ISSN 2664-3995 (Print) & ISSN 2664-6757 (Online)
South Asian Research Journal of Business and Management
Abbreviated Key Title: South Asian Res J Bus Manag

| Volume-4 | Issue-2 | Mar-Apr -2022 | DOI: 10.36346/sarjbm.2022.v04i02.003

Review Article

The Impact of Important Policys on the Financial Situation of China's Public Pension Fund: A Literature Review

Chen Xiaohua[1*]
[1]School of Finance, Jiangxi University of Finance and Economics, Nanchang, Jiangxi, China

***Corresponding Author:** Chen Xiaohua
School of Finance, Jiangxi University of Finance and Economics, Nanchang, Jiangxi, China

Article History
Received: 05.01.2022
Accepted: 08.02.2022
Published: 22.03.2022

Abstract: Mainly due to the impact of COVID-19 and the reduction of the basic pension insurance contribution rate paid by work unit to 16% in *the Comprehensive Scheme for Reducing Social Insurance Contribution Rates*, nearly one-third of China's provinces' public pension funds have experienced the phenomenon that revenue does not cover expenditure, which makes the sustainable operation of the public pension insurance system face more severe challenges. Moreover, in recent years, some policies issued by the Chinese government have some complex impacts on the sustainability of basic pension insurance. It is urgent to sort out the impacts of these significant policies on China's public pension insurance funds, which is conducive to summarizing some useful enlightenment from the existing literatures. It can provide the reference for the government to further reform the system and improve the sustainable operation of China's public pension insurance.

Keywords: Public pension insurance; policy impact; financial situation.

I. INTRODUCTION

The public pension system involves the basic interests of employees in various countries, and its sustainability directly determines whether employees can get the basic living security level after they retirement. Because it involves a wide range of people, once a serious payment crisis occurs in the system, social stability will be endangered. The increasingly serious problem of population aging will make the sustainable operation ability of the public pension system more fragile. Moreover, as COVID-19 has caused serious damage to the economic growth and social development of various countries, the sustainable operation of the public pension system is facing a more severe situation. Thus, in this complex situation, how to ensure the sustainable operation of the public pension system has become a difficult problem faced by countries all over the world, and it has received close attention from governments.

The sustainability of China's public pension system is also not optimistic. According to *the China Labor Statistics Yearbook 2020*, as of the end of 2019, the public pension funds for urban employees in 10 of China's 31 provinces had the problem that the current contributions did not meet the current pension expenditures. These 10 provinces are: Inner Mongolia, Liaoning, Jilin, Heilongjiang, Zhejiang, Jiangxi, Shandong, Sichuan, Gansu and Qinghai, of which Heilongjiang Province is particularly severe, has a cumulative deficit of 43.37 billion yuan. With the continuous deepening of China's aging population, without additional financial subsidies, it is expected that more and more provinces will face the dilemma that the current contributions of pension insurance cannot cover the current pension expenditures, making the public pension fund for urban workers gradually out of pocket at the national level, which poses a very serious challenge to the sustainability of China's public pension system.

Some important policies issued by the Chinese government will have some sustained and in-depth effects on the sustainability of China's public pension system. For example, the State Council officially issued "*the Implementation Plan for Transferring Part of State-owned Capital to Enrich Social Security Funds*" in November 2017, referred to as "state owned capital transfer policy", and issued "*the Notice on Establishing the Central Adjustment System for Basic Pension Insurance Funds for Enterprise Employees*" in June 2018, formally establishing the central adjustment system of pension insurance fund. The "*National Tax and Local Tax Collection and Management System Reform Plan*" pointed out that starting from January 1, 2019, basic pension insurance premiums, basic medical insurance premiums, and other social insurance premiums will be handed over to the tax department for unified collection, which also can be called the Reform of Collection System. In May 2019, the government issued *the Comprehensive Scheme for Reducing Social Insurance Contribution Rates*, which pointed out that the contribution rate of basic pension insurance paid by work units for urban employees can be reduced to 16%, and the calculation caliber of average wage is adjusted to the average wage of employees in urban non private units and in urban private units. This policy can be abbreviated as the "policy of reducing contribution rate". These above policies will have some profound impacts on China's public pension system. At present, the academic circles are also very rich in relevant literature research in this regard. In view of the in-depth impact of policies on the public pension system and the current severe situation facing China's public pension system, it is urgent to conduct a systematic literature review of these existing studies in order to sort out the specific impact conclusions of policy factors. From this, we can get inspirations for the government to take further measures to deal with the current complex situation, improve the sustainable operation ability of China's public pension system, and ensure that pensions for retirees are paid in full and on time. Thus, this study has very important and practical value.

