

Analysis of the Birth Rate and Its Influencing Factors in China

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Abstract. Population is the cornerstone of national development. China's fertility rate has been falling for more than a decade. Although the country has actively adopted policies to stimulate fertility, the impact has not been satisfactory. Continued low fertility rate will lead to aging population, labor shortage and other social problems. This paper mainly analyzes the current fertility situation in China and studies the factors affecting the fertility rate. Through simple mathematical calculation, descriptive statistics, and inferential statistics, this paper finds out the relationship and influence degree of each factor to fertility rate. It concludes that local economic level, raising costs and age at first marriage all have a key impact on fertility rate. To solve the downward pressure of China's population, this paper combined with China's national conditions, mainly put forward three feasible solutions, which are to increase the fertility fund, reduce the cost of raising children, and balance people's time for marriage, childbirth and work.

Keywords: Fertility rate, economic level, raising cost, age at first marriage.

1. Introduction

Since the founding of China, the issue of fertility has been the focus of people's attention. In the 1970s, China's total fertility rate was once more than 6. In the early 1970s, the Chinese government vigorously promoted family planning, encouraging each couple to have one child. This effectively kept the population from growing too fast, but is also led to China's transition from high fertility to low fertility^[1]. As a result of economic development, China's fertility rate has continued to decline. However, low fertility rate has also become a direct factor hindering economic and social development. Despite the opening of the tow-child policy in the early 20th century, the upturn in fertility rate has been muted^[2]. Based on the 2020 census and the newly released number of births by the National Bureau of Statistics in 2021, China's total fertility rate in 2021 was 1.6. The Low Fertility Trap theory suggests that when the total fertility rate falls to 1.5, it will fall further and become harder to raise it again. Under the influence of social and personal factors, the number of births and the birth rate in China are continuing to decline. The international community generally considers a country's total fertility rate of 1.5 as a warning line, indicating that it is at risk of falling into a low fertility rate. It is obvious that China now has one of the lowest fertility rates in the world. And China's population policy has shifted from reducing fertility to increasing it^[3]. Population is the key to national development and an important driving force of economic development^[4]. The low fertility rate contributes to a serious aging problem in China. Also, it leads to a shrinking workforce, social funding difficulties, and the decline in the ability to innovate in science and technology^[5]. Therefore, raising the fertility rate is one of the China's most important goals at now.

China is not the only country in the world where birth rates are falling off a cliff. The average global birth rate has nearly halved from more than 30% in the 1960s to 18% in 2019. Throughout the world, fertility rate varies from high fertility to low fertility. In this process, developed countries lead the global decline in fertility, while developing countries determine the trajectory of fertility decline^[6]. Falling fertility rate are a global problem. Experts differ on the census and solutions for this trend. Through multiple regression model, Wang pointed out that income level, education level, and housing factors have a key impact on China's fertility rate^[7]. In addition, He believes that the main reasons for China's ultra-low birth rate are social pension security, urbanization, and the expansion of university enrollment^[8]. From the perspective of economics, for parents, children are also kind of commodity. In terms of utility, parents also pursue utility maximization when they give birth to children, just like other goods. The intention to have children is inversely related to the cost of raising

children. When the expected income from raising children is greater than cost, parents are more likely to have children^[9].

China's efforts to raise the fertility rate have two main aspects: increasing fertility welfare policies and reducing the cost of raising children. In fact, in recent years, local government in China have put forward relevant welfare policies. For example, in Zhejiang Province, the government will provide appropriate financial subsidies to women who are not eligible to give birth because they are unemployed. In addition, the government will be able to provide childcare allowances to family with children under the age of three. Despite the government's favorable policies, people remain concerned about their impact. The extension of maternity leave may make employers more reluctant to recruit female employees and raise the employment threshold for women. Chen and Zhu argue that fertility policy changes alone cannot reverse the decline in ultra-low fertility rates^[10]. So far, the decline in fertility has continued, despite some short-term stimulus from the government. To achieve a reasonable return of China's fertility level, in addition to the adjustment of fertility policy, it is necessary to include the social security system, education system and other related systems and policies.

