Research on Factors Affecting the Birth Rate in China

Shiyue Hu*

Wuhan Britain-China School, Wuhan, China

* Corresponding Author Email: sandyhu0426@gmail.com

Abstract. The quantity and quality of the population are crucial to the prosperity of a country and a nation. The birth rate is a key indicator that affects future fertility levels. Data from the National Bureau of Statistics showed that the number of births in 2022 reached the lowest level in 60 years, ranking China among countries with a low fertility rate. So far, many scholars have studied the micro-influencing factors of the population birth rate in China. However, the mechanism of population birth rates is complex. There is a certain research gap in the current research on population birth rates by using multiple variable selection methods. Based on this, this paper attempts to use the variable selection method to make a comprehensive study of the macro factors affecting the birth rate in China and draws a conclusion. In the early days of the founding of New China, the natural environment and population factors were the main factors affecting fertility levels. Since the reform and opening up, social environment factors have become the main factors affecting the fertility level of the population. To predict the future birth rate of China, the influence of fertility policy will be further reduced, and economic and social factors will become the main factors affecting population fertility.

Keywords: birth rate, macro-influencing factors, family planning policy.

1. Introduction

Since the end of the 20th century, China has entered the ranks of low-fertility countries. The National Bureau of Statistics reported that 10.62 million children were born in China in 2021 and only 9.56 million in 2022, reaching the lowest level in 60 years with a birth rate of 6.77% and a natural growth rate of -0.60%, respectively. The persistent low birth rate has become the new normal for China's population and has been widely noticed by all sectors of society.

China has implemented a number of strategies to address the issue of a low birth rate. The "two-child policy" was first announced in 2002, and it was expanded upon in 2013 and 2016 to become the "comprehensive two-child policy." China's newborn birth rate declined from 12.96 per 1,000 live births in 2016 to 10.94 per 1,000 live births in 2018, despite the liberalization of the fertility policy, and the aging process accelerated [1]. Without a doubt, the birth rate cannot be greatly raised by liberalizing the fertility policy.

From the perspective of domestic and international reality, the persistently fall in the birth rate could eventually result in a shortage of labor resources and alter the population's original age distribution, which would substantially impede the growth of the national economy. Therefore, it is urgent and necessary to study the factors affecting the birth rate in China. In the existing domestic and international studies, many of them are based on the micro level. Scholars have explored the impact of individual factors such as financial expenditure on education, social security level, and fertility policy on the birth rate. However, as these social factors have received more and more attention, economists have been able to improve the economic models of these issues through comprehensive analyses. This study will examine the relationship between education level, medical resources, policies, sex ratio, population density, and the birth rate from a macro viewpoint in order to further the knowledge on the variables that affect China's birth rate. In order to evaluate and consider the fertility situation as well as identify the significant variables affecting the birth rate from a theoretical point of view, this paper analyzes the social and demographic factors affecting the birth rate in China. This analysis has significant theoretical significance for improving the pertinent theories. Additionally, the studies in this research have significant practical implications because they aid in offering recommendations for governmental decision-making and exploring practical strategies for maintaining an optimal population level.

2. Factors Affecting the Birth Rate in China

2.1. The Social Dimension

The study of factors affecting fertility is a very important research field in demography. Several scholars, both domestically and internationally, have analyzed the factors affecting fertility from a variety of perspectives. There are many social factors affecting the birth rate, such as education level, health care access, housing price level, social burden cost, social security level, etc [2]. This essay explores the relationships between three variables: educational attainment, medical resources and policies, and the fertility rate in China.

2.1.1 Impact of Educational Attainment on the Birth Rate

In recent years, some scholars have constructed empirical models using educational attainment and government expenditure on education as independent variables, respectively. and concluded that progress in education has a negative effect on birth rates.

Beginning in the 1970s, Western economists, represented by Becker, made a significant contribution by proposing an alternate hypothesis of the relationship between the quantity and quality of children in a household. A large number of scholars have confirmed that the theoretical and analytical framework developed by Western economists on this basis is similarly adapted to most developing countries, and the current theory has also been helpful as an adjunct to the theory of comparative advantage [1]. Under financial limitations, the marginal cost of child quality increases in relation to child quantity; hence, there is a negative connection between the two according to Becker's economic model of the trade-off between quantity and quality of children. Shen Yaru uses the 2SLS regression method to analyze the data in accordance with Becker's Q-Q theory, which postulates that the number of children a family has and the caliber of those children have a special link. Based on the regression results of the entire sample, Shen Yaru draws the conclusion that a rise in the average household expenditure on education will result in a significant decrease in the family's total number of children. The increase in family education spending will result in a significant decrease in the family's spending on other areas, and in order to maintain the family's utility maximization and to ensure a higher quality of life for the members, family decision-makers will control the family's reproductive behavior and reduce the number of births, which will directly affect the family's total number of children and accelerate the reduction of the family's utility [1]. Yang Longjian et al. also found that financial education expenditure has a significant negative effect on the birth rate [3].