II. Literature review of the effects of some significant policies

At present, Chinese academia mainly discusses the impacts of important policy factors on the financial situation of China's public pension system, such as the state-owned capital transfer policy, the policy of reducing the contribution rate, the fertility policy, the delaying retirement, the policy of levying system reform and the policy of central adjustment fund system, and summarizes the literature on the impact of these policies respectively.

A. *The impact of state-owned capital transfer policy on the financial situation of China's public pension system*

The state-owned capital transfer policy refers to transferring part of the state-owned capital to enrich the social security fund in order to improve the payment pressure and gap of the public pension insurance fund. This policy will have an in-depth impact, which has been studied in many literatures. Xiao and Chen (2015) believe that repayment of hidden pension debts through capital injection by partial transfer of state-owned capital is feasible in theory and practice, and in the process of transfer practice, the legal and actuarial balance of basic principle should be adhered to. Dong and Zheng (2020) constructed an interval minimum contribution rate function and simulated the impact of state-owned capital transfer on the rate of basic pension insurance in the next 30 years, and they believe that if the transfer ratio is 10%, the minimum contribution rate will drop by 1.1 to 2 percentage points; if the transfer ratio is 30%, the rate will drop by 5.7 percentage points. Deng and Zhang (2020) also discussed the impact of the transfer of state-owned capital on the space for the decline of the contribution rate of basic pension insurance for enterprise employees by building an actuarial model. They believe that although the transfer of state-owned capital can provide a certain space for the decline of the contribution rate of pension insurance, the space for the decline is very limited. If the proportion of state-owned capital transfer is increased, the space for the decline of the contribution rate can be further improved. Jing et al. (2020) investigated the impact of state-owned capital transfer policy on economic growth rate and pension replacement rate by constructing an overlapping generation model with state-owned capital transfer mechanism, and believed that state-owned capital transfer will inhibit economic growth while increasing pension replacement rate.

B. *The impact of the policy of reducing contribution rate on the financial situation of China's public pension system*

The policy of reducing the contribution rate mainly refers to reducing the contribution rate paid by the work unit of public pension insurance for employees. The *Comprehensive Scheme for Reducing the Social Insurance Rate* have reduced the contribution rate from the previous 20% to 16%, which will have some important impacts. Chen (2017) used the measurement method to explore the impact of reducing the contribution rate of pension insurance on the income index of the fund, and believed that reducing the contribution rate can improve the compliance rate, coverage rate and wage growth rate, thus improve the short-term fund income, but will increase the income and expenditure gap of the long-term fund. Qi (2019) believed that reducing the contribution rate of pension insurance paid by units would further expand the pension gap, so it is necessary to implement the delaying retirement policy and the state-owned capital transfer policy as soon as possible to delay the expansion of the gap. Guo and Zhang (2019) simulated and calculated the impact of the reducing the contribution rate policy on the income and expenditure balance of the basic pension insurance fund for urban employees, and believed that the policy of social security would have an obvious "crowding-out effect" on the income of the fund, and consolidating the payment base is the material basis for the implementation of the reducing the contribution rate policy of social security. Zeng and Li (2019) simulated the impact of reducing the contribution rate on the sustainability of the pension fund by building an actuarial model, and believed that the policy would not last long without the impact of other policies; In order to reduce the payment burden of enterprises and employees and ensure the sustainable operation of the fund, the government should encourage to improve the compliance rate and implement policies such as delaying retirement as soon as possible. Yang and Chen (2021) simulated the impact of reducing the contribution rate policy on the long-term finance of the basic pension by constructing an actuarial model, they believed that the policy would significantly worsen the financial situation of public pension fund in the early prediction stage, but improve the long-term financial situation in the later stage.

