International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 11 Issue 2 ǁ February 2023 ǁ PP. 156-162

The Effects of Female Education Level on Two-child Intention in China

Guangtong Yao

College of Management, Tianjin University of Technology, Tianjin, China

Abstract
As an important tool of population regulation,childbearing policy plays a very important role in controlling population structure and quantity.In recent years,China's overall fertility rate is insufficient, the population is aging,the gender gap and other problems are becoming more serious.To alleviate these problems,China has implemented a two-child policy aimed at lifting childbearing restrictions.At the same time, the number of women is increasing, especially in the field of higher education.Based on the data of the 2015 China General Social Survey (CGSS), descriptive statistics are made on the main variables and the hypotheses of this paper.Next, the discrete choice model Logit was used to analyze the relationship between the education level of women of childbearing age and their intention to have a second child.The empirical results show that: (1) compared with uneducated women of childbearing age, the improvement of education level has a significant inhibitory effect on the intention to have a second child. The influence of education level of women on the intention to have a second child has a critical point, and high school education level has the greatest inhibitory effect on the intention to have a second child.(2) The study found that the effect of education on two-child fertility intentions was only significant in category 1, with significant differences between urban and rural areas.Improving the education level of women of childbearing age in rural areas significantly affected their willingness to have a second child.
Key words: *education;Two-child policy*

Date of Submission: 02-02-2023 Date of acceptance: 15-02-2023

I. Research background

As a childbearing policy aimed at controlling the number and size of the population, adjusting the population structure and guiding people's childbearing behavior, the government formulated the one-child policy for couples in 1979 according to China's national conditions at that time.As a basic state policy strictly implemented, the policy played a very important role in the decline of China's childbearing rate during its implementation, effectively controlling the size and scale of the population.Although the one-child policy changed the status quo of China's rapid population growth, it also brought many side effects that were not conducive to the sustained and healthy development of society.First, the natural population growth rate dropped from 11.87 per thousand in 1979 to 4.79 per thousand in 2010, and the total fertility rate of women of childbearing age even dropped to 1.05 in 2015.There is a growing gap between the growth of the elderly population and the young workforce.At the same time, the quantity, quality and structure of the existing population can no longer meet the needs of economic development, which hinders the sustainable and robust development of the social economy.

Data sample processing

Male samples and female samples over 49 years old were deleted from the data, and invalid values and missing values were removed.In the data of CGSS2015, individual samples from Tibet Autonomous Region, Xinjiang Uygur Autonomous Region and Hainan Province were missing. Therefore, regions excluding Tibet Autonomous Region, Xinjiang Uygur Autonomous Region and Hainan Province were removed from the study regions, and the final samples involved 21 provinces, 4 municipalities directly under the Central Government and 3 autonomous regions in China.

The explained variable of this paper is the intention of women of childbearing age to have a second child.Aiming at women with fertility ability as the object of study, we explore whether they are willing to have a second child.This variable comes from the question “How many children do you want to have if there are no policy restrictions” in the CGSS questionnaire, and the respondents' answers are classified into a binary variable: willing to have a second child (yes), unwilling to have a second child (no).Those who answered 1 or 0 were classified as unwilling to have a second child and assigned a value of “0”; those who answered 2 or more

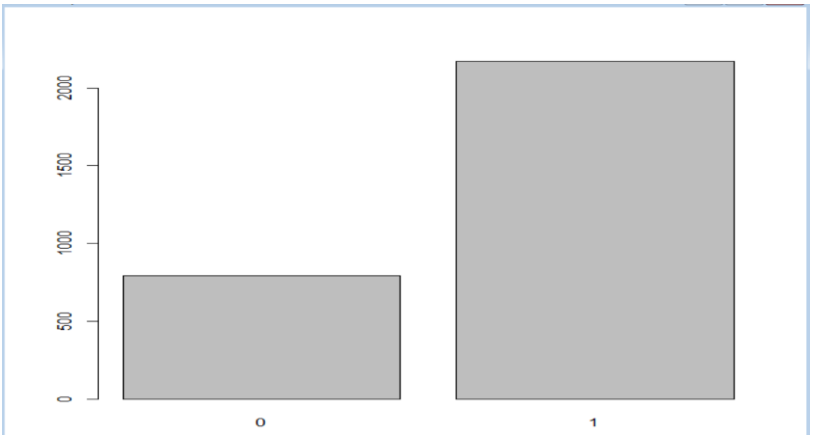
children were classified as willing to have a second child and assigned a value of "1"; those who answered "nothing" were also classified as willing to have a second child.
D1 junior high school and below;D2 High School;D3 University;D4 graduate students and above;

