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Correlation Analysis Between National Fertility Rate and Socioeconomic Development: A Study Based on Birth Rates in China

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Abstract: China's declining fertility rate poses significant challenges to social and economic development. The deceleration in population growth, potentially leading to negative growth, has diverse implications. Socially, an aging population strains the social security system, escalating demands for healthcare and pensions, while insufficient supply may compromise social welfare. The labor market is also affected, as an aging populace may cause labor shortages and increased labor costs, impacting economic development. Economically, the fertility rate decline hampers economic growth by slowing down population and economic scale expansion. Adjustments to the labor market and industrial structure may induce short-term economic fluctuations and unemployment issues, negatively impacting the social economy. Addressing falling fertility rates requires government intervention. Strengthening the social security system is crucial to meet challenges posed by an aging population. Additionally, policies encouraging fertility are essential, involving support for healthcare, education, and childcare services. Human resource development must be emphasized to enhance workforce skills, adapting to labor market changes and economic needs. In conclusion, China's declining fertility rate profoundly influences social and economic development. Government measures are imperative to ensure sustainable and healthy socio-economic growth.

Keywords: Fertility rate, social and economic development, National economy

1. Introduction

Low fertility intention and fertility rate not only directly lead to the change of the country's population quantity, population structure and quality of population, but also indirectly affect a country's innovation ability and consumption ability. For example, in Korea, consumption in specific areas like real estate has significantly decreased due to fewer clients needing shelter. Another instance is in the EU, where there has been an increase in the total cost of welfare payments and social benefits for the aging population profoundly impacting on the country's economic, social development and civilization inheritance. Therefore, correctly understanding of the formation mechanism of fertility gap and narrow the gap between fertility willingness and fertility behavior through policies is necessary. At the same time, according to the influencing factors of fertility rate, measures should be

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taken from the state, society, enterprises, families and female individuals to overcome the "low fertility trap" and solve China's population problem.

2. Literature Review

2.1. The Sever Decline of the Birth Rate in Developed Countries

Looking at the fertility level and economic development level of all countries in the world, when the economy is in the rising period, such as the war or national turmoil ends, and the economy begins to develop, people's living pressure is relatively small, the supply of labor jobs in the market is sufficient, and most people will prefer to have more children. The example booms in some countries (such as the United States and Japan). When the economy is in a stable period, the economic development is limited by the level of science and technology, the market employment position is not sufficient, the job competition is more and more fierce, the income level growth is slow, at the same time, due to the solidification of the class, the cost of raising children increases significantly, people will wisely choose to control the birth. When the economy is in recession, the employment opportunities and ideal positions are significantly reduced, and the young people are under greater pressure. According to the instinct of seeking benefits and avoiding disadvantages, people will give priority to ensuring their quality of life without considering the behavior of high cost and low benefit such as marriage and childbirth, thus appearing the single and Dink people, and reducing the fertility rate of the social population. Therefore, most western scholars believe that the fertility rate is negatively correlated with the level of national or economic development. Particularly, when the level of economic development reaches a certain threshold, the fertility rate tends to experience a markedly significant decline.

Based on the change of wealth level and population in Britain before and after the Industrial Revolution, he pointed out that wealth level and fertility are not linear, but also influenced by a series of other factors such as technical level, social structure, lifestyle and even political form and cultural change. Before the Industrial Revolution, the level of British wealth was highly positively correlated with fertility rates. Through their study of British wills, they found that during the 16th century, the richest people had an average of four to six children alive, an average of 3.5 to 4.5 children alive, while the poorest people had less than three children alive; by the end of the 18th century, the richer families still had more children, but the gap between the wealth classes was significantly narrowed. But when the Industrial Revolution arrived at the end of the 18th century, until 1880, fertility had less obvious connection with wealth levels. Between 1880 and 1980, the relationship between fertility and wealth levels was instead negative: the poorer the British, the more children. This phenomenon is very similar to the poorer," in the course of China's social development Li Mengshuang [1].