C. *The impact of the fertility policy on the financial situation of China's public pension system*

The fertility policy mainly refers to the "comprehensive two child" policy, that is, a couple in China can have two children, from some couples can have two children to all couples can have two children. This policy will have some important impacts. Luo et al. (2010) measured the impact of changes in demographic factors on the income and expenditure of basic pensions and individual account pensions, and believed that the increase in the fertility rate of women of childbearing age by age and the increase in retirement age are all conducive to the balance of funds. Sun et al. (2011) simulated the development trend of urban basic pension gap under different family planning policy adjustment schemes, and believed that gradually liberalizing the second child birth policy is conducive to improving the financial sustainability of the pension system. Tang and Wu (2016) simulated and calculated the changes in the balance of income and expenditure of the pension fund for urban employees under different implementation effects of the "comprehensive two child" policy, and believed that the implementation of the policy was conducive to the balance of income and expenditure of the fund, but the effect of the policy began to appear in 2037. Zeng *et al*. (2016) simulated and calculated the impact of the adjustment of fertility policy on the financial situation of China's pension insurance fund by constructing an actuarial model, and believed that under different "comprehensive second child" fertility wishes, the time point of the fund's cumulative deficit will be delayed, that is, the policy can alleviate the payment pressure of the pension insurance fund. Xiao and Deng (2017) simulated the impact of the "comprehensive two child" policy on the financial situation of the basic pension insurance pooling fund for urban employees by building an actuarial mode, they believed that although the policy could not delay the time when the current balance of the fund was in deficit, it could effectively alleviate the pressure of fund payment in the future. Shi and Chen (2017) simulated the impact of the "comprehensive two child" policy on the financial revenue and expenditure of the social pooling fund of basic pension insurance for employees by constructing a population prediction model and a fund revenue and expenditure model, and believed that the policy could improve the financial situation of the social pooling fund. By building an actuarial model, Wang *et al*. (2017) simulated the impact of the comprehensive second child and delaying retirement policies on the income and expenditure balance of the basic pension insurance fund for urban employees, and believed that both policies would delay the time point of the short-term and long-term income and expenditure deficit of the pension fund and alleviate the payment pressure of the fund. Zhang and Tao (2017) simulated the impact of the "comprehensive two-child policy" on the income and expenditure of basic pension insurance for urban employees from 2016 to 2100 by building an actuarial mode, they believed that if the fertility rate increased, the starting year when the expenditure of the pooling pension fund was greater than the income would be delayed accordingly, which could alleviate the payment pressure of the fund to a certain extent. Li and Luo (2018) simulated and calculated the financial situation and change trend of the basic pension insurance fund for urban employees in Shanghai by building an actuarial model, they believed that the "comprehensive two-child" policy could not reverse the trend that the fund's revenue could not cover its expenditure, nor could it curb the growing trend of the pension gap. Wei and Wang (2019) analyzed the impact of the "comprehensive two-child" policy on the social pooling account of the basic pension fund for urban employees by building an actuarial model, and believed that the policy would not change the trend of the expanding fund gap in the pooling account, and had limited effect on alleviating the pressure of fund payment. Wang and Chen (2020) used the actuarial model to simulate the impact of the "comprehensive two-child" policy on the financial situation of individual accounts of enterprise employees' basic pension insurance, they believed that the policy could improve the financial situation to a certain extent, but its effect was limited.

D. *Impact of delaying retirement policy on the financial situation of China's public pension system*

China has not yet officially implemented a delaying retirement policy, but the academic community has already started to explore the impact of delaying retirement. China's current retirement age policy is still the legal retirement age standard established in 1978: the current retirement age for male employees is 60, the current retirement age for female cadres is 55, and the current retirement age for female workers is 50. However, China is expected to implement a gradual delaying retirement policy during the 14th Five-Year Plan period (2021-2025). At present, the academic circles have different views on the impact of delaying retirement on the revenue and expenditure of pension insurance at home and abroad.

Some scholars believe that delaying retirement can alleviate the pressure of pension funds and enhance the sustainability of pension funds. Cremer and pestieau (2003), karlstrom *et al*. (2004), galasso (2008), and Breyer and Hupfeld (2010) have shown that extending the retirement age can improve the ability to pay of the pension insurance system. Yu and Zeng (2015), Jin *et al*. (2016) successively used actuarial models to simulate and analyze the financial situation of pension in China's social pooling account, and found that delaying retirement can reduce the gap scale of pension fund and increase the sustainability of China's social pension fund system. Tian and Zhao (2018), and Yu (2018) further simulated on the basis of the actuarial model and found that delaying retirement can significantly alleviate the payment pressure of the pension insurance fund and realize the sustainability of the financial situation of China's social pension insurance fund. Ren *et al*. (2018) believed that the policy of delaying retirement age would not only increase the pension income, but also reduce the pension payment, which would have a cumulative effect on the scale of pension funds and alleviate the aggravation of the payment pressure of pension funds in China.