Survey on frequency of second-child fertility intention

The explained variable of this paper is the willingness of women of childbearing age to have a second child.As can be seen from the frequency distribution chart, among the 2964 samples used in the study after a series of screening of the original data, more than 2000 respondents are willing to have a second child, while only 800 respondents are unwilling to have a second child.Obviously, in comparison, the proportion of those who are willing to have a second child is much larger than that of those who are unwilling to have a second child.This indicates that without the restriction of childbearing policy, most women of childbearing age tend to have two or more children when choosing the number of children.

```
> case=read.table("clipboard",header=T)
> head(case)
  id provinces  a31 edu want
1  1    北京市 1993   3    1
2  2    北京市 1979   3    1
3  3    北京市 1984   3    0
4  4    北京市 1988   3    0
5  5    北京市 1987   2    0
6  6    北京市 1982   4    0
> summary(case)
       id            provinces        a31           edu            want
 Min.   :   1.0   北京市  : 220   Min.   :1969   Min.   :0.000   Min.   :0.0000
 1st Qu.: 741.8   上海市  : 170   1st Qu.:1974   1st Qu.:1.000   1st Qu.:0.0000
 Median :1482.5   深圳市  : 149   Median :1981   Median :2.000   Median :1.0000
 Mean   :1482.5   山东省  : 144   Mean   :1982   Mean   :1.583   Mean   :0.7321
 3rd Qu.:2223.2   河南省  : 134   3rd Qu.:1989   3rd Qu.:3.000   3rd Qu.:1.0000
 Max.   :2964.0   黑龙江省: 130   Max.   :2000   Max.   :4.000   Max.   :1.0000
                  (Other) :2017
> attach(case)
> tl=table(want)
> barplot(tl)
```

图表 1-1Screenshot of the procedure for importing and checking generalized data



图表 1-2Screenshot of the results of the broad classification of the intention to have a second child

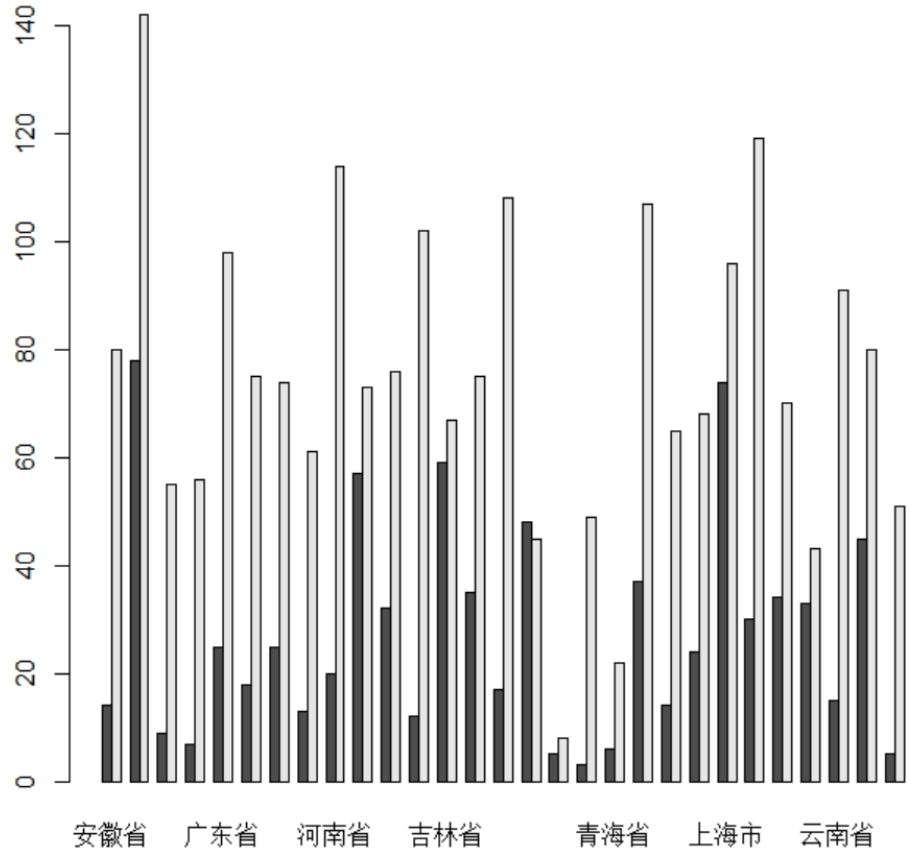
Two-dimensional contingency table of fertility intention by provinces and cities