Previous studies have identified some key factors affecting fertility rate and analyzed its trend in China over the past decade or so. However, many factors lack date support and cannot fully explain the extent of their impact. Also, there is still no optimal way to solve China's low fertility rate problem. Therefore, it is necessary to continue to identify and discover more factors affecting fertility rate. By studying the factors that have affected fertility rate in recent years, it is helpful for the country to solve the problem from the root causes and adopt powerful and useful policies to alleviate fertility rate through quantitative analysis and inferential statistics, expecting to find new findings on the previous work to propose new solutions.

2. METHODOLOGY

This paper mainly described the current fertility rate in China and analyzed the impact of three factors on the birth rate, which are local economic level, raising cost and age of first marriage. Firstly, by collecting data from the National Bureau of Statistics, this paper obtained the birth population and the average population in China from 2010 to 2021. Fertility rate refers to the ratio of births to the average population in a certain place over a period of time. It reflects the birth level of the population. According to the formula

$$B = \frac{P_b}{P_a} \quad (1)$$

Where P_b represented the number of births in a year and P_a represented the average annual population, the fertility rate B can be calculated.

Secondly, according to date from China's National Bureau of Statistics, the birth and death rates of China's population had been collected every year since 2010. Natural population growth rate N was the rate and indicator reflecting the trend of natural population growth, which depended on changes in the birth rate and death rate of the population. According to the formula

$$N = \frac{P_b - P_d}{P_a} \times 1000\% \quad (2)$$

Where P_d represented the number of deaths in a year, the natural population growth rate per year since 2010 could be calculated.

Furthermore, according to the China Census Yearbook 2020, the total GDP of China's provinces in 2020 could be obtained. According to the formula

$$R = \frac{G}{P_a} \quad (3)$$

Where G represented total GDP, per capita GDP of each province R could be calculated. The cost of raising a child aged 0-17 in China was about 485,000 yuan. According to the data of China

Statistical Yearbook 2020, the ratio of per capita consumption expenditure C_a of residents in each province of China relative to the national average consumption expenditure C_t could be obtained. If the proportion of raising costs C_r in each province relative to the national average was also the same as the proportion of per capita consumption expenditure, then the formula

$$C_r = 485,000 \times \frac{C_a}{C_t} \quad (4)$$

could be used calculate the raising cost in each province. According to China's Seventh Census Yearbook, the average age of first marriage for men and women could be obtained. According to the formula

$$Y_a = \frac{Y_t}{P_m} \quad (5)$$

where Y_t denoted the total age of men and women who get married for the first time, and P_m denoted the number of men and women who get married for the first time, the average age of first marriage in China Y_a could be calculated.

After obtaining the above data, descriptive statistics were carried out in the form of Excel tabulations and tables. Through the quantitative analysis of these indicators, the influence degree and change trend of these indicators on fertility were found. Using the indicators obtained, this paper proposed feasible measures to increase fertility in China, hoping to help solve the crisis caused by low fertility.

3. REsults and discussion

After collecting and analyzing the relevant data, this paper obtains the following information about the change of fertility rate and the factors causing low fertility rate. In order to truly solve China's fertility problem, it is crucial to make solutions suitable for China's social situation. Solving a series of practical dilemmas that people face, including housing costs, education resources and job security, means that it will take a long time increase fertility rate in China in the future.