Other scholars questioned the effect of delaying retirement to alleviate the payment pressure of pension insurance. Weller (2002), and Miyazaki (2014) found that delaying retirement is not only difficult to cope with the expansion of the pension gap, but also leads to the decline of the tax base, especially the pension treatment of low-income groups. And in the long run, delaying retirement is difficult to play a role in alleviating the pension payment crisis. Wang *et al*. (2010) believed that although delaying retirement could reduce the size of the fund gap in the short term, after delaying retirement, the fund gap would expand again due to the increase of its pension benefits standard. Yu (2012) believed that delaying the retirement age does not necessarily increase the ability to pay for basic pension insurance. Cao and Lu (2010) believed that even if delaying the retirement age can alleviate the pressure of pension payment, this effect is quite small and cannot fundamentally make up for the gap, and the problem of pension deficit in the future is still inevitable. Zou (2017) believed that delaying retirement could not solve the future pension fund deficit and other problems from the root, which would not only reduce the pension treatment of current workers after retirement, but also increase the pension burden of several new generations after retirement. Yang (2019) also believed that the delaying retirement policy is difficult to alleviate the dilemma of pension payment.

E. ***Impact of the collection system reform policy on the financial situation of China's public pension system***

The collection system reform policy refers to the reform of China's public pension insurance premium collection institution from the previous social security institution to the tax authority, which will improve the collection rate of pension insurance and have a series of effects. Zheng (2018) analyzed the three potential uses of the increased income part of the pension insurance premium based on the estimation of the increased income potential of the tax department, considered that the best scheme should hedge the increased income part from the reduced fee, and put forward a specific scheme to reduce the payment rate from 28% to 19%. Zeng *et al*. (2019) used the actuarial model to analyze the impact of reducing the contribution rate, the collection system reform and delaying retirement age on the basic pension insurance fund for urban employees, and believed that after the implementation of the collection system reform, the time point when the fund began to have accumulated deficits was delayed by 1-11 years. Shi and Zeng (2019a) calculated the operation, financial burden and financial subsidy scale of basic pension insurance for enterprise employees in the current period and after the collection system reform policy, and believed that for every 10% increase in collection rate, the year when the financial burden of pension first appeared was delayed by about 5 years, and the impact of collection rate on income of pension insurance fund was stronger than that on expenditure. Zeng *et al*. (2020a) analyzed the impact of the collection system reform on the space for the reduction of the contribution rate of public pension insurance, and believed that the collection system reform can increase the collection rate of pension insurance by 13.5 percentage points, and the increase in the collection rate will increase the income of the pension insurance fund. While ensuring the balance of fund revenue and expenditure and the unchanged pension treatment, the contribution rate of the pension insurance policy can be reduced to 21.82% from 2019 to 2025. Zeng *et al.* (2020b) used the actuarial model to analyze the impact of the full responsibility collection of public pension insurance premium by the tax department on the space for the reduction of the contributon rate of the basic pension insurance for urban employees, and believed that the full responsibility collection of the insurance premium by the tax department can increase the collection rate of pension insurance in China by 20.3-25.2 percentage points.