In order to further reflect the regional distribution characteristics of the desire to have a second child, the frequency of the willingness to have a second child in different provinces is reflected in the figure below.It can be found that the proportion of women of childbearing age willing to have a second child is different in different provinces, cities and autonomous regions. The proportion of women willing to have a second child is relatively low in areas such as Beijing and Tianjin, whose economy is relatively developed and living standards are relatively high, while the proportion of women willing to have a second child is relatively high in areas whose general economic development level and living standards are relatively low. For example, Jiangxi

Province and Ningxia Hui Autonomous Region have a relatively high proportion of willing to have a second child.

```
> t22=table(want,provinces)
> barplot(t22,beside=T)
```

图表 2-1Screenshot of the procedure for roughly classifying provinces and fertility intentions



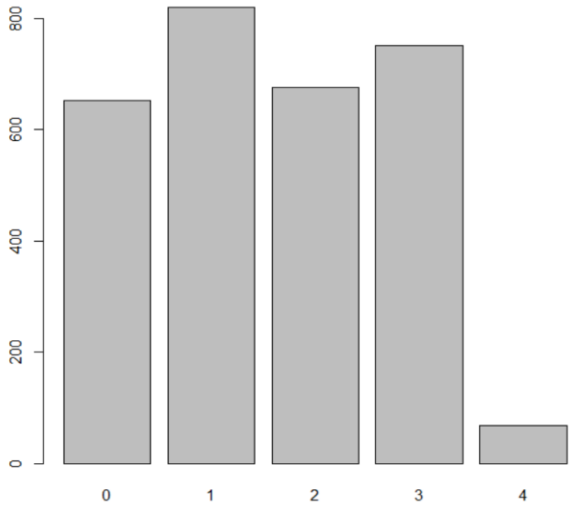
图表 2-2Approximate distribution of fertility intentions by province

The distribution of education level

According to the graph, we can see the distribution of the proportion of respondents with different education levels.The proportion of respondents in the middle school and below age group is the highest, exceeding 50 percent, indicating that more than half of women of childbearing age have a secondary school education level or below, which may be related to China's Nine-year compulsory education policy.The state stipulates that all school-age children must complete six years of compulsory primary education and three years of compulsory secondary education.At the present stage, educational opportunities are equitable and both boys and girls can receive education.Therefore, women of childbearing age who get this level of education account for the largest proportion.Second, the current expansion of higher education has further achieved educational equity at all stages, which has made the threshold for women to enter higher education relatively low, and the proportion of female students in colleges and universities continues to rise.Although the proportion of higher education graduates is small, the proportion of women among graduate students at this stage is increasing.In recent years, women have made up half of the total number of graduate candidates.

```
> tll=table(edu)
> barplot(tll)
```