3.1. Analysis of fertility rate and related data in China

Table 1. National birth rate and natural growth rate since 2010

Year	Birth rate of population (%)	Mortality rate of population (%)	Natural population growth rate (%)
2010	11.90	7.11	4.79
2011	13.27	7.14	6.13
2012	14.57	7.13	5.90
2013	13.03	7.13	5.90
2014	13.83	7.12	6.71
2015	11.99	7.07	4.93
2016	13.57	7.04	6.53
2017	12.64	7.06	5.58
2018	10.86	7.08	3.78
2019	10.41	7.09	3.32
2020	8.52	7.07	1.45
2021	7.52	7.18	0.34

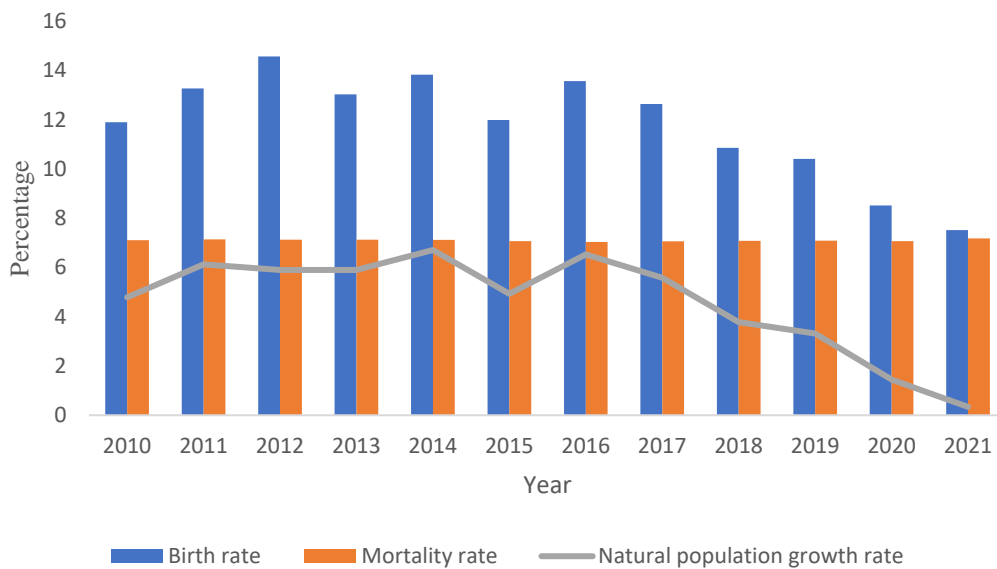


Figure 1. Change of national birth rate and natural growth rate since 2010

According to table 1 and figure 1, since 2010, China’s birth rate has shown a trend of increasing first and then decreasing. In 2012, China’s birth rate peaked at 14.57%. However, since 2016, the number of birth rate in China has significantly declined by about 6%, from 13.57% to 7.52%. The sharp decline in the birth rate over the five year also contributed to a decline in the natural population growth rate, from 6.53% to less than 1%. During this decade, the mortality rate of China’s population remained around 7%, which was a small fluctuation.

This shows that after more than 30 years of family planning work, China’s population has completed the transition of fertility rate and entered a demographic transition stage with low birth rate, low death rate and low natural population growth rate. At the same time, the aging problem of China gradually emerged. It is predicted that China’s aging population will become increasingly serious in the coming years. In the future, the Chinese market may face the problem of insufficient young labor force and difficulty in industrial transformation.