F. ***The impact of central adjustment fund system policy on the financial situation of China's public pension system***

The central adjustment fund system policy refers to the establishment of a central adjustment fund on the basis of the current provincial overall planning of basic pension insurance for enterprise employees, and the appropriate adjustment of pension funds in various provinces to ensure the timely and full payment of retirement benefits. This policy will have some important effects. Deng and Yang (2018) actuarially evaluated the income and expenditure balance of the urban workers' public pension pooling account from 2018 to 2040 under the background of national pooling, and believed that the pooling account fund would not have the dilemma of "income not cover expenditure" in the short term under the condition of national pooling. Xue and Zhang (2018) built an actuarial model to simulate and calculate the adjustment effect of the central adjustment fund system policy, and believed that the scheme of central adjustment proportion should be "low starting point, small overall planning and gradual", which has a great adjustment effect. Bian and Zhang (2019) believed that the change trend between the central adjustment proportion of pension and the balance gap of inter provincial pension insurance shows a "U" relationship, and the optimal adjustment proportion corresponding to the minimum inter provincial balance gap is 4.54%. Peng and Wang (2019) quantitatively measured the effect of different central allocation ratios on narrowing the regional gap of pension funds, and believed that the central adjustment system can narrow the fund gap between provinces in the short term, but with the gradual increase of the central allocation ratio, it will cause new unfair problems. Pei *et al*. (2019) believed that the implementation of the central adjustment fund system would not significantly improve the overall operation of pensions in inter provincial areas, but it can effectively reduce the operation differences of pension systems between regions. Fang and Wei (2019) used the actuarial model to measure the redistribution effect of the central adjustment fund system on the balance of regional pension funds, and believed that the system can significantly adjust the fund imbalance between regions, especially in the redistribution of funds between provinces with large fund balances and provinces with large gaps, And it can reduce the Gini coefficient of the number of reserve months paid by the regional pension insurance fund, but the improvement effect is limited. Shi and Zeng (2019b) built an actuarial model to simulate the impact of the central adjustment fund system on the sustainability of pension funds and financial subsidies in various regions, they believed that the system is conducive to improving the sustainability of pension funds in provinces with pension payment difficulties, but the adjustment effect is constrained by factors such as retirement age and collection rate. Xiao (2019) measured the policy effect of the central adjustment fund system and believed that increasing the proportion of transfer to the central government does not affect the direction and value of the adjustment rate of each province. After the implementation of the system, it will not affect the current total income and the total scale of accumulated balance of the fund at the national level, but it can effectively balance the pension insurance burden of various provinces and play a role of adjustment.

III. Enlightenments and further policy suggestions

By combing the research results of the impacts of the above six significant policies on the financial situation of China's public pension system, we can get some conclusions that these important policies affect the financial situation of public pension. The impact conclusion of the state-owned capital transfer policy is similar to that of the collection system reform policy, which both can help to improve the financial situation of the public pension system. The conclusion of the impact of the contribution rate reduction policy is that it will further expand the payment gap of public pension, that is, worsen its short-term financial situation, but improve the long-term financial situation of public pension. The conclusion of the impact of fertility policy is that it can alleviate the payment pressure of public pension fund to a certain extent, but this beneficial effect is limited. The conclusion of the impact of the delaying retirement policy is that it can alleviate the pressure of the public pension fund and enhance the sustainable operation of the fund, but this beneficial effect is also very limited, which is difficult to alleviate the plight of the huge payment pressure of the public pension in the future. The conclusion of the influence of the central adjustment fund system policy is that it can effectively adjust the fund imbalance between provinces and regions, but on the whole, it still cannot solve the payment dilemma of public pension.

Based on the above conclusions, the following policy enlightenments can be obtained, which can provide a reference for the Chinese government to improve the sustainable operation ability of the public pension system.

(1). The Chinese government needs to continue to implement the state-owned capital transfer policy and the collection system reform policy. Both policies can improve the sustainable operation of China's public pension system. The proportion of state-owned capital transferred needs to be kept in an appropriate range, and the promotion speed of the collection system reform policy should consider the affordability of enterprises.

(2). Adopt measures to improve the implementation effect of fertility policy. The research conclusion shows that the fertility policy can improve the financial situation of public pension and improve the ability of sustainable operation to a certain extent. At present, the effect of China's fertility policy is not ideal. Supporting fertility welfare measures should be adopted to improve the fertility wishes of women of childbearing age.

(3). Accelerate the introduction of the policy of delaying retirement. The delaying retirement can also improve the financial situation of public pensions to a certain extent. At present, the retirement age of Chinese workers is low, which is 60 for male workers and 55 for female workers, which is lower than that of major developed countries in the world. Thus, the delaying retirement policy should be introduced as soon as possible.

(4). The Chinese government should actively pursue a combined policy for public pension insurance. That is, the combination of multiple policies can ensure the payment safety of China's public pension fund as much as possible and ensure that the pension benefits of retirees are paid "in full and on time".

Funding: This research was supported by the Science and Technology Project of Jiangxi Provincial Department of Education (GJJ210542).

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