Analysis Of Influencing Factors of Population Fertility Rate: A Case Study of China

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Abstract. Population fertility rate is one of the essential indicators to study the population size and trend of a country or region, which is of great significance for the government to formulate population policies, plan social development and optimize the labor market. China's total fertility rate has shown a continuous decline since 2014, falling to 1.30 in 2020, reaching the lowest level in history. Based on the relevant data of the National Bureau of Statistics of China and some relevant literature, this paper analyzes the main factors affecting the fertility rate and their specific influencing mechanisms with China as an example. This paper examines the factors from the perspectives of population, macro economy, macro policy and fertility concept. This study also discusses the reasons for the continuous decline of the fertility rate in China since 2014. The analysis found that the gender ratio, education level, aging, economic development, youth unemployment rate, fertility costs, fertility policies, fertility concepts, and COVID-19 all have a certain degree of impact on China's fertility rate.

Keywords: Fertility rate; population structure; fertility cost; fertility benefit; fertility concept.

1. Introduction

With the rapid development of economic globalization and the intensification of social changes, many countries and regions in the world have shown a trend of rapid decline in fertility after entering the 21st century. Some countries experience negative population growth and even face the serious problem of population degradation. The growth of population size tends to be slow and stable, even if there is explosive population growth, it will not last for a long time, and it is easy to regulate. However, the reduction of population size tends to be out of control, and the development speed from the initial small reduction to the collapse of the population is often beyond expectations. These can cause a series of economic and social problems and have a huge impact on industries such as education, health care, pension and real estate.

Studying the factors affecting population fertility can not only help the government and scholars to better understand the laws and trends of population development but also provide a powerful scientific basis for them to formulate relevant policies. Over the past few decades, scholars have conducted numerous studies to try to identify the various factors that influence the fertility rate of a population, including economic, social and cultural factors, as well as public services such as policy, education and health care. Studies show that economic development increases educational opportunities, improves medical and pension conditions and increases the difference between urban and rural household registration, which prompts women to delay childbirth and reduce the number of births [1,2]. Social factors, including gender equality and the concept of marriage, directly affect the marriage rate or indirectly affect the future fertility rate by causing gender imbalance [3]. Fertility policies play an essential role in the direct regulation of fertility rates in some countries. However under huge economic pressure, people's response to fertility policies is significantly lower than expected [4]. The increase in fertility cost and the decrease in fertility benefit have a negative impact on fertility rate when the population of childbearing age weighs the cost and benefit [2]. At the same time, the fertility rate in different regions and between urban and rural areas of the same country also show a big difference, which is the result of the influence of the economy, culture, policies, and other aspects [5].

Although the existing research on the factors affecting population fertility has made great progress, there are still some deficiencies and gaps. For example, in some specific countries, with rapid

economic growth, the reverse adjustment of policies, and the rapid dissemination of new ideas, people's lives and concepts have experienced severe shocks in a short period of time. This has resulted in changes in fertility beyond what would have been expected from previous fertility theories over large time scales. This paper takes the decline of the fertility rate in China from 2014 to 2022 as an example, summarizes the existing research results, and discusses the influencing factors of the fertility rate. Through systematic sorting and analysis, the author hopes to draw some conclusions and enlightenment and provide certain references for the formulation of population policy. Besides, the author also hopes that this study can stimulate more attention and research on the factors affecting population fertility and provide new ideas and perspectives for future population development and social changes.

2. The current situation of the Chinese population's fertility rate

2.1. Overview of China Population Data

Since the total fertility rate of China has fallen below the generation replacement level at the end of the last century, China's population scale has been effectively controlled, but some structural problems, such as the aging of the population, have also caused more and more obstacles to China's development. The Chinese government is constantly adjusting the fertility policy but has not achieved the expected results. After implementing the "Selective two-child policy" policy in 2014, the total fertility rate increased from 1.77 in 2013 to 1.84, but in 2015 fell to 1.66. Subsequently, the "Universal two-child policy" policy was implemented in 2016. The total fertility rate increased to 1.88 for two consecutive years but then continued to decline. In 2020, it fell to 1.30, reaching the lowest level in history.

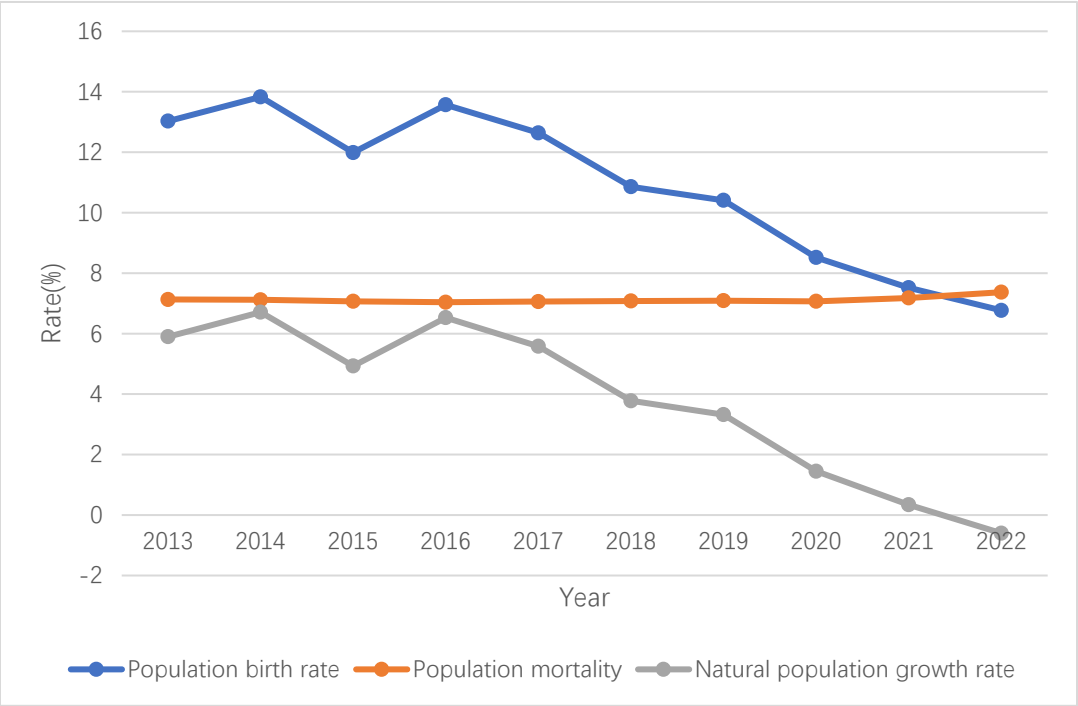


Fig. 1 Population Data of China (2013-2022)

The data in Figure 1 comes from the National Bureau of Statistics of China and shows the population data of China in the past ten years. As can be seen from the figure, the mortality rate is basically stable except for the increase due to COVID-19. The fertility rate has been in a state of continuous decline except for the increase in 2016, and the natural population growth rate has also turned negative for the first time in 2022. China has not seen the expected retaliatory births after the implementation of the "Two-child" and "Three-child" policies, which can only slow down the rate of fertility decline but cannot directly change the downward trend.

2.2. Data Related to the Fertility Rates in China

In recent years, the causes of the low fertility rate in China have been very complex, including the change in population structure, residents' economic income, unemployment rate, housing price, ideological changes, and many other factors. Table 1 lists some data on factors affecting the fertility rate, which comes from the National Bureau of Statistics of China. This article will discuss the factors affecting the fertility rate in China based on the above data and published literature.

Table 1. Data Related to the Fertility Rate in China

	2015	2016	2017	2018	2019	2020	2021	2022
Birth rate(%)	11.99	13.57	12.64	10.86	10.41	8.52	7.52	6.77
Male-to-female ratio(age 20-24) (female=100)	108.51	109.62	110.98	112.89	114.61		113.20	
Child dependency ratio(%)	22.6	22.9	23.4	23.7	23.8	26.2	25.6	24.8
Elderly dependency ratio(%)	14.3	15.0	15.9	16.8	17.8	19.7	20.8	21.8
Resident consumption level(¥)	18857	20801	22968	25245	27504	27439	31013	31718
The average sales price of commercial housing(¥/m^2)	6793	7476	7892	8726	9310	9860	10139	

3. The Main Reasons for the Decline in Fertility Rate

3.1. Analysis From a Population Perspective

3.1.1 Male-to-Female ratio

China's male-to-female ratio of 20-29 years old has increased rapidly in the past 20 years, and the trend of more males than females in the childbearing age is becoming more obvious. The male-to-female ratio of 10-14 years old even reached 119.10 in 2019, indicating that the imbalance between the numbers of men and women is likely to become more serious in the next decade.

From the perspective of the causes of gender imbalance, the "preference for son" ideology is deeply rooted in China, and the improvement of infant gender detection technology in recent years has made the artificial selection of newborn’s gender more and more frequent. It is undeniable that this behavior directly leads to the reduction of the number of female newborns, thus reducing the population fertility rate to a certain extent.

From the perspective of the results of gender imbalance, on the one hand, the reduction of female newborns will directly lead to the reduction of the number of women of childbearing age in the future, and then affect the fertility rate; On the other hand, the male-to-female ratio can affect the fertility rate by influencing the marriage rate [3]. In China, the vast majority of births are within marriage. As Chinese people are deeply influenced by traditional culture including Confucian culture, it is unlikely that there will be a large number of births outside marriage at present and in the short-term future. Therefore, the decline in marriage rate caused by the imbalance of the male-to-female ratio can directly lead to the decline of the fertility rate [3].

3.1.2 Parental education level

Existing statistical data show that with the improvement of parents' education level, the average fertility intention gradually decreases. For people at all education stages, their willingness to have two children accounts for the highest proportion, while among people with junior high school education or above, the proportion of preferring three or more children decreases significantly with the improvement of education level [1].

With the increasing education level, the knowledge acquired by parents enables them to take better contraceptive measures, which greatly reduces the probability of unwilling births [4]. At the same time, the improvement in education level means the extension of education time, which often makes young people delay marriage and childbearing time. As the most suitable time for childbearing after marriage is compressed, the decrease in the number of the newborn is predictable. Parents with higher education also pay more attention to the quality rather than the quantity of their children. The limited time and energy of parents and the cost of high-quality education make contemporary parents choose the fertility strategy of "fewer and better births", which is also the main reason why parents' education level affects the fertility rate.

3.1.3 Aging problem

Since the implementation of the one-child policy in China in the 1980s, the fertility rate has decreased significantly, which also makes the aging degree of China's population increasingly high 40 years later. As can be seen from Table 1, the elderly dependency ratio has continued to increase since 2015. Many studies have shown that there is a negative correlation between the elderly dependency ratio and the population fertility rate, and some scholars have concluded through calculation that every increase of 1 unit in the elderly dependency ratio will reduce the population fertility rate by 1.47 units [6].

The increase in aging itself means a decline in the proportion of the population of childbearing age, which naturally leads to a decline in fertility. In addition, due to the implementation of the one-child policy, many families now have both spouses as the only child, which means that the couple has to support four elderly people at the same time. As a result of the huge time cost and economic cost, these couples usually delay the plan of having a child, reduce the number of children, or even choose not to have children. Even for couples who are not both only children, the cultural concept of "filial piety first" will make them give priority to meeting the needs of the elderly, even if it requires changing the original family plan.

3.2. Analysis From Macroeconomic Perspective

3.2.1 Economic development

Since the implementation of Reform and Opening-up in 1978, China has witnessed rapid economic development and accelerated urbanization process. A large number of rural labor forces have flooded into cities to work instead of staying in their hometown to engage in agricultural economic activities. However, the separation of the rural couples caused by one of them working in cities and the household registration problems of their children in cities has led to a decline in the fertility rate of the rural population. In the flood of urbanization, they gradually abandoned the traditional concept of "the more children, the more blessings" [1]. At the same time, the influx of rural labor has also increased the employment pressure in cities. Coupled with the rising living cost brought by economic development, the fertility willingness of the urban population has also begun to decline under the pressure of life [1].

Classical Western population economics believes that with the rapid economic development of developing countries, the cost of fertility cost increases, but the fertility benefits are less than before. This phenomenon can lead to the decline of population fertility [7]. This situation is particularly obvious in China, where the fertility cost is mainly borne by the family. With the rapid increase in the cost of food, clothing, housing and investment in education, people are more concerned about the cost rather than the highly uncertain benefits [2]. In view of this situation, the ever-improving pension insurance brought by economic development has become the choice of more and more people. In the case of completely rational consideration, people will naturally choose pension insurance with relatively low risk to replace the traditional pension method of "raising children for old age".

3.2.2 Youth unemployment rate

The fertility rate in the United States declined significantly during the Great Depression in 2008. Some scholars have confirmed in their studies that the youth unemployment rate can reasonably

explain the change in the fertility rate to a certain extent and found that the youth unemployment rate can also well predict the change of the fertility rate [8]. According to the National Bureau of Statistics of China, the youth unemployment rate in China has continued to increase in recent years, rising to 20.4% by 2022, which is also in accordance with the existing research results.

When the overall unemployment rate of society continues to rise, it means that there are certain problems in economic development. In this period, enterprises generally reduce enterprise risks by changing recruitment strategies or cutting new employees. Therefore, compared with other age groups, young people are more sensitive to the market environment, which also explains why the average unemployment rate of youth is 2.6 times that of the middle-aged and 3.5 times that of the elderly [9].

Chinese young people usually consider marriage and childbearing after graduation and getting a job, because in the traditional Chinese concept, marriage and childbearing need to be carried out in a relatively stable economic situation. Generally, young people who do not have enough savings need a stable job to meet this requirement. However, the increasing youth unemployment rate makes Chinese youth feel the great uncertainty of the future. Many graduates are faced with the situation of "graduation equals unemployment". Meanwhile, a high unemployment rate will also cause the low-quality of employment positions and the deterioration of the working environment, which increase income uncertainty and reduce the subjective happiness of employees. All these can directly affect the reproductive intention of young people [9].

3.2.3 Fertility cost and fertility benefit

In the past, people mainly gave birth according to traditional habits. Compared to this, contemporary Chinese people pay more and more attention to the practical factors of giving birth, such as the cost and benefit, among which housing cost and education costs are the most important costs.

The traditional view that housing is an important prerequisite for starting a family in China is deeply rooted. The government, which has made real estate the country's first pillar industry, is not trying to change this mindset at all. In fact, the government shows great welcome to it. Since 2008, China's housing price has soared rapidly, and the proportion of residents' income spent on real estate has also increased significantly. The data on average sales price of commercial housing in Table 1 can also show this trend. Some scholars have confirmed through data research that the rise in housing prices has a significant inhibitory effect on the fertility rate. And the impact is really enormous [10]. In the case of the imperfect rental housing system and low public acceptance of rental houses for marriage, some young people who cannot afford to buy houses choose to postpone marriage or even not get married, while others need to rely on the savings of the elderly or choose loans to buy houses. The repayment period of loans of ordinary residents exceeds 10 years, and some even exceed 30 years. It almost covers the entire childbearing age. The family's expenses for raising children are compressed, resulting in a decrease in the willingness to have children [7]. In addition, having more children means the need for more money in the future to help children buy a house, which undoubtedly increases the fertility cost.

Chinese people are increasingly focused on the quality of their children rather than the quantity, so the proportion of income spent on education is increasing. "Do not lose at the starting line" is not only the consensus of Chinese parents but also the inevitable requirements of "survival of the fittest" competition brought about by employment pressure. The high fees of preschool education, the school district housing in the compulsory education stage, and various remedial classes and extra-curricular special classes throughout the entire education stage, are a great cost for ordinary families.

In addition, medical care, sports, and entertainment are all part of the fertility cost. However, compared with the rapidly increasing cost, the benefits of fertility are becoming less and less. Moreover, the most crucial point is that the cost of fertility is mainly borne by the family, showing the characteristics of privatized cost, while the benefit of fertility is socialized due to the collective consumption of various public policies [2]. Take the endowment insurance system as an example. The endowment insurance is generally universal. China's public financial policies, mainly based on

taxation and transfer payments, collect and redistribute the individual economic benefits created by the entire working population. These individual economic benefits are the fertility benefits, but they are consumed by all residents, so the fertility benefits are not sufficiently exclusive. The private production function of children is further weakened [2]. The privatization of costs and the socialization of benefits have created a problem of "having children to work for others," and as more and more families realize this problem, the fertility rate will inevitably decline.

3.3. Analysis From Macro Policy and Fertility Concept Perspective

3.3.1 Fertility policy

In China, the family planning policy is a direct method for the government to control the population, which has a crucial impact on China's population structure and fertility rate. The family planning policy, which has a strong binding force, mainly started in 1979, and up to now includes four stages: "One-child", "Selective two-child", "Universal two-child" and "Universal three-child".

The most important reform is the "One-child policy", promulgated in 1979, which largely brought population growth under control but also led to serious problems such as aging. At present, the main population of childbearing age in China is just the generation born under the influence of the one-child policy. First of all, as the only child in the family, each person needs to raise two old people, and the huge pressure of supporting the elderly reduces the willingness to have children. Secondly, this generation grew up in a family environment with only one child. The influence of the environment makes them accustomed to giving birth to only one child. This subtle influence could not be eliminated simply by changing the birth policy. Finally, compared with the older generation, this generation who grew up as the only child has a stronger sense of self, is unwilling to be bound, and has a stronger desire to realize their self-worth. In other words, to some extent, they grow up in a spoiled environment and are more selfish than any other generation. Having children is a great responsibility or even a burden for them. So, this generation will be less willing to have children than ever before.

Since 2013, the Chinese government has released birth restrictions one after another. Although the fertility rate has rebounded in the early stage of the new policy, there has been no retaliatory increase as expected by experts. The trend of fertility decline is still irreversible. With the development of society and the improvement of education level, people's response to the simple encouragement and call of the government is gradually declining. Especially for important decisions like childbearing, more practical factors are taken into account, such as the fertility cost. The reason for these adjustments of population policy is the increase of social pressure on old-age support, the decline of demographic dividend, the unsalable commercial housing, and other social problems brought about by the past family planning policy, rather than responding to the appeals and demands of the public. Therefore, responding to the new policy can solve social problems, but it does not bring direct benefits to citizens, so the new policy doesn’t gain great responses from people. As a result, the new policy doesn’t achieve the expected effect.

3.3.2 Changing concepts about marriage and fertility

As of 2015, the population using the Internet in China has exceeded half of the total population, and the proportion of teenagers is even higher. The popularity of smart devices and the explosive growth of we-media in recent years have made the way for people to obtain information more simple, fragmented and flat. People are exposed to the ideas and cultures of different regions and times in a very short time. It has a huge impact on the traditional concepts of marriage and fertility [7]. In addition, the entry threshold of new media is low, and the quality of new media varies. In order to obtain more traffic, new media often release corresponding information to cater to the negative emotions with strong emotional colors that have been among the public for a long time. This information can even be comparable to those released by official media in terms of dissemination speed and influence [7].

With the input of Western culture, the rise of feminism and the prevalence of individualistic values, the concept of marriage in China has gradually changed from a single traditional Confucian view of marriage to a diversified one. Cohabitation, divorce, non-marriage, dink, homosexuality and other behaviors have gradually been accepted by the society. Marriage is no longer a necessary option, and the decline in the marriage rate inevitably leads to the decline in the fertility rate [7].

From the perspective of fertility, the "fertility anxiety" phenomenon has been very common nowadays. While the parents' expectation of their children's future is gradually rising, the increasingly fierce social competition makes parents more worried about education, health, psychology, housing, income and other issues. The pressure that the child will need to face in the future will let the parents double feel and bear the first. Moreover, with the spread of consumerism and the concept of gender equality, giving birth to children will inevitably affect the quality of life and career of parents. Especially, as women gradually get rid of family constraints and join the workplace, preparation for pregnancy, maternity leave and lactation will cause huge losses in the golden period of their career and further reduce their fertility intention [11].

3.3.3 The impact of COVID-19

There are many studies on the mechanism of how large-scale epidemics inhibit fertility rate. The main reasons include population death caused by epidemics, economic regression, people's concern about the recovery of epidemics, and the damage of the virus to the reproductive system, etc., which are also reflected in the COVID-19 epidemic [12].

In China, the majority of deaths caused by COVID-19 are the elderly, which objectively alleviates the aging problem. The pressure on society and families to support the elderly has been reduced, but the fertility rate has not rebounded significantly. In addition to the above reasons, the frequent lockdown measures in the three years of the epidemic made the income source of many families very unstable and some families even directly lost their income source. Among these families, those who had no excess savings or took on mortgage loans spent three years in a very difficult environment. This experience makes them deeply realize the uncertainty of the future and the importance of savings. Therefore, many families increase the amount of savings by postponing childbearing or reducing the number of children, in order to improve the family's ability to withstand pressure and uncertain risks.

4. Conclusion

Through the research, this paper finds that the main factors affecting China's fertility rate are the pressure of fertility cost, the change in fertility concept, the unreasonable population structure, and the continuous impact of fertility policy. With the continuous development of society, people's education level continues to improve. Independent thinking and awareness of future planning continue to strengthen. This is an unstoppable and irreversible process, then people will gradually transition from the original state of blindly and recklessly following the fertility instinct and backward fertility tradition to a new stage of thinking about the meaning, gains, and losses of fertility and making reasonable fertility planning. The rapid development of the information society has accelerated this process and at the same time provided more information for people to make family planning. The new generation of people of childbearing age who are no longer bound by traditional concepts will think more rationally about the future of themselves and their children in the long run when faced with the fertility cost which is much higher than the fertility benefit. The privatization of fertility costs and the socialization of fertility benefits will gradually surface under rational thinking, which is a trend that cannot be changed through public opinion control and guidance. The imbalance of the sex ratio and the encouragement of the policy have relatively less impact on the fertility rate, and the satisfaction of the spiritual needs of childbirth is even less critical under the prevalence of consumerism and the increasing richness of cultural life.

Based on the above analysis, if China wants to solve the problem of rapid decline in the fertility rate, on the premise of not implementing a mandatory fertility policy, it needs to give priority to reducing the cost of fertility for the people, such as lowering housing prices, lowering loan interest

rates, granting maternity allowances, increasing government investment in education, providing free medical care, etc. Rather than short-term economic growth, maintaining a long-term healthy population structure will be more conducive to the development of the country. Otherwise, China may encounter huge economic and social problems brought about by population collapse when it has not yet gotten away from excessive dependence on demographic dividends. This paper analyzes the factors that affect China's fertility rate. The author hopes that it will provide more ideas and possibilities for further research in the future and provide references for the government to formulate relevant population strategies, so as to achieve the purpose of creating a social environment with higher subjective happiness of the people.

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