3.2. Analysis of the relationship between per capita GDP and birth rate in each province of China

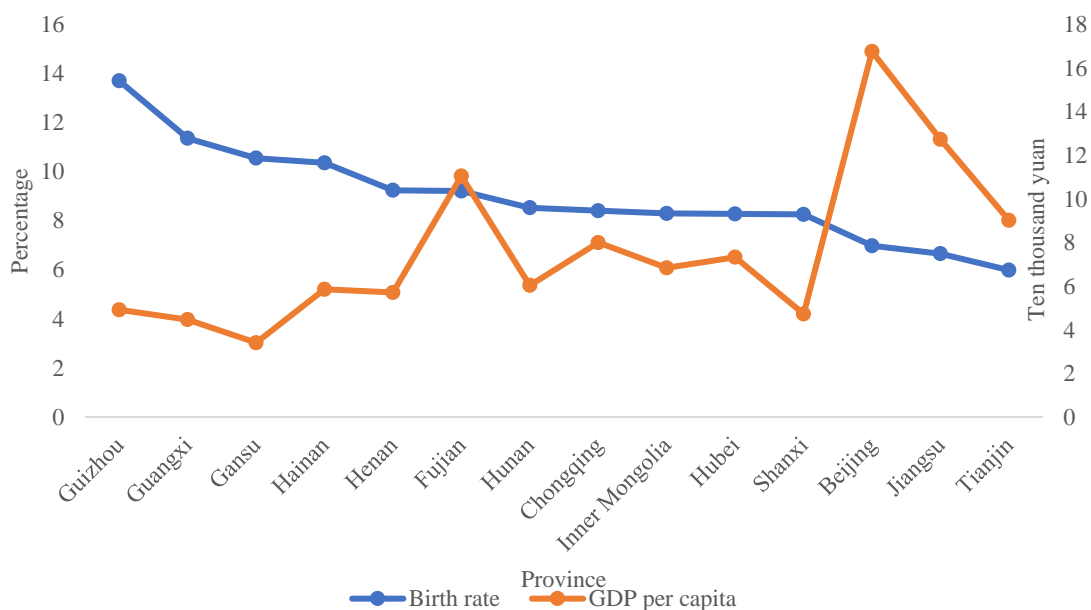


Figure 2. Per capita GDP and birth rate by province in China in 2020

Figure 2 shows the per capita GDP of China’s fourteen provinces in order of birth rate from highest to lowest. Per capita GDP is strongly correlated with people’s happiness. In other words, the higher the per capita GDP, the higher the people’s income and the better their living conditions. As can be seen from the graph, generally speaking, with the increase of the regional economic level, the birth rate in that region is gradually decreasing. In some content, economic development restrains people’s fertility desire and behavior. There are many reasons for this trend. It is found that there is an inverse relationship between the level of economic development and the ideal number of children. In addition, housing prices and raising costs in economically developed areas are much higher than those in economically undeveloped areas. This may also account for the low fertility rate in economically developed areas.

3.3. Analysis of the relationship between raising cost for each child and birth rate in each province

Figure 3 shows the comparison between the cost of raising a child and the birth rate in 15 provinces in China in 2020. As can be seen from the figure, Shanghai, and Beijing, as the two provinces with the highest raising costs, spend an average of about 1 million yuan from birth to adulthood for a child. Shanghai’s birth rate is below 6, while Beijing’s below 7. In terms of national rankings, they are at the bottom for birth rate, 28th and 23rd respectively. The two cities indicate an extreme inverse relationship between raising costs and birth rates.