Researchers who examined the relationship between education level and fertility goals came to similar conclusions. For instance, Zhou discovered that parents' educational attainment has a large negative impact on the number of children they desire [4]. Liu et al. discovered that residents' inclination to have two children is also significantly impacted [5]. Zhang and Wan empirically analyzed the effect of years of education per capita on the birth rate based on the provincial panel data of mainland China from 2003 to 2017 and found that the birth rate has a U-shaped relationship, i.e., families with both lower and higher average levels of education choose to have more children to maximize the utility of the population. There is evidence of a spatial spillover effect, and the availability of post-secondary education also significantly boosts birth rates in the region and its surrounding areas [6].

2.1.2 Impact of Medical Resources on the Birth Rate

The development of health care not only enables human beings to control fertility but also makes it possible to control the number and timing of births and to improve the quality of the population, with a double impact on fertility levels. On the one hand, it can help lower fertility levels by lowering newborn and child mortality, enhancing population health, extending life expectancy, and creating contraception and birth control techniques. On the other side, it also helps to increase fertility levels, for instance, by lowering the dangers associated with reproduction for women of childbearing age,

decreasing the burden of reproductive health care on the populace, and creating assisted reproductive technologies to enable infertile people to become parents [7].

Using stepwise regression and vector error correction modeling, Liu comes to the conclusion that an increase in the level of medical care is conducive to an increase in the total birth rate [7]. He measured the level of health care by the ratio of beds to 10,000 people [7]. The test results show that for every 1 percent increase in the number of beds per 10,000 people, the total fertility rate will increase by 0.487 percent, and that improving the standard of health care and health care insurance will be conducive to increasing the level of fertility [7]. The population no longer needs to boost birth rates in order to assure the continuance of children, which may lead to reduced fertility levels, even though improved levels of medical care may cut fertility levels by making it less hazardous to have children. However, advances in medical technology have significantly reduced women's reproductive risk and made reproductive health services accessible, thus contributing to higher fertility levels [7]. Similar conclusions were reached by Xiayu Zhang after analyzing the LASSO model. According to the data, the number of healthcare beds per 1,000 people is significant at the 10% level, and a 1% increase in that number would result in a 0.275% increase in birth rates; meanwhile, the number of healthcare technicians per 1,000 people is significant at the 5% level, and a 1% increase in that number would result in a 0.248% decrease in birth rates [8].

2.1.3 Impact of Policies on the Birth Rate

Some scholars have argued that the government's population policy regulation is the main reason for the change in the birth rate. From 2013 to 2016, the Chinese government introduced the "two-child", "two-child alone", and "two-child comprehensive" policies to address the problems of childlessness and aging brought about by persistently low fertility, and to optimize the population structure in order to achieve sustainable development. Since the relaxation of the fertility policy, the country's fertility rate has risen [1].

According to Shi et al.'s micro research results, the liberal fertility policy has positively incentivized women's "two-child" total fertility rate, with the most pronounced increase in fertility between 13 and 17 years, during which time there was even a "birth pile-up" phenomenon [9]. The "birth pile-up" phenomenon was even observed during that period. However, in the context of long-term development, adjustments in fertility policy alone cannot meet the needs of a sustained and healthy population [8]. Wang et al. used the PSM-DID technique to conduct a systematic study of the impact of the "two children alone" and "two children across the board" policies on the fertility behavior of Chinese families, with a view to obtaining more accurate conclusions [10]. The study found that the "single two-child" policy did not effectively stimulate the desire of single families to give birth to a second child, while the "comprehensive two-child" policy had minimal impact on the second-child fertility of non-single families [10]. With the help of CFPS data, Qing et al. evaluated the effect of the "two-child" policy from 2010 to 2018 by means of a propensity score matching model and a double-difference model, and showed that after the implementation of the policy, the proportions of the second child births in cities and towns and the proportions of the second child births in one-child families both increased, and the proportions of the second child births in both urban and rural areas increased [11]. According to the study, the proportion of urban families having a second child and the proportion of one-child families having a second child have both increased since the policy's implementation, and the gap between urban and rural areas in terms of the number of children having a second child has shrunk. It is clear that the fertility policy's revisions have had some positive effects on China's birth rate [11].

