

Analysis of the Pension Fund Gap in Wenzhou from Actuarial Perspective

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Abstract

Along with the socio-economic development, the deepening of aging and the lowering of fertility rate, the pension insurance fund in Wenzhou has been experiencing a gap and showing an expanding trend. The huge fund gap will not only put great pressure on the financial expenditure, but also affect the normal operation of the economy, so it is urgent to study the financial sustainability of the pension insurance fund. This paper studies the size of the elderly population in Wenzhou in the next 20 years and measures the income and expenditure of the pension insurance fund on this basis, studies the operation of the pension fund in Wenzhou in the next 20 years and puts forward corresponding policy recommendations according to the problems that arise in the fund.

Keywords

Pension; Gap; Actuarial.

1. Introduction

Against the backdrop of the accelerating aging of China's population and the requirement of the Central Economic Work Conference to prevent major risks, the financial sustainability of pension fund has become one of the key concerns of the government and needs to be urgently addressed. Studying the current situation of pension fund operation and its future "pressure-bearing capacity" is the core basis for solving this problem. Based on this, the World Social Security Research Center of the Chinese Academy of Social Sciences has released the "China Pension Actuarial Report 2019-2050", which forecasts the gap of the national pension fund in the next 30 years under the central transfer, and argues that the basic pension insurance system faces the challenge of financial unsustainability in the medium and long term, and the financial sustainability of local pension funds also needs to be studied and analyzed.

Wenzhou's seventh census data show that the proportion of the population aged 65 years or older is 11.71%, according to the World Health Organization for aging society subdivision standards, Wenzhou has entered the first stage of aging society, and the speed of aging continues to accelerate. According to the 2020 health-related monitoring data released by Wenzhou Center for Disease Control and Prevention, the per capita life expectancy of the city's residents will reach 81.72 years in 2020, an increase of 0.01 years compared to 2019, and along with the continuous improvement of the health care system, it is expected that the per capita life expectancy will further increase. The large scale of aging, the increase in the number of senior citizens, the aging problem of getting old before getting rich is becoming increasingly obvious, and the number of pension recipients as well as the duration is increasing. 2021, the city's birth population is 65,000, the death population is 57,000, and the natural increase in population is 0.8 million. The birth rate is 6.8 per thousand, the death rate is 5.9 per thousand, and the natural growth rate is only 0.9 per thousand. According to the relevant departments, Wenzhou will achieve negative population growth in 2023, and the number of working population, the basis of pension contributions, decreases sharply. There is an irreconcilable contradiction between the huge demand for pensions in the future and the limited supply.

Based on the current pension insurance contribution and treatment system in Wenzhou, this project intends to make a systematic forecast study of the pension insurance fund gap in Wenzhou from 2020 to 2040.

2. Pension Fund Gap Projection

The fund gap projection process in this paper is divided into three steps: in the first step, a general population projection model is built to project the population size and distribution of Wenzhou in the next 20 years; in the second step, a pension benefit projection model and a contributory population projection model are constructed, and the parameters of each model are set to produce the projection results of contribution income and cost expenditure under the base case. The third step is to forecast the pension funding gap based on the results of the previous measurements.

2.1. Population Projection

Forecasting the total population and its structure is the primary issue facing the construction of the pension gap. A reasonable projection of population size is important because it is the basis for scientific determination of the peak ageing period and is directly related to the accuracy of the pension gap projection. In this paper, a CL10 -13 pension life table is adopted to project the male and female populations of Wenzhou from 2020 to 2040, using Wenzhou's seventh census data as the base data. It is assumed that males are aged 20-60 as contributors and 61-82 as pensioners, while females are aged 20-50 as contributors and 51-82 as pensioners. The results are as follows.

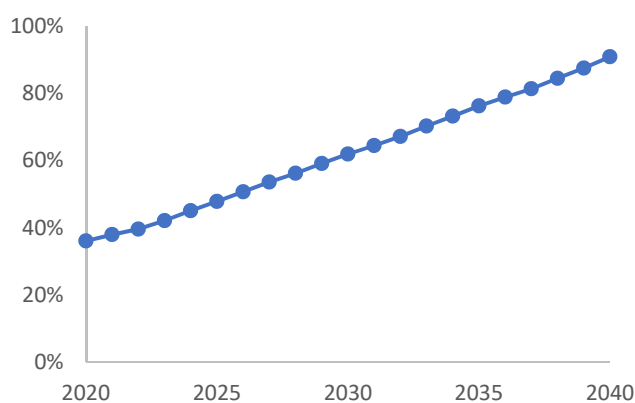


Figure 1. Contributory Maintenance Rate in 2020-2040

As can be seen from Figure 1, the contributory maintenance rate (number of retirees/number of contributors) shows a continuous upward trend from 2020 to 2040, with 2.78 contributors supporting one retiree in 2020, and almost one contributor supporting one retiree in 2040. According to this rule, it can be predicted that the future contributory maintenance rate will exceed 1, this will make the pension fund unsustainable.

2.2. Pension Fund Balance

Pension insurance in Wenzhou is divided into two parts: pension insurance for urban employees (including enterprises and institutions) and pension insurance for urban and rural residents. The monthly average of the total wages payable in the previous year for urban employees is taken as the payment base, and the proportion of employees' pension insurance contributions is 22%. Among them, the proportion of unit contribution is 14% and the proportion of individual contribution is 8%. Urban and rural residents who are insured choose

their own grade of contribution and pay more. In terms of treatment, the level of pension treatment for urban workers and urban and rural residents will increase in accordance with a certain percentage according to the 2017-2019 period.