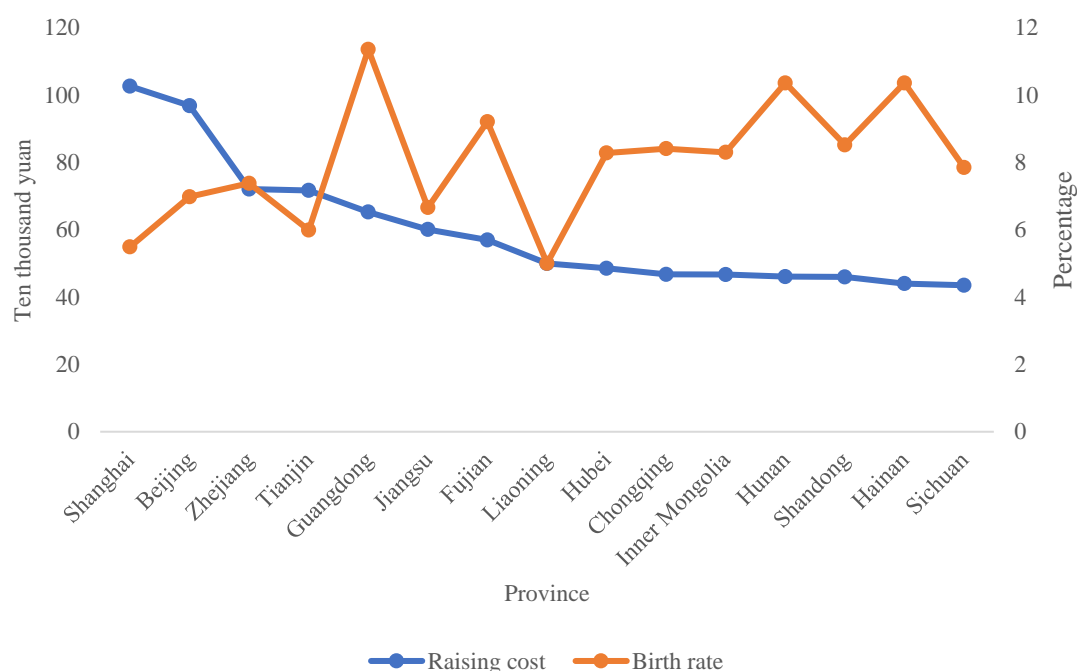


Figure 3. Raising cost for each child and birth rate by province in China in 2020

The next five provinces with the highest raising costs are Zhejiang, Tianjin, Guangdong, Jiangsu, and Fujian. Statistics show that the costs of raising a child from birth to adulthood ranges from 500,000 to 700,000 yuan. The average birth rate in the five provinces is 8.12, higher than 6.24 in Shanghai and Beijing. Compared with the previous provinces, these five provinces have lower raised costs but higher birth rates. Provinces ranked 8th to 15th had average raising costs of around 400,000 yuan. Meanwhile, their average birth rate in 2020 was 8.39, slightly higher than 8.12 in the second group of provinces.

Through the comparative analysis of three groups of provinces, in general, there is an inverse relationship between the birth rate and the cost of raising children. That is, as the cost of raising children increases, the birth rate decreases. And as the cost of raising children falls, the birth rate rises. But from an individual perspective, the second and third groups had fluctuating birth rates, while the first group was extreme. This suggests that as the cost of raising children falls, so does the effect on

the birth rate. In provinces where raising costs are less expensive, differences in birth rates may have more to do with social attitudes and other factors than raising costs.

3.4. Analysis of changes in the average age of first marriage for men and women in China

Table 2 and figure 4 show the changes in the age of first marriage for Chinese men and women in the past decade. Over the past decade, the average age at first marriage rose by 3.63 years for men and 3.95 years for women. The average of first marriage has always been slightly higher for men than for women and is also rising for both sexes. The trend toward later marriage and childbearing may be influenced by multiple factors such as education, work, and traditional attitudes. However, postponing the age of first marriage will have a negative impact on China's fertility rate. It affects not only the age at which families first have children, but also the decision to have more than one child, and thus the total number of children in a family.

Table 2. The average age of first marriage in China between 2010 and 2020

Year	Average age at first marriage	Average age of first marriage for men	Average age of first marriage for women
2010	24.89	25.75	24.00
2011	25.09	25.93	24.24
2012	25.34	26.14	24.52
2013	25.72	26.52	24.91
2014	26.06	26.86	25.25
2015	26.43	27.21	25.63
2016	26.71	27.50	25.91
2017	27.00	27.80	26.19
2018	27.30	28.12	26.50
2019	27.68	28.48	26.88
2020	28.67	29.38	27.95

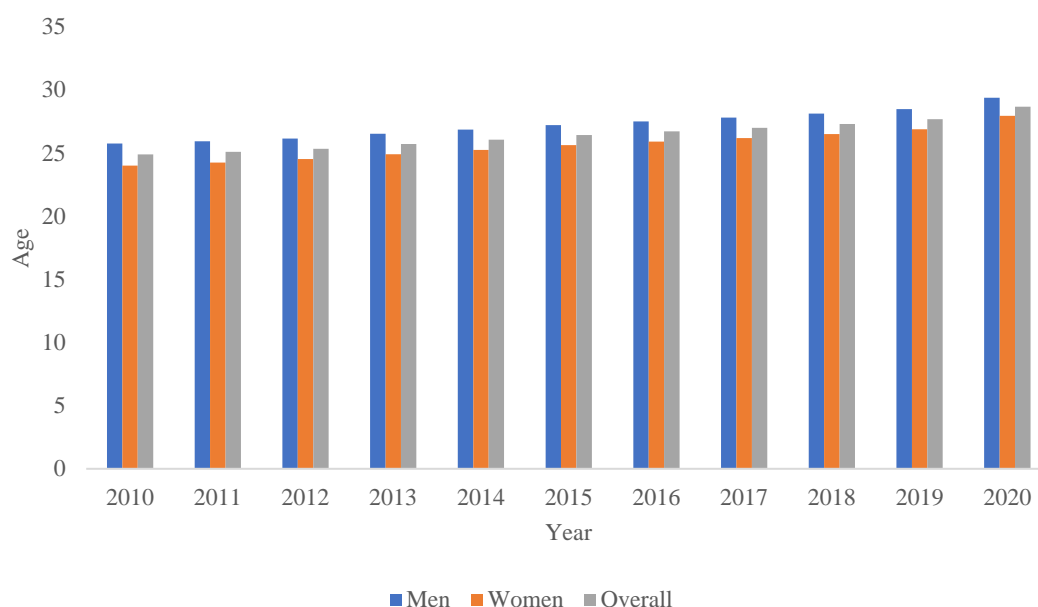


Figure 4. The average age of first marriage for men and women in China between 2010 and 2020

4. Conclusion

At present, China's total fertility rate is below 2.1, the level needed to meet normal population replacement. In the future, faced with the improvement of the economic level and the adverse impact

of the epidemic, China's fertility rate will continue to decline. This will lead to a serious aging problem, a decline in population vitality, and a shrinking population size. The economic market is facing a series of crises such as insufficient labor force, insufficient market vitality and reduced demand. In order to cope with future crisis, the national government should take active and effective measures to slow down the rate of fertility decline and stabilize China's population base. According to the above research and analysis, this paper puts forward the following countermeasures and suggestions.

Firstly, China should consider increasing fertility funds. Fertility funds can be funded through cash, welfare, housing, and other means. The fertility fund can increase the income of the family and make up the difference between the raising cost and the actual income level. Japan has one of Asia's biggest aging and fertility problems. Since 1990, Japan has used cash welfare to stimulate childbearing. Expectant parents can receive a payment of 420,000 yen with some local governments adding cash payments. In addition to the lump-sum payment, mothers can also receive cash benefits such as maternity grants and child leave grants. At present, China's birth subsidy system is few and not widely implemented. In order to further strengthen social support for childbearing, the government may consider incorporating childbearing into the social security system, improving and increasing the child-bearing subsidy system, and expanding the coverage of women of childbearing age who participate in maternity insurance.

Secondly, reducing the cost of raising children is an essential step to raising fertility. The high cost of raising children is an important reason why many families give up having two children. From the milk powder and diapers that family need to buy when they are babies, to the expensive tuition they spend when they are young, most families in China are out of reach of their income. On the one hand, the government should subsidize or even free some necessary expenses for children during their growth. On the other hand, for the unnecessary expenses when children grow up, the government should reduce the pressure on the family by guiding the social customs, traditional ideas, and other ways.

Finally, the government should try its best to balance people's time for marriage and childbearing with their time for work and study. It is becoming more common for people to delay their first marriage as school takes longer and work becomes more stressful. The hours spent in length of schooling and unreasonable work encroached on family life. The government should streamline the length of schooling and legislate to guarantee an eight-hour working day. At the same time, the social concept of starting a career before starting a family needs to change. The government should share concerns and help to strengthen household resilience.

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