

Pension reform for public sector

Situation Analysis

[Topic 1.3.1]



By:

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Public Sector Pension Reform in China

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Abstract: In China, the public sector refers to government organs and public institutions (hereinafter, GOPI pension). The GOPI pension system and enterprises pension system had evolved from “uniform” to “different” and finally to “re-uniform” to a social insurance system. Since the Basic Pension System of Urban Enterprise was established in 1997, the pension gap between public and private sectors had expanded; labor flow between public and private sectors had become more difficult; and the pension expenditure burden on local governments had become heavier because of ageing. The GOPI pension reform in 2015 made the traditional fiscal-based public sector pension system change to a comprehensive social insurance system. Public sector and the private sector achieved a unified pension system. Meanwhile, there were several supporting reforms include wage adjusted, the GOPI occupational pension system introduced, and the Investment Act of Basic Pension Fund released.

The main content of GOPI pension system reform are: First, to establish a two-pillar mandatory pension system constructed by Basic Pension system (hereinafter BP system) and Occupational Pension system (hereinafter OP system); the second is to explicit the responsibility of workplaces to contribute 20 percent of total wage expenditure to BP system and additional 8 percent to OP system, and individuals to contribute 8 percent of individual wage to BP system and additional 4 percent to OP system, the total contribution rate is 40 percent; the third is to establish a financing mode combined by social pooling and individual accounts, elementary pension comes from social pooling fund which is financed by employer's contribution, individual basic account pension comes from employee's contribution; the forth is to establish occupational pension system which is financed by both of employer's and employee's contribution and operates in accordance with the market-oriented investment; Fourth, established a virtual account, taking into account the fiscal pressure at the beginning of reform, virtual account approach is adopted in OP system, that means employer does not pay any real money into individual occupational pension account, the contribution is credited until the employee retires, when the employee retires, the government will pay lump-sum of accumulated contribution and its accrued interest into the individual OP account.

There are two potential risks in GOPI pension system: the first is financial sustainability risk. To predict fiscal sustainability of GOPI system should make some hypotheses to system parameters such as the long-term ROI (7%), accounting interest rate (equals to wage growth which is decline linearly from 9.36% in year 2014 down to 3.09% in year 2090), reasonable pension divisor (should be adjusted dynamically and be lower than the existing divisor at same retirement age level) as well as population, economic growth, revenue growth, and then it is found: from 2015 to 2090, the Basic Pension revenue increases gradually, accounting for 4-6% of homochronous fiscal revenue ; between 2015 and 2035 the Basic Pension expenditure decreased slightly and after 2035 increased sharply, accounting for 4-9% of homochronous fiscal revenue; the current value of history debt accounts for 430 percent of fiscal revenue of year 2014 and will be repay completely in 50 years; the fund shortfall accounts for less than 3% of homochronous fiscal revenue as well as 0.8% of homochronous GDP; cumulative fund will run out in 2080. The Pension Divisor in 2015 reform is too low, which will speed up the depletion of Basic Pension funds of GOPI. The second risk is lack of persistent contribution abilities in some local governments. For example, in 2013, the maximum per capita fiscal revenue exceeds the minimum one more than six times among all provinces, and more than 5 times among different cities of Shandong Province. After the 1994 tax reform, the local governments bore more and more social affairs while fiscal revenue declined sharply from 75 percent of national fiscal revenue to 48 percent, just because fiscal powers were centralized. Therefore, local governments dependent largely on central government transfer payments. From 2011 to 2014, more than 90% of GOPI pension expenditures are paid by the local government. But not all the money comes from local revenue. Because lack of data availability, from social security and employment fiscal expenditure in which the proportion of central financial transfer payment is more than 40%, it can be estimated GOPI pension expenditures of local governments have to depend largely on central government transfer payments. The establishment of occupational pension system is an important part of the GOPI pension reform in 2015. The occupational pension system is characterized

as follows: First, it is mandatory; the second is the employers and employees have to pay; the third is that employer's contribution is notional before employee retires; the fourth is to take DC system. OP benefit level is influenced by four important factors: First, Pension Divisor is too low, which will magnify longevity risk. The second is contribution period. To extend contribution period will increase pension benefit significantly. For example, Assuming ROI is 7 percent, replacement rate of OP in the case of 30 years contribution will be 45 percentage points higher than 20 years contribution. The third is ROI. Assuming 30 years contribution period, OP pension replacement rate in the case of 7% ROI will be 70 percentage points higher than that in the case of 2% of ROI. The fourth is accounting interest rate of virtual contribution from employers (governments). Assuming 30 years contribution and 2% accounting interest rate (one-year deposit interest rate on average in the last 20 years, equals to the prescribed accounting interest rate of individual pension account in Urban Enterprise Pension system), the OP replacement rate is 46 percentage points lower than the replacement rate in the case of 7% ROI.

EU public sector pension systems can be categorized into independent and mixed systems. In recent years, many EU countries reform their public sector pension systems to fit for ageing and labor mobility speeding up. The major reform measures include: First is reducing pension benefit via cutting down payment or compressing the replaced wage base; the second is transferring public sector employees into general pension system; the third is introducing DC system; the fourth is establishing risk reserve funds. After studying on pension reforms of Germany, France, Britain, Belgium, the Czech Republic, Poland and the Netherlands, the following lessons can be learned: First, reduce DB pension benefits; the second is to defer retirement age or increase contribution years; the third is to cut down survivor pension benefits; Fourth, establish occupational pension plans as a complement; the fifth is to transform DB plans into DC mode; the sixth is to establish a mechanism of punishing early retirement and encouraging delay retirement; the seventh is improving pension portability via settle accrued pension rights in lump-sum way or calculate pension separately in different pension plans; the last but not least is using actuarial technical to adjust system parameters to achieve financial sustainability.

To improve GOPI pension system, the policy recommendations are as following. First of all is to enhance rights equity. The participants have right to supervise investment of pension fund. The interest rate of virtual account should be credited in accordance with market ROI and not less than a guarantee interest rate. The second policy proposal is to improve portability of GOPI pension.

To improve GOPI pension system, the policy recommendations are as following. First of all is to enhance rights equity. The participants have right to supervise investment of pension fund. The interest rate of virtual account should be credited in accordance with market ROI and not less than a guarantee interest rate. The second policy proposal is to improve portability of GOPI pension. When participants change their jobs, their all accrued pension contribution (both of employers' contribution and employees' contribution) should be roll-out and transferred into pension system in new workplace. The third is to enhance the financial sustainability of GOPI pension system via actuarial technical. Floating contribution rates should be adopted. Based on floating rates, policy makers can determine a reasonable contribution rate which can help expanding pension fund revenue. Developing a more dynamic and scientific Pension Divisor, cancelling the contribution wage ceiling, merging GOPI pension fund and Urban Enterprise pension fund into one fund pooling, and increasing the minimum contribution years at same time raise the related pension benefit level, all of these measures will promote GOPI pension system more scientific and more sustainable. The fourth is to improve the performance of pension fund investment. It should set up a more independent investment institution as fiduciary, and establishment of performance evaluation mechanism should be based on a long-term assessment. It is necessary to endow limited option right to invest his/her OP funds, and preset a guarantee investment return rate to minimize the investment risk.

Key Words: Public Sector; Government Organ and Public Institute; Pension Reform; Occupational Pension; EU; Fiscal Sustainability; Virtual Account

1. History of GOPI retirement system

After the founding of new China, pension system established in SOEs first. In 1955, imitating the enterprise model GOPI pension system was established, reformed in 1985, 1993, 2006 and 2015. The latest reform changed the mode of GOPI pension system completely from the traditional fiscal support mode to the social insurance. The pension reform determines contribution responsibility of participants and uniforms the pension system of the public sector and private sector.

1.1 From early 1950s to early 1990s, pension systems between GOPI and enterprise were similar

In 1955, according to enterprise pension system, pension system in GOPI established, two kinds of systems were basically identical. In March 1950, the central government introduced retirement system only covered workers in industries like railway, the customs and post and telecommunications. It was stipulated that workers aged 50 years old and over who worked at least for 10 years could retire and pension was paid lump sum. The retiree could gain 1/3 last monthly salary per working year. The accumulated pension would not exceed six months' salary. This was the first pension system in new China, but the pension level illustrated that workers retirement was not encouraged.

In 1951 the first Labor Protection Law was issued and the workers in the industries of railway, shipping, post and telecommunications employing 100 workers and over could get pension when retiring without contributing. The enterprises contributed 3% of total payroll, of which 30% was managed by ACFTU and 70% was used to pay for pension by trade union. Enterprise male worker aged 60 years old and over and worked for 25 years, female worker aged 50 years old and over, and worked for 20 years could retire. According to the working years, for the replacement rate was 35% to 60%. In 1953 the labor protection system expanded to manufacturing, mining, transport industry and construction In February 1958, the minimum work years for the maximum pension benefits was shortened from 22.5 years to 15 years, and the maximum replacement rate was improved from 60% to 70%.

In December 1955, with reference to enterprise pension system, GOPI pension system was introduced. This was the first retirement system of GOPI in new China. The retirement age and replacement rate were same as that of enterprise while the acquired minimum work years for male and female workers were 25 years and 20 years respectively, 5 years more than that of enterprise pension system.

In 1978, pension benefits and retirement age were adjusted both in GOPI and enterprises, while retirement age of female workers diverged. The adjustments included: First, the acquired minimum working years for pension cut down from 20 years to 15 years, and the replacement rate was 60%, 70% and 75% for retirees worked for 10 to 15 years, for 15 to 20 years and for 20 to 25 years respectively, 80% for whom retired before October 1 in 1949 and 90% for whom retired before the end of 1945; the second is cutting down the retirement age of enterprise female workers from 55 years to 50 years, 5 years earlier than that of GOPI.

In this period, the pension system in China evolved to a pension system with universal coverage and retirement conditions loosened gradually. However, the pension system was the product of the planned economy system. Although retiree left work position, but was still managed by the labor department of former work unit, and pension was still labor cost and was not a real social insurance system.

Wage system reform in 1985 expanded pension gap between GOPI and enterprise. In planned economy period, the Department of Treasury earmarked funds including wages and pensions to SOEs on the basis of amount of positions, not changing along with number of staff and workers. The rule of allocation was equalitarianism which could not encourage SOEs to improve production efficiency. In January 1985, in order to enhance the vitality of SOEs, the policy was changed to allocate on the basis of operating efficiency. Thereafter, wage differentials between GOPI and SOEs began to emerge.

In June 1985, GOPI wage reformed. The wage of GOPI was divided into Basic Wage, Duty Wage, Seniority Pay and Premium Wage. The central government set wage standards to Base Wage and Duty Wage, and allowed local governments to determine levels of Seniority Pay and Premium Wage. Wage standards of the same position were divided into several ranks (see Annex 1.1). For example, in the governments of central level and province level, the highest Position Wage of the governor of province was 315 Yuan per month, 7.5 times of that of the clerk (42 Yuan per month). The gap of pension between GOPI and SOEs expanded synchronously

1.2 From early 1990s to the end of 2014, Urban Enterprise pension system diverged from GOPI pension system and transitioned to social insurance mode.

1.2.1 Wage system reformed of 1993 changed pension structure of GOPI and enterprise

In 1990s, the pace of SOEs reform accelerated. Pension expenditure was always heavy burden on SOEs, so the central government planned to replace the transition traditional pension system by a social insurance system.

In 1991 local governments reformed their enterprise pension systems. In new pension system, the work units and their workers were asked to contribute for social pooling pension fund. The GOPI remained the traditional pension system. Since then, the pension system modes of GOPI and enterprise became divided.

In 1993 the National Civil Service System was introduced, and the wage system of national civil servants reformed (see Annex 1.2 and Annex 1.3). Contrasted with the previous wage system, the number of position levels was integrated from 26 degrees to 12 degrees. The structure of wages was changed to Basis Wage, Duty Wage, Rank Wage and Seniority Pay, and the Duty Wage and Rank Wage were in the majority. In addition, the state civil servants could get regional allowances and other allowances, and increased salary regularly and got bonuses on the basis of work performance. For example, the maximum Duty Wage and Rank Wage of the governor of province was 530 Yuan per month and 382 Yuan per month respectively, 4.4 times and 2.8 times of that of clerks (120 Yuan per month). Compared with before, the wage differentials between different positions didn't expand. At the same time, the wage of public institutes reformed synchronously. The wage of professional technicians was divided into Duty Wage and Work Premium (see Annex 1.4).

In Wages reform of 1993, the pension benefit of GOPI was adjusted. The authority of determining pension benefit standards was decentralized, and the central government set ceiling of the pension benefit. Taking Shaanxi province as an example, the Basic Wage and Seniority Pay were paid in full to retirees, and Duty Wage and Rank Wage were paid at a certain proportion which was 75% to 88%. It is estimated approximately the replacement rate was at least 80%.

In the first half of 1990s, salary monetization was improved in enterprises, while a large proportion of hidden welfare in GOPI. To maintain living standard, except for pension, the retired staff of GOPI were paid subsidy for food, meat, and so on. Because of lack of controlling, the local governments constantly pushed up the Pension Subsidy. So, the pension gap between GOPI and enterprise come out.

1.2.2 Enterprise social pension insurance system was established in 1997, and pension system of GOPI and enterprises operate in "dual track" way

To coincide with the reform of state-owned enterprises, the enterprise worker pension insurance system implementation of coordinated reform. In 1995 proposed to establish a pension insurance system which combining Social Pooling fund and Individual Basic Pension Account. Regulate the enterprise and Individual capture to expend scale, Individual Basic Pension Account size and pension insurance gold extend

standard. All of enterprises implemented social pension insurance system. After business implemented the system of social pension insurance, Enterprise pension system completely separated with GOPI. Formed a GOPI staff oriented financial retirement system and the system of social pension insurance for enterprise employees (see Table 1.1). GOPI pension related to the rank of the title and working years before retirement and the social average wages and town enterprise Pension Individual Basic Pension Account accumulation amount.

Table 1. 1 After reform of 1997, comparing Urban Enterprise system with GOPI pension system

	GOPI pension system	Urban Enterprise Pension System
Retirement conditions	Male 60 years old, female 55 years old, no age limitation for disabled workers; male aged 55 who have Worked for 30 years or and female aged 50 who have worked at least 20 years, can apply for early retirement.	Male 60、 female cadres 55、 female workers50,Accumulative total capture at least 15 years.
Pension benefit	(basic pay and seniority pay) x 100% + (position salary + rank level salary) * n. n is equal to: 88% (work for at least 35 years); 82% (work for 30 to 35 years) ; 75% (work for 20 to 30 years) . Allowance: according to rank, title or position, working years and financial burden ability, determined separately.	Basic pension = local social average wages multiply by 20%; Individual Account Basic Pension equals to accumulated fund in individual account divided by 120; The "transition workers". ¹
Replacement rate	More than 80% (estimate value).	Not lower than 58.5% (target value).
Contribution responsibility	Individual didn't contribute. The governments paid pension.	Work units and participants contributed at the rate of 20% of the total payroll (in which 3% storing in Individual Account) and 8% of individual wages (all for storing in Individual Account) respectively.

Source: edited by the author.

1.2.3 Wage reform of 2006 resulted in the pension gap between GOPI and enterprise expanded

In July 2006, wage reformed in GOPI. The Basic Wage and Seniority Pay in previous wage system of government organs were cancelled and added Rank Wage from 15 grades to 27 grades (see Annex 1.5 and Annex 1.6). It is stipulated that Rank Wage rose up 1 grade every 2 years if passing performance appraisal. At the same time, Post Performance Salary Mechanism was carried out in public institutes. The wages were divided into Duty Wage, Rank Wage, Performance Wage and Subsidy and Allowance.

After wage reform, the proportion of subsidy in pension increased. It is estimated that subsidy accounted for 60-70%² of pension of civil servants. Take Shaanxi province as an example, in 2007, the average wage of workers in post was 21239 Yuan, and The Pension Subsidy of GOPI retirees was from 660 Yuan to 1760 Yuan per month on the basis of ranks, accounting for 37% to 100%³ of average wage in post.

¹ Transition workers "refers to those in the new system prior to the implementation of the work, and after the implementation of retired people in the system, associated with" old man "and" new man ", the "old man" mean in the new system before retired people, "the newcomer" refer to begin to work after the new system implementation.

²"subsidies and allowances is 70% of civil servant salary, was accused of not conducive to integrity", People's Daily, 2014-9-11, <http://news.sina.com.cn/c/2014-09-11/001030821953.shtml>.

³ From the internal investigation report.

Due to soft budget constraint, constant increasing of Pension Subsidy widened the pension gap between GOPI and enterprise.

In 2005, Urban Enterprise Basic Pension system adjusted as follows: First, pension replaced social average wage instead of the average of sum of social average wage and individual indexation wage, which was benefit to encouraging hard work to get higher salary; the second is the replacement rate was changed from fixed 20% to a proportion relative to work years, 1% for every work year, which was benefit to encouraging to work longer. Table 1.2 shows the difference between pension system of GOPI and enterprise after 2005.

Table 1. 2 Comprising Urban Enterprise pension system and GOPI pension system after wage reform in 2006

	GOPI pension system	Urban Enterprise pension system
Benefit qualification	Male workers aged 60 years old and over, female workers aged 55 years old and over, or the disabled. The workers who have worker for at least 30 years, or worked for 20 years and less than 5 years away from retirement age, could apply for early retirement.	Male workers aged 60 years old and over, female workers aged 50 years old and over, and contribution accumulated at least 15 years.
Pension benefit	Pension replacement rate: 90% (work for 35 years); 85% (work for 30 to 35 years); 80% (work for 20 to 30 years); 70% (work for 10 to 20 years); Allowance: according to rank, title or position, working years, and at the financial ability, determined by the local governments.	The parts of pension benefit: Basic pension = (social average wage of last year + indexed individual wage) / 2 x 1% x work years; Individual Account Basic Pension = accumulated fund in Individual Account / pension divisor (the pension divisor can be seen in Annex 1.7); Transitional annuities = the social average wage of last year x the index of individual wage x accrued work years with no contribution x 1.4%.
Qualification for early retirement	Workers who worked for at least 30 years, or worker for 20 years and less than 5 years away from retirement age, could apply for early retirement.	Workers in special jobs could apply for early retirement.
Replacement rate	More than 80% (estimate).	Not lower than 58.5% (system target).
Contribution	Individual didn't contribute. The governments paid pension.	Work units and participants contributed at the rate of 20% of the total payroll (all for payment of pension) and 8% of individual wages (all for storing in Individual Account) respectively.

Source: edited by the author.

1.3 The pension reform of 2015 transitioned GOPI pension system to social insurance mode

On January 14, 2015, the state council promulgated the GOPI Pension System Reform Decision (Guofa[2015] No.2), announced that the GOPI pension system had been established. As the second file published by the State Council in 2015 shows the importance of GOPI pension reform.

1.3.1 The reform background

After wage reform in 2006, the GOPI pension structure altered obviously, and Pension Subsidy were increased dramatically under soft budget constraint pension. The pension gap between GOPI and enterprise were too large. The "dual-track mode" pension systems in public and private sectors had been criticized increasingly. It badly needs reform. Before the reform, the GOPI pension was paid in DB way and participants take no payment obligation. The difference of pension system mode resulted in Portability loss of labor mobility between public and private sectors. Moreover, the local governments faced the problem of uneven scale of fiscal revenue and pension expenditure. This reform is to deal with these problems under principles like fairness, portability and sustainability.

(1) The widening pension gap between GOPI and enterprise caused more and more criticism

Before the year of 2006, the pension gap between GOPI and enterprise was obvious. