

The Influence of Population Aging on Economic Growth and Countermeasures

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Abstract: The data from the seventh population census in 2020 shows that China's population is aging further, and the long-term and rapid aging phenomenon will have a huge impact on China's economy. Therefore, the extensive repercussions that demographic expansion and the aging populace exert on economic proliferation have arouse wide concern. This paper will use theoretical analysis to explore the influence of the aging demographic on economic growth from the four aspects of effective labor supply, savings and investment, enterprise innovation, and social security, and put forward some policy suggestions to deal with these shocks. The research finds that population aging will affect the effective labor supply and reduce the savings rate. The effect of enterprise innovation will be weakened in promoting population aging and the social security system: the pension insurance system and the medical insurance system will be seriously influenced. Therefore, this paper summarizes how population aging has some influence on China's economic growth from the above four perspectives, and puts forward some suggestions in order to alleviate the bad impact of population aging on economic development. It is suggested to improve the family planning policy, delay retirement, strengthen basic education, encourage technological innovation in enterprises to alleviate the problem of an insufficiently effective labor force, and establish a fully covered pension system to ensure the elder people lead a high-quality life.

Keywords: Aging population, economic growth, labor supply, enterprise innovation, social security.

1. Introduction

According to the National Bureau of Statistics, China has entered the aging society as early as 2000. By the end of 2021, the number of elderly people aged 65 and above will account for 14.2 percent of the total population. According to the seventh census, 18.70% of the population is aged 60 or older. It is clearly that the problem of population aging in China is more and more serious, and it is crucial to correctly understand the impact of population structure change on economic growth. Through theoretical analysis, this article analyzes the impact of China's aging population on economic growth from four aspects: effective labor supply, investment and savings, enterprise innovation, and the social security system. There has been a steady decline in working-age population since 2010, resulting in insufficient effective labor supply. Zuo Xuejin finds that China's total population and the number of people in working age continue to decrease sharply, and the economic growth rate will be further slowed down; the consumption structure will change, and both the investment rate and savings

rate will fall; the innovative thinking of enterprises is weakened, which will affect the social production efficiency; the burden of pension increases and the cost of medical insurance increases, which has a great impact on economic growth [1]. In this regard, this paper puts forward some policy suggestions to alleviate the negative impact of population aging on economic growth: it is suggested to improve the family planning policy, delay retirement, strengthen basic education, encourage technological innovation in enterprises to alleviate the problem of insufficient effective labor force, establish a full-coverage tiered pension system to ensure the elder people can lead a superior life, and reduce pension expenditure.

2. Analysis of the Characteristics of China's Aging Population

2.1. Population Aging is Fast-paced

Industrialization and the family planning policy have led to a sharp decline in China's fertility rate. The development and progress of modern medical treatment have increased the life expectancy of the Chinese population. Statistics from the National Health and Development Commission show that life expectancy has risen from 67.77 years in 1981 to 78.2 years in 2021. Declining birth and death rates have directly contributed to China's rapid population aging. The statistics of the National Health and Construction Commission indicate a surge in the elderly population (60+) to over 300 million by the end of the 14th Five-Year Plan, exceeding 20% of the total, initiating moderate aging. By 2035, this figure is projected to exceed 400 million, accounting for over 30%, ushering in severe aging. This demographic shift will significantly impact China's labor supply.

2.2. "Getting Old before Getting Rich"

The one-child policy implemented in 1980 has resulted in China's aging population in a relatively short period of time. The aging of China's population came when the economy was not yet developed and industrialization was not yet complete. Unlike some developed countries, the aging of the population is a natural development process over a longer period of time, and the problems it is plagued with can be gradually solved. For example, Germany's per capita GDP reached \$21,031 in 1972 when it entered a moderately aging society (14% of the population over 65 years old), while China's per capita GDP was less than half of that when it entered a moderately aging society. Therefore, China's aging population is characterized by "getting old before getting rich". This means that once the aging population becomes a constraint on economic growth, China's economy will face relatively severe challenges, and the task of coping with the aging population and economic development is very arduous. Du Yang suggested that, from a macro point of view, improving the efficiency of resource use in dealing with aging and adhering to the principles of wide coverage and low level of security should become a long-term strategy. From a micro point of view, it will also be a long-term challenge to deal with poverty related to population aging [2].

3. Analysis of the Impact of Population Aging in China

3.1. Analysis of Effective Labor Supply

3.1.1. Relationship between the Number of Labor Forces and GDP Growth

From the perspective of supply and demand, a decrease in the proportion of the working-age population was caused because of the population aging, and leads to a decline in the labor participation rate. Bloom and Williamson used the data of 78 countries from 1965 to 1990 and combined it with the Harvard model to draw the conclusion that if there is a 1% increase in the working-age population, the GDP per capita will raise by 1.46% [3]. It can be seen that, from a global

perspective, the proportion of the working-age population is positively correlated with the economic growth rate. Economic growth theory indicates that the size of the labor market is a significant factor that affects national output. Based on the corresponding estimation parameters and population forecast data, Du Yang and Feng Yonggang speculated that, if other conditions remain unchanged, the rapid population aging alone will reduce the average annual economic growth rate of China by about 1% in the next five years [4]. Therefore, the proportion of the working-age population will be influenced by the aging demographic, which will have a negative impact on overall economic growth. As can be seen from the data from the National Bureau of Statistics, since China entered the aging stage in 2000, the ratio of the people in working-age has been declining year by year. Such a rapid decline in the labor force will make China's labor price rise, which in turn will have a great impact on China's "demographic dividend" advantage and further slow down economic growth.

3.1.2. The Quality of the Labor Force

The economy in China is undergoing a transformation towards a phase of superior-grade development. China is also shifting from a "demographic dividend period" to a "talent dividend period" due to an aging population. According to the Ministry of Education, China's spending on education accounts for only 4% of GDP. According to data released by the World Bank, China's education expenditure is slightly lower than the world average of 4.3%. It is much lower than that of some high-income countries. And there is a big difference between urban and rural educational resources in China. Due to the impact of China's urbanization and population flow, China's compulsory education will face the problem of "difficult enrollment" in urban areas but "no student source" in rural areas. Therefore, population aging has a direct impact on the effective labor supply, thus affecting the total factor productivity, which in turn has a bad effect on the growth of the economy.

3.2. Savings Rate and Investment Rate

Soyoung Kim and Jong-Wha Lee believe that will reduce the number of savers will be effected by the increasing number of elder people and thus reduce the scale of savings [5]. In the life cycle hypothesis, Modigliani & Brumberg argued that the income of working-age people is greater than their consumption, so they are savers [6]. In old age, however, they spend on medical and health care. It can be concluded that an aging population leads to a decrease in the number of working-age people, which in turn leads to a decrease in the scale of savings. Relevant statistics also confirm this conclusion: China's savings rate rose from 36.7% in 2000 to a peak of 50.7% in 2010, and then declined gradually after 2010, reaching only 44.2% in 2019. On the basis of predicting the world population development trend before 2050, Bloom et al. believe that population aging will reduce labor participation rates and savings rates, which will lead to a slowdown in economic growth [7]. Based on the analysis of aggregate supply and aggregate demand, Su Jian concluded that there is a negative relationship between population aging and economic growth [8]. High savings and high investment are the main driving forces of China's economic growth. The improvement of production technology has promoted the rise and development of new industries and high-tech industries, thus improving the income level. Therefore, savings are positively correlated with economic growth, while population aging will have a bad impact on the savings rate. Demographic changes, typically characterized by an aging population, will have a negative impact on the long-term savings rate and a further impact on investment. A country's investment is mainly derived from domestic savings and net investment inflows. Other things being equal, a lower savings rate due to aging will naturally lead to a lower investment rate. China's investment rate has fallen from a peak of 47% in 2011 to 43.1% in 2019. According to forecasts, China's investment rate will further decline in the future. Therefore, China's future economic growth will mainly rely on technological innovation.

3.3. The Impact of Technological Innovation on Enterprises

The influence of population aging on enterprise technological innovation can be seen in two aspects. From the perspective of innovation input, on the one hand, the increasing number of elder people will lead to an improvement of labor costs and social security expenditure, resulting in an increase in corporate tax burden and a "crowding out effect" on the R&D input of enterprises [9]. On the other hand, technological progress will overcome the diminishing marginal output limit of labor and physical capital, and increase the return on capital. It will adjust the effect of aging demographics on economic development through technological innovation, weaken the impact of labor force reduction on economic development, and cause the "crowding out effect" on enterprise innovation. The reverse force effect is mainly manifested in the reduction of demand for labor-intensive industries, which leads to technological progress, but the process takes a long time. Therefore, from the perspective of innovation input, the aging population will inhibit enterprise technological innovation in the short term. From the perspective of innovation efficiency, due to the influence of factors such as physical health, professional skills, and learning ability, innovation ability and innovation consciousness will decline with age. Population aging will also have a bad effect on the quality of labor, which will weaken the innovation efficiency of enterprises and increase the difficulty of enterprise training. Therefore, from the perspective of innovation efficiency, the degree of population aging is negatively correlated with the innovation efficiency of enterprises. The improvement of enterprise innovation levels at the regional level can promote high-quality economic development, but population aging will inhibit this promotion effect. At the same time, scientific and technological innovation can adjust the adverse influence of negative growth on the population and economy [10]. Although the negative growth of the working-age population will inhibit economic growth, scientific and technological innovation can significantly reduce this adverse impact. Scientific and technological innovation can also optimize the structure of industry, speed up the water regression of traditional industries, and promote the rise of new industries and new business forms, thus promoting the adjustment and transformation of economic structure. Therefore, China should strengthen scientific and technological innovation, increase investment in education, and cultivate relevant talents. Thus, the impact of an aging population on economic growth can be mitigated.

3.4. Impact on the Social Security System

3.4.1. Impact on Pension Insurance

The old-age dependency ratio is increasing year by year. In the context of an aging population and a low fertility rate, the old-age dependency ratio is rising year by year, and the number of retirees receiving pensions relative to the number of workers paying pensions is increasing year by year. As a result, the income from pension insurance funds is smaller than the expenditure, which has a negative influence on economic growth. Zuo Xuejin believes that the demographic shift towards aging directly impacts the financial stability and balance of payments in the core social security system, and uses the CGE model of China's aging society to predict that by 2100, the cumulative loss or debt of China's basic pension insurance will reach 260% of GDP [1]. Due to the limited coverage of basic pensions in rural and urban areas, they will face the problem of inadequate pension income after they lose the ability to work. In the future, the problem of pension adequacy for China's rural elderly and those working in urban areas will become more prominent. Therefore, it is of great importance to establish a national unified basic pension to ensure the lives of the elder people in both countries and cities. It can be seen that the rapid aging of the population has put great stress on China's social pension system and, meanwhile, has had a great impact on economic growth.

3.4.2. The Impact of Medical and Health Services

An aging population will lead to an increase in expenditure on basic medical insurance. In terms of medical expenses, the medical expenses of people aged 65 and above are about four times or more than the medical expenses of people under 65. It can be seen that the aging of the population increases medical expenditure. Meanwhile, the population of elderly people who are unable to take care of themselves or are semi-independent is increasing rapidly, which will have a great impact on the elderly care system and the public health and medical system. Due to China's low natality and the shortage of people of working age, the elderly care service industry faces a serious human resource problem. In this regard, medical and health institutions can directly connect with universities, strengthen school-enterprise cooperation, increase the number of laborers engaged in the elderly care service industry, and improve the professional skills of medical personnel. For the purpose of coping with the influence of an aging population on medical and health services, early prevention and treatment should be encouraged, and investment in medical insurance and health service institutions should be increased to ensure people's health.

4. Suggestions on Policy Measures

4.1. Fertility Policy Perspective

On the one hand, it is necessary to improve the family planning policy so that it covers all the population of childbearing age both in the city and countryside and thus improves its effectiveness. It is suggested that, in the context of China's primary fertility rate, in order to avoid further decline in fertility level and the problem of falling into the "low fertility trap", the birth restriction should be completely lifted in terms of policy [11]. On the other hand, in order to build a childbearing-friendly society and implement active supporting policies for childbirth, Chen Yaner et al. suggested focusing on the two core issues of "fertility" and "parenting", improving supporting policies for childbirth, improving supporting facilities for childbirth, providing economic assistance to families giving birth, and reducing the burden on families in housing, childbirth, parenting, and education [12]. Women's employment should be guaranteed, gender discrimination should be eliminated, and the employment structure should be optimized. We should help women better balance family and careers.