图表 3-1Screenshot of the overall statistical procedure on the status of education



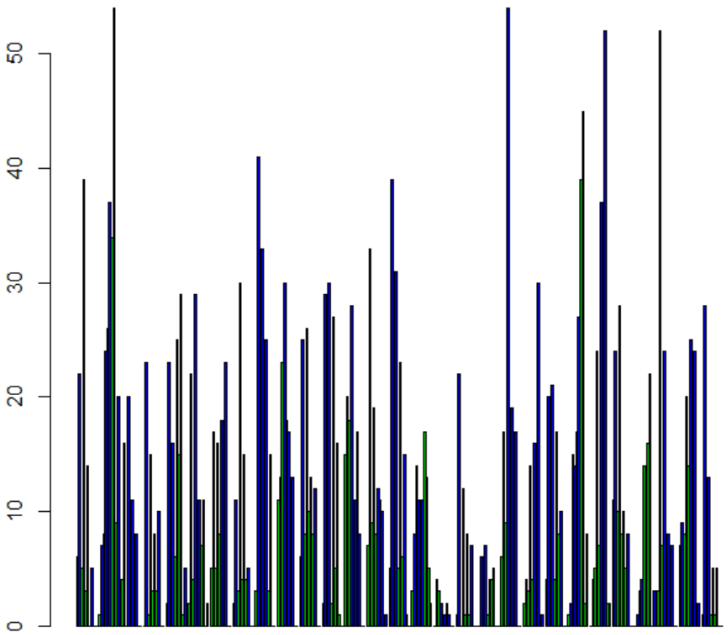
图表 3-2General educational status of the study population

Regional differences in having a second child

Statistics show that more than 80 percent of uneducated women of childbearing age in most provinces and cities voluntarily have two children.Basically, as the level of education increases, the proportion of women of childbearing age who want a second child decreases.The proportion of women of childbearing age with a secondary school education or above who want to have a second child has fallen compared with women who have a secondary school education or below.As can be seen from the figure, in the field of higher education, generally speaking, more than half of women of childbearing age who have received higher education are willing to have a second child.In addition, compared with undergraduates, the proportion of graduates over child-bearing age who hope to have a second child has increased, but it is worth noting that in some provinces, municipalities and autonomous regions, there is a lack of samples of women who have completed child-bearing, and these deficiencies are mainly concentrated in the economically underdeveloped Midwest area.

```
> t3=ftable(edu,want,provinces)
> barplot(t3,beside=T,col=3:4)
```

图表 4-1Combined study codes for education, fertility intentions, and province of residence



图表 4-2A combination of education, fertility intentions and province of residence

Constructing the model

The explained variable in this paper is "two-child fertility intention", which is a binary variable with a numerical value of 0/1.This paper mainly uses Logit model to analyze the relationship between education level and second-child fertility intention.Logit model examines the dependency relationship between independent variables, suitable for the model where the dependent variable is a categorical variable,and the independent variable is a binary variable.The principle behind it is that the Logit model can predict the probability of a categorical variable, so the Logit model is as follows :want=a0+a1*edu+u.

```
>  fm<-glm(want~edu,family=binomial(link=logit),data=case)
> summary(fm)

Call:
glm(formula = want ~ edu, family = binomial(link = logit), data = case)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.8606  -1.4350   0.7193   0.8247   1.0644

Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept)  1.53596    0.07777  19.751   <2e-16 ***
edu         -0.31604    0.03691  -8.562   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 3445.0  on 2963  degrees of freedom
Residual deviance: 3369.7  on 2962  degrees of freedom
AIC: 3373.7

Number of Fisher Scoring iterations: 4
```

