0.533***
		(-5.30)
Logarithmic population		0.173***
		(2.96)
Constant term	2.116***	4.805***
	(11.37)	(3.96)
N	5377	4817
Pseudo R2	0.0081	0.0353
Logpseudolikelihood	-2800	-2500
Prob>chic2	0	0

4.2 Robustness test

This paper uses Probit model regression analysis to test the stability of the Logit model, and the results are basically consistent with the benchmark model. As shown in the figure below, the fertility desire of second child is positively correlated with years of education, and negatively correlated with the square of years of education, that is, the relationship between the two are U-shaped.

Table 4 Probit model regression analysis results

	Probit Model
Years of education	-0.072***
	(-3.41)
Square of years of education	0.003***
	(3.33)
Log of household income	0.048**
	(1.96)
Religious Belief	0.258***
	(3.51)
Suite building area	0.001***
	(4.25)
Urban residence	-0.249***
	(-4.95)
Age	0.005**
	(2.10)
Log of GDP per capita in the region	-0.318***
	(-5.44)
Logarithmic population	0.105***
	(3.02)

Constant term	2.867***
	(4.08)
N	4817
Pseudo R2	0.0354
Logpseudolikelihood	-2500
Prob>chic2	0.000

5. Main conclusions and policy recommendations

5.1 Main conclusion and discussion

In this study, it was found that there was a U-shaped relationship between the number of years of education and the fertility desire of second child, that is, the fertility desire of second child decreases first and then increases as the level of education increases. This article mainly analyzes the reasons for this relationship from two major aspects: material transformation and spiritual transformation. Material transformation is the change of objective conditions. With the improvement of education level, the income level will increase, and the years of education will also affect the individual's work, social and economic status and other factors; The change in spirit can be said to be a change in concept and cognition. The number of years of education improves the individual's cultural level so that the cognition and pursuit of things for society also change.

When the education period reaches 10.77 years, with the improvement of education level, people tend to reduce the fertility desire of the second child. As their years of education increase, individuals change their traditional ideas and concepts, get rid of the shackles of family values, advocate the pursuit of their own life value, pursue a quality life or a rational understanding of the growth of their children, and tend to raise a child whole-heartedly. In addition, under the influence of their educational level, the individual's work pressure is greater, the social status and the income are not very high, so there is not enough time and energy and the economic foundation to support the care of the second child, thereby reducing their fertility desire of second child.

After the education level reaches 10.77 years, with the improvement of education level, people tend to increase the fertility desire of the second child. From a perspective of cost, individuals have a high number of years of education, a higher working level and a higher income level, and the higher social and economic status provides them with superior material conditions, broader social networks and more resources for having a second child. With the flow of social classes, Chinese residents will be more inclined to use the increased social resources in this process to raise their children and expand the size of the family; From the perspective of cultural cognition, groups with high levels of education will recognize the importance and value of character development and perfection, companionship, and sharing in the development of children, and understand the important role of siblings in the life of children, so people's willingness to have a second child has been raised. At this stage, the increase in the fertility desire of the second child is no longer a traditional concept of "having children against age" and "family awareness", but is a social cognition that keeps pace with the times like "independence" and "spiritual pursuit." which is the new meaning of traditional factors in the new era. This is precisely the significance of the new interpretation of the fertility desire of the second child and education level that have been studied in the academic world in the new era.

5.2 Policy recommendations

Although the implementation of the national "two children" policy and the transformation of the floating population's fertility concept will release people's fertility wishes. However, the development of market economy and society will bring people's reproductive behavior different degrees of support costs and economic pressure. In this case, the family's resource endowment or family's economic income capacity will become an important factor that affects people's willingness to convert fertility into fertility behaviors, so the government should introduce relevant policies covering education, medical care, social security, etc. The existing maternity subsidy system should also be improved to encourage people to transform their fertility wishes into fertility behaviors. In addition, China should not only vigorously develop the social economy and improve the quality of life of the people, but also make overall plans in all aspects of social culture, national

policies, etc.so as to promote the transformation of people's fertility desires into modern concepts with new meanings.