4.2. Increase Labor Force Participation

On the one hand, Chen Chuanming pointed out that an important measure to improve the labor participation rate is to increase the rural labor participation rate. With a large rural population in China, the phenomenon of hidden unemployment is relatively serious [13]. Therefore, solving the rural labor force participation rate is an important measure to improve the labor participation rate. On the other hand, retirement age should be delayed to make full use of the elderly labor force. Chen Yaner et al. suggested that the top-level design of human resources development for the elderly should be strengthened, and elderly talents should be included in the overall talent strategy layout. To maximize the utilization of the experience and ideas of the elder employees, and further innovate on this basis [12]. Make a reasonable retirement age according to the concept of prospective age proposed by Sanderson and Schbov [14]. Zuo suggested that the retirement age could also be defined according to the need to break even on pension payments. Adjust the retirement age according to the above two methods, so that the support ratio of the pension system will rise. And then fully develop the old labor resources of those who are willing to work.

4.3. Promote Technological Progress

Promote scientific and technological innovation to cope with the impact of an aging population. At the enterprise level, increase investment in research and development departments to improve their productivity. At the national level, on the one hand, the period of compulsory education should be extended to the senior high school stage, and education expenditure should be increased. The government should strengthen basic education, balance the educational resources in cities and countryside, and improve the overall quality of China's labor force. Wang Guangzhou and Wang Jun point out that the population of higher education will peak around 2035, which will help higher education shift its goal to improving the quality of education and effectively transfer and divide limited educational resources [11]. Encourage technological innovation, develop labor-saving industries, and promote the transformation of industrial structures so as to mitigate the impact of aging on economic growth. On the other hand, cooperation between schools and enterprises should be strengthened to cultivate high-quality and compound employment talents, encourage vocational education, and improve the production efficiency of the labor force.

4.4. Improve the Social Security System

The government should improve the social security system and realize full old-age pension coverage in all regions, establish a flexible pension system, improve the basic pension system, and establish a unified first-tier pension system across the country. Zuo Xuejin proposed that the first-tier pension should be set at 6% of China's per capita GDP [1]. On this basis, a multi-level income security system for the elderly, including enterprise annuities and personal pensions, will be established to ensure that "the elderly have their own livelihood". Du Yang pointed out that the fairness and sustainability of basic pension benefits can be improved by integrating the pension system at the national level. By raising the overall level of pension insurance, the efficiency of management and use of pension resources can be improved, and the sustainability of the system can be improved. The government should accelerate the transformation of the pension industry while balancing the public welfare and profitability of the pension service industry, and enterprises should expand financing channels on this basis to achieve the upgrading of the pension industry.

5. Conclusion

China's aging population is a serious problem and has caused a serious negative impact on the economy. The main characteristics of China's aging population are the rapid aging of the population and the serious problem of "aging before getting rich". This paper not only analyzes but also concludes that population aging will lead to a decrease in the number of effective labor forces and a need to enhance the ability of the manpower; the increase in the elderly population will lead to a decrease in the investment rate and savings rate and a decrease in the innovation efficiency of enterprises. However, scientific and technological innovation can alleviate the impact of population aging on economic growth and promote industrial transformation, and the burden of social security systems, for example, pension insurance and medical insurance will increase and need to be improved. In turn, it will have a great negative impact on economic growth. This article discusses the adjustment of birth policy, the perfect birth-supporting policy, raising the labor participation proportion of the people in rural areas, and delaying the retirement age, so as to improve the total labor participation rate of China; increase enterprise innovation input, realize the transformation of enterprises into "labor-saving enterprises", increase the length of basic education, and balance urban and rural education resources so as to promote scientific and technological innovation; establish a flexible pension system to achieve full pension coverage, and at the same time, realize the transformation and development of the pension service industry from the perspective of the government and enterprises,

so as to improve the social security system; the four perspectives put forward policy suggestions on coping with the adverse effect of aging demographic on the development of economy. The purpose of this paper is to analyze and summarize the scholars' research on the impact of population aging on economic growth, identify the current problem of population aging in China, and put forward relevant policy suggestions and solutions. This paper does not carry out empirical analysis, but only some theoretical analysis. Through further study of economics, the author will carry out empirical analysis of these models in the future and further put forward more appropriate suggestions and solutions.

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