图表 5-1Code for regression on data

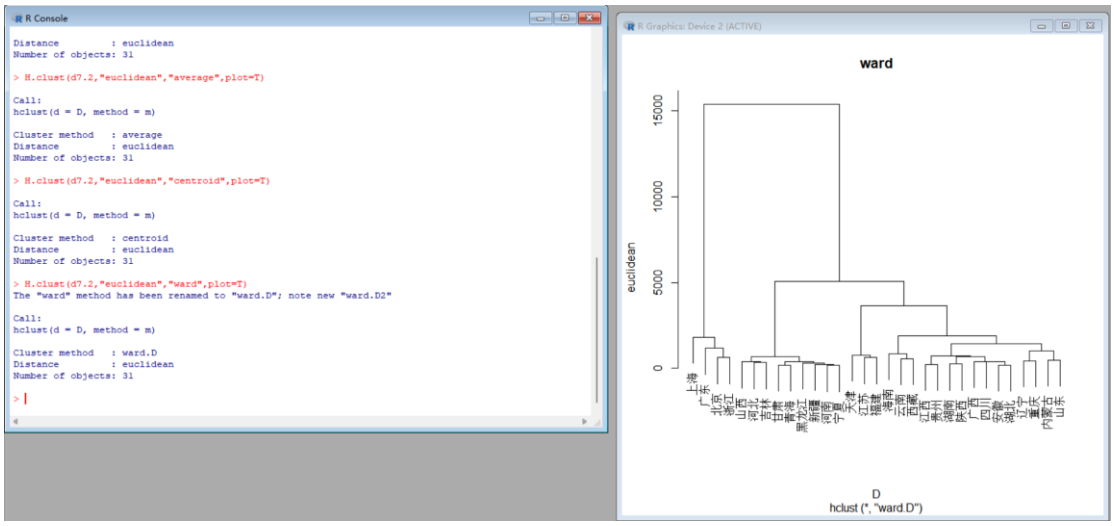
```
> coef(fm)
(Intercept)         edu
  1.5359564  -0.3160352
```

图表 5-2Read the code of the regression function

The table shows that there is a significant negative correlation between the level of education and the fertility intention of women of childbearing age.Compared with the uneducated group, the absolute regression probability between women of childbearing age and the level of secondary education, secondary and university education is gradually increasing, indicating that the higher the level of education, the lower the probability of a college-educated woman of childbearing age having a second child, and the higher the probability of a woman of childbearing age having a second child.

Economic analysis of regional differences in childbearing intention

The established index of people's living standard is considered from two aspects of people's living quality and cost. The secondary indexes of people's living quality index are per capita consumption level, per capita disposable income of urban residents, per capita net income of rural residents, average wage of employees in urban private units, GDP Per Capita. The secondary indexes of people's living cost index are clothing, equipment, medical care, transportation, education and housing.



图表 6-1Clustering according to the overall level of each province

II. Conclusion

The education level of women of childbearing age has a inhibiting effect on their willingness to have a second child.As education levels rise, women of childbearing age are less likely to have a second child.In addition, there is a tipping point where a woman of childbearing age's level of education affects their second desires at childbearing age.Women of childbearing age with primary and secondary education are less willing to have children than those with non-education, while those with secondary education are least willing to have children.When the education level rises to the higher education level above university, the intention of having a second child is higher than that of women of childbearing age with high school education. The reason may be that, first of all, education improves women's labor productivity, labor income, occupation type and social status through the accumulation of human capital investment. Women of childbearing age with higher education level have higher individual market returns, which increases the marginal cost of having one more child. In addition, employment in the formal non-agricultural sector reduces women's free time. At the same time, childcare facilities are rare in China. Children from 0 to 3 years old are taken care of by the parents of both spouses.Day care facilities in society are relatively expensive and rare, which creates an obvious contradiction between work and childcare.At the same time, the opportunity cost of sacrificing working time to take care of children is too high, and the utility of the time spent in taking care of children is not enough to satisfy the utility brought by work. In this case, according to the benefit maximization principle, women with high education are reluctant to give up work to have children. Secondly, the influence of education on women in the marriage market also affects their willingness to have a second child.The higher a woman's level of education, the more resources they can contribute to the family, which can increase their voice in the family, including the ability to control fertility decisions, so that women are free to decide if, when and how many children they have, rather than being reduced to a “childbearing machine”.In addition, due to the upward matching of marriage, women with higher education level are likely to be matched with those with higher education level in the marriage market, and the higher education level of men in the family makes their fertility concept and gender concept more modern, which also has an impact on women's willingness to have a second child.