References

- [1] BeckerG.S.1960.An Economic Analysis of Fertility. In Demographic and Economic Change in Developed Countries, a Conference of the Universities-National Bureau Committee for Economic Research:209-231.
- [2] Becker G. S. and Lewis H.G.1973.On the Interaction between the Quantity and Quality of Children. *Journal of Political E-conomy* 2:279-288.
- [3] Boyd, Monica (1973). Occupational Mobility and Fertility in Metropolitan LatinAmerica. *Demography*, 10(1), 1-17.
- [4] Das G. M., Jiang Zhenghua, Li Bohua, Xie Zhenming, Chung W. J. and Hwa-Ok B.2003. Why is Son Preference so Persis-tent in East and South Asia? a Cross-country Study of China, India and the Republic of Korea. *The Journal of DevelopmentStudies* 2:153-187.
- [5] Dumont, Arsène (1890). *Depopulation and Civilization: A Demographic Study*. Paris: Vigot Frères.
- [6] FORT M, SCHNEEWEIS N, WINTEREBMER R. More Sch-ooling, More Children: Compulsory Schooling Reforms andFertility in Europe. Bonn, Germany: IZA Working Paper(No.6015),2011.
- [7] WONGUPPARAJ P, WONGUPPARAJ R, KUMARI V, et al. The Flynn Effect for Verbal and Visuospatial Short-term andWorking Memory: A Cross-temporal Meta-analysis[J].*Intelligence*,2017,64(7):71-80.
- [8] Chen Wei, Jin Yongai. The Differences and Influencing Factors of Chinese Women's Reproductive Willingness and Reproductive Behavior. *Journal of Demography*, 2011.
- [9] He Mingshuai, Yu Miao. Family per capita income, intergenerational social mobility and fertility desire. *Labor Economics Research*, 2017, 5 (5).
- [10] Jin Xiaoyi, Li Shuzhuo, Feldman. Marriage form and boy preference: A survey of three counties in rural China. *Population Research*, 2004.
- [11] Lv Jianghong, Huang Baofeng, Shi Shenglin. Comparison of fertility wishes of women of child-bearing age between one-child and two-child families. *Journal of Demography*, 2013, (197).
- [12] Li Rongbin. Research on children 's gender structure, family economic constraints and floating population 's fertility desires—also on the influence of intergeneration and social class. *Youth Research*, 2017.
- [13] Li Tiantian, Guo Jun. Analysis of the influence of education on women 's fertility desire . *Modern Marketing*, 2019.
- [14] Li Yuzhu. Analysis of fertility concept and fertility behavior in areas with low fertility level . Beijing: Graduate School of Chinese Academy of Social Sciences, 2011.
- [15] Liu Zhangsheng, Liu Guihai, Zhou Jianfeng, Fan Liqin. How does education affect the Chinese “two children” wishes? —— Evidence from CGSS (2013) . *Journal of Public Administration*, 2018, 15 (2).
- [16] Ma Liang, Fang Xingming, Lei Zhen, Cai Xiaochen. Will the sex of the only child affect the parents 'willingness to give birth? ——Research based on China Comprehensive Social Survey (CGSS) data . *Journal of Demography*, 2016, (220).
- [17] Mu Yingtan, Yuan Xin. The contradiction between "birth and" not-birth "-family resources, cultural value or gender of children? [J]. *Population Research*, 2018, 42 (1).

- [18] Tao Tao. The relationship between rural women 's expectation of children 's utility and their boys 'preference . Population and Economy, 2012.
- [19] Wu Jiwen, Luo Min. Research on the fertility concept of young parents of the next child under the "two-child" policy —— Taking Nanjing as an example . Journal of Huaihai Institute of Technology, 2017 (10).
- [20] Wang Tianyu, Peng Xiaobo. The impact of social security on fertility will: evidence from the new rural cooperative medical care. Economic Research, 2015 (2).
- [21] Wei Wei, Lin Limei, Lu Haiyang, Zheng Xining. The impact of subjective well-being and public education satisfaction on the reproductive will of the second child of the residents —— Based on the empirical analysis of CGSS. Social Development Research, 2019.
- [22] Xu Yingmei, Qu Lingyun. Reproductive wishes of women of child-bearing age in one-child families and their influencing factors——Based on surveys in Ezhou, Huangshi and Xiantao cities of Hubei Province [J]. Chinese Population Science, 2011, (2): 76-84.
- [23] Yang Juhua. An Analysis of the Floating Population 's Fertility Willingness under the Single Second Child Policy. Chinese Population Science, 2015, (1): 89-96.
- [24] Zhang Lina. Socioeconomic status, subjective mobility perception, and second-child fertility willingness of women of childbearing age —— An empirical study based on CGSS2013 data. Journal of Xihua University, 2018, 37 (3).
- [25] Zhang Wanyi, Zhang Yunduo, Qiao Wenjun. Research on the influencing factors of fertility desire of urban and rural residents —— An empirical analysis based on CGSS2010 data [J]. Hubei Agricultural Sciences, 2016, 55 (18).
- [26] Zhou Yun. Comparison of fertility wishes, fertility levels and influencing factors between China and Japan. Population and Society, 2016, 32 (1).
- [27] Zheng Zhenzhen. Study on the fertility will of Chinese women of childbearing age. China Population Science, 2004 (5): 73-80.