Using the data collection and parameter setting as the basis of analysis, mathematical programming was used to forecast the pension gap in Wenzhou against the background of an ageing population and fewer children. The forecast results for the current balance of pension (pension paid in the year - pensions spent in the year) in Wenzhou from 2017 to 2040 are shown in Table 1. On the whole, the current balance of pension under the pay-as-you-go system is on a declining trend. Specifically by phase, from 2017-2018, the current income of pensions was greater than the expenditure and pensions had a balance; from 2019 onwards, the current income of pension was less than the expenditure and there was a gap of payment of RMB 4.062 billion, accounting for 0.6% of the GDP in that year, and the gap was getting larger, and by 2040 the current balance of pension expanded to RMB 49.213 billion, and if the growth rate of Wenzhou City's GDP in 2022 is used, the current balance of pension in 2040 will be larger. If calculated based on the GDP growth rate in 2022, the pension gap in 2040 will account for 3.1% of the GDP of that year, and the government's financial burden will increase year by year.

Table 1. Current balance of pension fund in 2017-2040

Year	Number	Year	Number	Year	Number
2017	28.51	2025	-52.46	2033	-233.48
2018	12.66	2026	-70.35	2034	-266.42
2019	-40.62	2027	-89.30	2035	-302.47
2020	-33.48	2028	-105.38	2036	-332.87
2021	-27.87	2029	-129.09	2037	-362.37
2022	-20.15	2030	-153.10	2038	-404.06
2023	-25.04	2031	-173.63	2039	-445.26
2024	-38.61	2032	-198.74	2040	-492.13

The accumulated pension balance (accumulated pension contributions - accumulated pension expenditure) in Wenzhou from 2017 to 2040 is projected as shown in Table 2. The accumulated balance of the pension fund in Wenzhou behaves differently at each stage, with the accumulated income of the pension fund being greater than the accumulated expenditure from 2017 to 2026, but the accumulated balance is decreasing. From 2027 onwards, the accumulated balance of the pension fund is in deficit and growing, and the absolute value of the difference is increasing, indicating that the population receiving pension is increasing and increasing at a faster rate. If financial subsidies are not taken into account, the accumulated balance deficit will reach RMB 365,699 million by 2040, accounting for 23.6% of GDP in that year, putting the fund under pressure.

Table 2. Accumulated balance of pension fund in 2020-2040

Year	Number	Year	Number	Year	Number
2017	329.75	2025	101.65	2033	-1051.41
2018	340.3	2026	31.31	2034	-1317.83
2019	299.25	2027	-58.00	2035	-1620.30
2020	265.77	2028	-163.38	2036	-1953.17
2021	237.91	2029	-292.46	2037	-2315.54
2022	217.76	2030	-445.57	2038	-2719.60
2023	192.71	2031	-619.19	2039	-3164.86
2024	154.11	2032	-817.93	2040	-3656.99

3. Conclusion

According to the above analysis, Wenzhou City pension insurance under the pay-as-you-go system, on the existing contribution system and treatment system, the pension fund contributory maintenance rate shows a continuous rising trend in 2020-2040, the number of pension insurance recipients is increasing, the pressure of contribution population dependence increases; the current balance has been in deficit in 2019, it will reach RMB 49.213 billion in 2040, accounting for 3.1% of the GDP of that year. The accumulated balance of the pension fund will be in deficit in 2027 and the deficit will expand at an increasing rate, the accumulated balance deficit will reach RMB 365.699 billion in 2040, accounting for 23.6% of the GDP of that year, with the problem of the fund's income and expenditure falling short and the fund operating under great pressure.

In response to the problems of the pension fund, the following policy recommendations are proposed.

First, the government should introduce relevant policies to increase the fertility rate. The decrease in the number of working population in the future is one of the main reasons why the balance of pension funds is being hit. Although the government is encouraging the birth of children, with the development of the economy, the improvement of people's education level, and the increasing pressure of life, especially the pressure of "education, housing and medical care", people do not have a strong desire to have children, and the natural population growth rate is still relatively low. Therefore, in order to maintain the total population balance, the government should formulate policies to encourage childbirth as soon as possible, increase the government's expenditure on the support of the newborn population, and reduce the burden of families by reducing the costs of childbirth, medical care, and education, so that residents can change their mindset of having children and want to have children, dare to have children, and be able to have children.

Second, establish a sound pension supervision mechanism, increase government supervision, and promote the preservation and value of pension fund. On the one hand, the government should increase supervision of the work of enterprises to insure their employees with pension insurance, reduce the situation that many enterprises operate irregularly and do not insure their employees with pension insurance, urge and guide enterprises to insure their employees, and also strengthen the guidance of flexibly employed people to pay basic pension insurance to increase the fund income of basic pension insurance. On the other hand, the government should strengthen the management and operation of the fund. It can entrust professional investment management companies and change the way of investment, for example, it can ensure the safety of both the principal of the pension fund by diversifying investments in the capital market and choosing a less risky way to achieve reasonable returns under the premise of controlled risks, so as to realize the preservation and value of the pension fund.

Finally, the government can adopt a gradual retirement approach to gradually extend the retirement age more slowly and steadily and encourage more contributions and longer contributions. The retirement age of urban workers in China is much lower than that of developed countries, which increases the number of elderly people who need to support and increases the pressure on pension payments. And many elderly people who have reached retirement age but are in good health are willing to choose to continue working, so we need to increase the development of this part of the experienced labor force. However, there are some types of workers who do not want to delay retirement, so the retirement age can be gradually raised on a voluntary basis and the willingness of workers to delay retirement can be increased through certain incentives. In addition, the approval of early retirement needs to be strengthened, leaving this right to those who really need it and reducing the unnecessary loss of pensions.

Acknowledgments

This work was supported by Wenzhou Polytechnic.

Fund project: "Analysis of the Pension Fund Gap in Wenzhou City from an Actuarial Perspective." project(NO.WZY2022031).

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