References

[1]. Magawi P A . Effect of education on fertility in the republic of congo. 2010.
[2]. Fort M , Schneeweis N , Rudolf Winterbmer. Is Education Always Reducing Fertility? Evidence from Compulsory Schooling Reforms[J]. Economic Journal, 2016, 126(595):1823-1855.
[3]. Azarnert L V . Immigration, fertility, and human capital: A model of economic decline of the West[J]. European Journal of Political Economy, 2010, 26(4):431-440.
[4]. Larsen U , Hollos M . Women's empowerment and fertility decline among the Pare of Kilimanjaro region, Northern Tanzania[J]. Social Science & Medicine, 2003, 57(6):1099-1115.
[5]. Upadhyay U D , Gipson J D , Withers M , et al. Women's empowerment and fertility: A review of the literature[J]. Social Science & Medicine, 2014, 115:111-120.
[6]. Xiu J X , Jin W R , Min L Y , et al. Willingness to have a second child among women with gynecological disease in China: a cross-sectional survey[J]. Lancet, 2016, 388:S1-S1.
[7]. Zhenzhen Z , Cai Y , Feng W , et al. Below-replacement fertility and childbearing intention in Jiangsu Province, China[J]. Asian Population Studies, 2009, 5(3):329-347.
[8]. C. Zhou, M. Leng, Z. Liu, et al. The impact of recommender systems and pricing strategies on brand competition and consumer search. Electronic Commerce Research and Applications, 2022, 53: 1-15.
[9]. P. Chen, R. Zhao, Y Yan, et al. Promoting end-of-season product through online channel in an uncertain market. European Journal of Operational Research, 2021, 295(3): 935-948.

[10]. Ka A , Al B , Sw A . Housing wealth, fertility intentions and fertility[J]. Journal of Housing Economics, 2021.
[11]. Xu Y . Can Pets Replace Children? The Interaction Effect of Pet Attachment and Subjective Socioeconomic Status on Fertility Intention[J]. International Journal of Environmental Research and Public Health, 2021, 18.
[12]. Doris, Hanappi, Valérie-Anne, et al. Changes in Employment Uncertainty and the Fertility Intention–Realization Link: An Analysis Based on the Swiss Household Panel[J]. European Journal of Population, 2017, 33(3):381–407.
[13]. C. Zhou, W. Tang, R. Zhao. Optimal consumption with reference-dependent preferences in on-the-job search and savings. Journal of Industrial and Management Optimization, 2017, 13(1): 503-527.
[14]. Modena F , Rondinelli C , Sabatini F . Economic insecurity and fertility intentions: the case of Italy[J]. Review of Income & Wealth, 2014, 60(maysuppl.):S233–S255.
[15]. C. Zhou, W. Tang, R. Zhao. Optimal consumer search with prospect utility in hybrid uncertain environment. Journal of Uncertainty Analysis and Applications, 2015, 3(6): 1-20.
[16]. Lan M . Relationship between Chinese Women's Childhood Family Background and their Fertility Intentions under Different Policy Conditions[J]. Journal of Child and Family Studies, 2021, 30(12):3016-3028.
[17]. Pedro J , Fernandes J , Barros A , et al. Effectiveness of a video-based education on fertility awareness: a randomized controlled trial with partnered women[J]. Human Fertility, 2020(1):1-17.
[18]. J. Yu, J. Zhao, et al. Strategic business mode choices for e-commerce platforms under brand competition. Journal of Theoretical and Applied Electronic Commerce Research, 2022, 17(4): 1769-1790.
[19]. Liu Z , Gong Y . Income, Social Security and Chinese Families' "Two-Child" Decisions: Evidence from Urban Residents' Fertility Intentions[J]. The Singapore Economic Review, 2020(3).
[20]. M. Chu. The impact of online referral services on cooperation modes between brander and platform. Journal of Industrial and Management Optimization, 2022, DOI: 10.3934/jimo.2022174.
[21]. J, C, Daniluk, et al. Fertility awareness online: the efficacy of a fertility education website in increasing knowledge and changing fertility beliefs[J]. Human Reproduction, 2014.
[22]. Kebede E , Striessnig E , Goujon A . The relative importance of women's education on fertility desires in sub-Saharan Africa: A multilevel analysis[J]. Population Studies, 2021.
[23]. Yoon, Soo-Yeon. Is gender inequality a barrier to realizing fertility intentions? Fertility aspirations and realizations in South Korea[J]. Asian Population Studies, 2016, 12(2):1-17.
[24]. B Éva, Anna R , Edith G , et al. Declining realisation of reproductive intentions with age[J]. Human Reproduction, 2019(10):10.