Yang divided China into three types of fertility policies and conducted a reverse study. To determine the full extent of the "comprehensive two-child" policy's effects on various regions, the "one-child" and "one-and-a-half-child" policies were implemented after the "comprehensive two-child" policy was put into place [2]. The effects of the "one-child" policy and the "one-and-a-half child" policy were analyzed from 2000 to 2016 so that the effects of the "comprehensive two-child" policy could be studied [2]. The causal effects of fertility policy adjustments on total fertility were assessed and identified using the double-difference-in-differences (DID) method. In a positive way,

the study's findings show that both fertility policies significantly lower the level of total birthrate, demonstrating that the "two-child policy" actually raises the level of total birthrate and that the "one-child policy" has a greater impact than the "one-and-a-half child policy" [2].

2.2. The Population Dimension

2.2.1 Impact of the Sex Ratio on the Birth Rate

The population's gender ratio affects the birth rate in two ways. The first is the sex ratio of newborn babies. In the past, there was no way to know the sex of the baby, and the sex of the births could not be artificially controlled. The sex of the babies born was controlled by natural norms and always maintained a balance. But with the development of society and the advancement of medical technology, people have mastered the ability to know the sex of the babies ahead of time and can intervene to artificially control the sex of the births. So the number of the population's births as well as their sexes are controlled to a certain extent, which has a certain impact on the population's birth rate. This has undermined the laws of nature and had a certain impact on the birth rate.

Secondly, the traditional concept of "raising children for old age" has led to an imbalance in the male-to-female ratio in China's population structure. When the gap between the male population and the female population is too large, there are too many males and too few females, leading to the problem of "male surplus", an imbalance in the structure of the marriageable population, and the inability of excess males to marry, which ultimately causes the marriage rate to fall. According to 2017 data from the National Bureau of Statistics, there are more than 32 million more males than females in China, which is a serious demographic problem facing China at this stage.

2.2.2 Impact of Population Density on the Birth Rate

The majority of researchers have discovered a strong inverse relationship between birth rate and population density. After adjusting for factors including the degree of urbanization, economic development, and other pertinent factors, Beaver researchers at the global level discovered a negative association between population density and the birth rate [12]. Smaller degrees of study have also revealed this association. Firebaugh used regression analyses of 22 villages in Punjab state, India, for the period 1961-1972 to find negative regression coefficients of the crude birth rate with such variables as population density, agricultural output, female literacy, and caste hierarchy [13]. The regression coefficients of the variables were negative, and although population density did not affect the birth rate to a significant extent, it was statistically significant. Yasuba analyzed the fertility ratio in the United States of America for the years 1800-1860, and his main conclusion was that the most significant factor influencing fertility differentials and trends was population density; the fertility ratio decreases as population density increases [14]. Ren Qiang selected and analyzed time-series data from China's 1970-1990 sub-provinces with multiple linear regression and came to similar conclusions [15].

3. Conclusion

Through the detailed analysis of China's birth situation, this paper gained a certain understanding of the trend of change in China's birth rate, the current status of the law, and related macro-influential factors. Vertically, China's population fertility level shows different stage characteristics: in the early years of the founding of the People's Republic of China, the natural environment and demographic factors were the main factors affecting the population fertility level. In order to promote economic development, raising the number of births and increasing the labor supply became common choices for population fertility at that time. With the incorporation of the family planning policy into the constitution in 1978 and the implementation of China's reform and opening-up policies, the influence of social and environmental factors on population fertility began to come to the fore. China's economy, medical care, education, and culture developed tremendously, and the concept of fertility slowly changed. More critically, the interventions and implementation of family planning policies during

this period led to the dominant influence of fertility policies on fertility levels, and from 2013 to the present, China has begun to improve its family planning policies and gradually liberalize the number of births in a bid to improve its future demographic structure, with socio-environmental factors becoming the main factor influencing fertility levels. As a result of the combined effects of economic and social factors and policies, fertility levels remain low and are on a downward trend. According to this paper's analysis of China's projected future fertility levels, the influence of fertility policies will further decrease, and economic and social factors will become the main factors influencing population fertility.

Based on the above research, this paper has learned that the specific significant factors affecting China's population are fertility policy, education level, medical resources, etc. Then this study puts forward the following suggestions for the phenomenon of China's low birth rate at the present stage: First, speed up the adjustment and improvement of the fertility policy and consider promoting the gradual transition from the "two-children" to the "full liberalization" of fertility restrictions as soon as possible. Second, the adjustment and improvement of fertility policies should be accelerated. Consideration should be given as soon as possible to the gradual transition from "two children across the board" to "full liberalization", so as to ensure the reproductive rights of potential groups of people and ultimately the full liberalization of restrictions on fertility. Third, efforts should be made to increase publicity for the country's fertility policy, and more public service advertisements should be devoted to encouraging the population to give birth in accordance with the policy and to creating a cultural environment conducive to childbearing.

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