From history back to reality, will the increase in economic income necessarily increase fertility rates? Through empirical research, scholars have found a negative correlation between economic income and fertility rate. The increase of economic income objectively reduces the economic pressure of having children, but at the same time, it increases the opportunity cost (The cost of the opportunity that is given up in order to take a different course of action.) of having children. Especially for women with higher economic income, if the responsibility of bearing and raising children is more borne by them, the opportunity cost of childbirth is higher, which will subjectively reduce their willingness to have children. Liao Bingyi also studied the development of the financial market on the influence of fertility, points out that a wide range of financial investment for young people will form negative income utility, and the increase of family debt will promote parent's investment in children (choose more children) as the guarantee of his later life, therefore, the financial market investment income on fertility is negative Liao Bingyi [2].

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2.2. Research on the Correlation between Birth Rate and Economic Development

Niu Jianlin & Qi Yaqiang used panel data from seven South Asian countries (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) from 1971 to 2013 to analyze the fertility rate problem in South Asia and concluded that the economic development in South Asia contributed to the reduction in their fertility rate. Decline in fertility in recent years is more determined by economic development than by population policy Niu Jianlin & Qi Yaqiang [3], Mengqiao Wang [4]. As many demographers on China's fertility problems research that China's "one-child" policy successfully prevented the birth of 4 billion additional population, but Jane Golley through the evolution of contemporary Chinese fertility policy concluded that China's rapid economic development since 1980 is the main factor of birth rate decline Jane Golley[5]. Zhao Zhongwei Using the data of 172 countries from 1980-2009, adopt the threshold regression analysis method to study the relationship between HDI and TFR, found that the two present negative correlation, and the economic development and fertility in underdeveloped countries negative correlation is strong, in the developed countries economic development and fertility negative correlation is weak Zhao Zhongwei [6]. Smith James P proves the negative relationship between economic development and fertility rate from another perspective: the average pregnancy of women will reduce the labor supply for about two years, while reducing the fertility rate can increase the female labor supply and thus promote economic growth Smith James P [7].

In addition, there is another factor in the economic development that will affect the fertility rate, namely, the economic uncertainty. Xiaogang Wu believes that the uncertainty about future economy will affect people's reproductive choices, but it is necessary to distinguish the different roles of men and women when analyzing the impact of economic uncertainty on fertility, because they assess the impact of economic uncertainty on fertility when women realize future economic uncertainty; men's concerns about economic uncertainty do not affect the fertility outcomes of couples, because mothers raise children for more time than fathers Xiaogang Wu [8]. Of course, some scholars believe that economic uncertainty or economic risk (including the risk of employment status change and a family to the future unpredictable events of risk) will not affect fertility will, because it is the external accidental factors, and fertility will be often determined by the internal personal characteristics and preferences. However, external uncertainties exert a considerable influence on translating internal fertility intentions into actual fertility behaviors, thereby resulting in adverse effects on the fertility rate. As of 2022, China is poised to experience negative population growth, with the total fertility rate plummeting below 1.1—the lowest globally. The situation underscores the pressing need for proactive measures to liberalize and incentivize childbearing.

Over the years, China has witnessed a significant decline in its total fertility rate. From approximately 6 before the 1970s, it decreased to around 2 in 1990 and further declined to approximately 1.5 after 2010. The alarming trend persisted, with the rate reaching 1.15 in 2021 and potentially falling below 1.1 in 2022. This is a critical concern as it represents only half of the replacement level necessary for generational sustainability, marking the lowest fertility rate globally.

The implementation of the comprehensive two-child policy yielded results below expectations, while the three-child policy failed to manifest the desired effects. Consequently, these policies were unable to reverse the declining birth trend in China. The cumulative effect of births has diminished since 2017, with only 9.56 million births in 2022—a significant drop compared to the 2021 figure of 10.62 million, setting a record low. This decline contributed to a negative growth of 850,000 in the total population. Addressing this challenge requires a comprehensive reevaluation of existing policies and the introduction of effective strategies to rejuvenate and sustain population growth.

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3. Fertility Rate in China and Its Significance

3.1. Current Fertility Rate of China's Population

Today's world population problem has become a prominent problem. Many countries around the world have fallen into the "low fertility trap". China's total fertility rate is about 1.2, far lower than the world recognized 2.1 to maintain the normal replacement level of population replacement. Therefore, China also faces the possibility of falling into the "low fertility trap". In 2016, China implemented the "universal two-child" policy, with the purpose of preventing "getting old before getting rich" and overcoming the "silver crisis", but the implementation effect of the policy is far from expected. The United Nations population agency released the 2017 edition of the world population outlook is expected: the end of the 21st century China's population will appear "V" reverse, accelerated in the state of low fertility fell below 1 billion to 613 million, and more than half of them are the elderly, namely China in less than one hundred years, will reverse from the population explosion for population collapse (Figure 1).

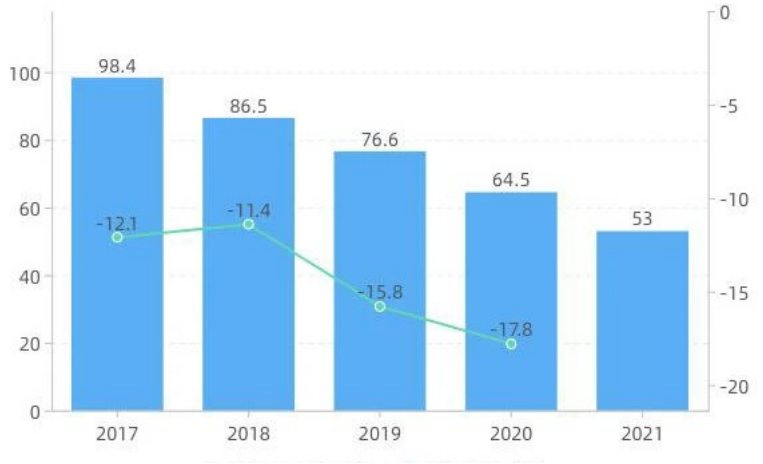

Figure 1: Fertility trends in China during 2017-2021 [9].

3.2. The Disadvantage of Low Fertility in China-labor Reduction

Due to the reduction of labor population, the shortage of human resources will lead to the lack of economic development power, which seriously hindering the economic development of the countryFeichtinger Gustav & Wrzaczek Stefan concluded by studying the relationship between Japan's birth rate and economic growth rate that the aging and contraction caused by long-term low fertility rate are the main reasons for Japan's long-term economic downturn, and the most prominent manifestation are the lack of innovation and entrepreneurial ability and slow technological progress Feichtinger Gustav & Wrzaczek Stefan[10]. The shortage of labor force not only restricts the economic development, but also affects the allocation of national defense forces due to the lack of human resources, thus challenging the national security guarantee. To sum up, the population structural imbalance caused by the low fertility rate will bring adverse effects on economic development, social stability, national defense security, personal happiness and other aspects.

3.3. China Faces the Increasing Population Aging

With fewer children and the longer life span of the population, the aging phenomenon will become more serious. According to the data in the 2016 Statistical Bulletin on Social Service Development released by the Ministry of Civil Affairs in August 2017, by the end of 2016, there were more than

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230 million people over 60 years old, accounting for 16.7% of the total population, among which the population aged 65 and above accounted for 10.8% of the total population. It will reach 243 million in 2020 and exceed 300 million in 2025. China is the only country in the world with an elderly population of over 100 million, with the largest aging population in the world and the highest development speed of aging in the world Gadenne Clara[11].When the proportion of aging exceeds the number of fewer children, a dangerous inverted pyramid population structure will be formed, which will make the population lose its balance ability, development ability and risk resistance ability, and seriously hinder the development of society and economy.

4. Correlation Analysis Between Fertility Rate and Socio-economic Development

From the perspective of human capital theory, the human resources in the three elements of productivity can be further divided into different types of talents according to the degree of technical knowledge, and the output of talents brought by talents with high knowledge and technology is obviously higher than that brought by talents with low knowledge and technology. The rapid development of many developed countries is also due to the increase of human capital, which is far greater than the increase of labor force and material capital, and the contribution to social output and economic growth. At the same time, innovation is the main driving force of industrial upgrading and social progress, and high-knowledge and technical talents are the main force of innovation in the whole society. Therefore, the increase of high-tech knowledge talents and the increase of human capital will be conducive to the improvement of the overall innovation ability of the society. So, we can also think that the birth rate decline for labor quality rise provides a good opportunity, although the demographic dividend gradually disappears, the number of labor factors supply presents a downward trend, but with the improvement of labor quality, talent dividend will slowly highlight, and have a certain role in promoting economic growth. To sum up, low fertility rate is both an opportunity and a challenge for China's future economic development. We should actively take reasonable measures to seize the opportunity and reduce the negative impact as much as possible.

5. Solution to a Low Fertility Rate

5.1. Handle the Relationship Between Economic Development and Fertility Rate Well

Although some scholars point out that when the HDI value reaches the critical value of 0.86, HDI and TFR will change from negative correlation to positive correlation, that is, after the economic development to a certain level can rely on economic development to achieve the automatic recovery of fertility level. However, the HDI of Shanghai and Beijing, with high degree of economic and social development in China, has reached the inflection point level, but TFR does not appear "anti-J" law. In addition, when studying the impact of China's family planning policy and economic development on the total fertility rate, it was found that with the passage of time, the influence of policy factors decreased, while the effect of economic development increased. In 1990, the effect of family planning policy on the total fertility rate was greater than that of economic development. But by 2000, economic development was even more effective. By 2010, the effect of the family planning policy on the total fertility rate was not significant Zhen Guo [12]. Therefore, correctly handling the relationship between economic development and fertility rate is the key to solve our population problem. Foreign scholars study more from the overall level of economic development, and we can combine with the present situation of China, from the transformation of economic development model, financial markets, economic risk, human capital, population flow, employment migration to study the influence on fertility, strive to promote economic development improve fertility at the same time. China is a country in transition. The analysis of the relationship between economic development level

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and fertility rate by foreign scholars must consider the influence of transformation factors on China's economic development and its influence on the fertility rate when being used in China.

5.2. Handle the Relationship Between Policy and Fertility Rate Well

According to Chaoze Cheng, China has fallen into the trap of endogenous low fertility, which is characterized by culture, willingness and endogenous Chaoze Cheng [13]."A new reproductive culture has been formed among the modern new generation population, which is the selective low fertility culture and even the dink culture of no birth". Our country is in the transition from restricted policy to encourage fertility policy stage, in the face of the current population fertility, domestic scholars from the fertility, fertility, fertility behavior, fertility policy was studied, points out that China's population reproduction is facing cliff avalanche phenomenon, must improve the fertility of childbearing age population, even put forward full open fertility, the policy of encouraging fertility. Scholars have put forward many countermeasures to encourage childbirth, such as suspending social maintenance fees, implementing the maternity fund system, giving subsidies to families with children, extending maternity leave, increasing the investment in social public services for raising children, and even proposed the proposition of levying taxes on DINK families.

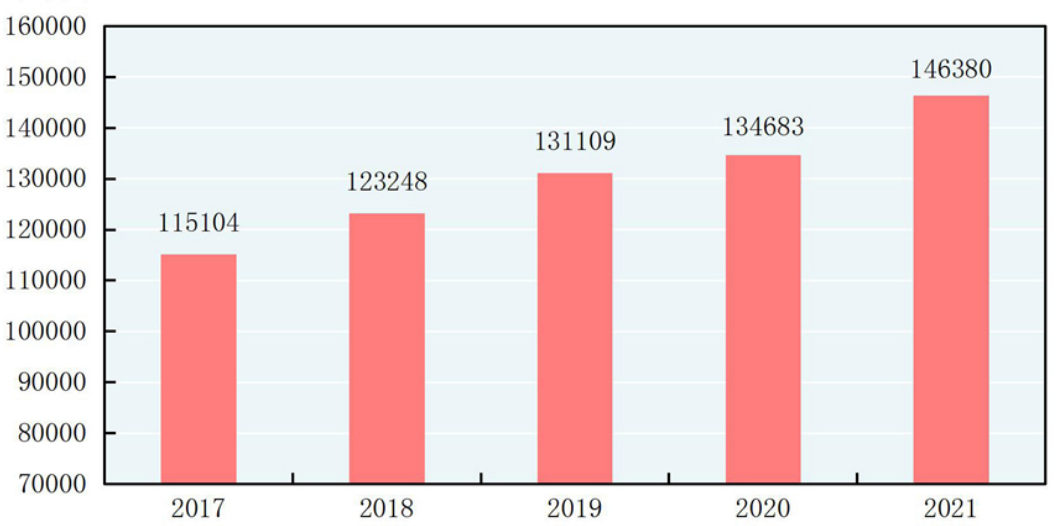

Figure 2: China's birth rate during 2017-2021[14].

At the practical level, the Liaoning Provincial government has also issued the Population Development Plan of Liaoning Province, taking the lead in proposing more incentive policies to families who have a second child Liaoning Province. In the process of formulating various policies, the following relations should be handled: (1) the relationship between reproductive rights and policies. Birth right is a natural human right and inviolable, the need of family happiness, social harmony, population optimization and national rejuvenation, because right poverty is the root of economic poverty and civilization backwardness. Therefore, neither the policy to reduce the fertility rate nor the policy to raise the fertility rate should violate the reproductive right. We should let everyone decide whether to live or not and achieve free birth (2) Handle the relationship between the law of fertility rate and policy. Is the fertility rate changing regularly? This is controversial, but the trend analysis of the fertility rate can be referred to in our policy formulation. For example, scholars believe that the current low fertility rate has changed from policy, mandatory and exogenous to cultural, voluntary and endogenous, so the relevant fertility policies in order to improve the fertility rate should encourage people to take the initiative to produce more births instead of blindly punishing

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less or no births through policies. (3) Handle the relationship between short-term birth policy and long-term fertility policy. With policy to adjust the fertility rate is a common practice, fertility changes are influenced by many factors, we must deal with the relationship between short-term and long-term, not only to prevent interest groups make fertility policy curing, but also from promoting the comprehensive development of human beings and protect the population balance development of two dimensions to consider, the long-term human well-being and short-term ecological population of unity.

6. Conclusion

To sum up, a scientific population system can not only promote the balance of population structure, moderate population size and improvement of population quality, but also promote the sustainable development of a country's economy, social harmony and stability and the happiness of residents. Of course, in addition to the population system, other related systems, such as political system, economic system, social security system, employment system and so on. It is an important field to study the relationship between population and economics to discuss the relationship between population and system.

Although the current fertility rate is very low, it is unlikely to fall to the "ultra-low" level reached in Europe, Japan and South Korea, another view is that China has entered the "low fertility trap", because as an ideology, the ultra-low fertility rate and the reality of China, China has actually entered the "low fertility trap". We are more inclined to favor the latter.

For the national fertility rate and social and economic development research, there are some possible limitations and future research directions. Studying the relationship between fertility rate and social and economic development requires a large amount of data to support it. However, missing or inaccurate data may be problematic due to historical reasons and the difficulty in data collection. It is also a challenge which variables to study the relationship between fertility rate and social and economic development. For example, economic development, medical conditions, education, birth policy, etc. may affect fertility rate, but how to choose and treat these variables in research needs to be considered with caution.

To study the relationship between fertility rate and social and economic development, appropriate research methods are needed. For example, statistical methods, such as regression analysis, structural equation models, can be employed, but other social science theories and methods may need to be combined when processing and interpreting the results. In addition to the known factors such as economy, medical conditions, education and fertility policy, there may be other unknown factors affecting the fertility rate. For example, social and cultural factors, policy implementation effect and so on. fertility rates in China vary significantly among different regions and population groups, which may be related to regional economic development level, cultural background, policy implementation and other factors. Therefore, the study of these differences contributes to a more comprehensive understanding of the relationship between fertility rate and socioeconomic development.

In addition to studying the impact of fertility rate on social and economic development, the impact of social and economic development on fertility rate can also be studied. This can help us to understand the interaction and influence between fertility rates and socioeconomic development. The changes in fertility rate may affect the population structure, and thus affect the development of the population aging problem. Therefore, studying the relationship between fertility rate and population aging can help us to better understand the development trend of population aging problem.

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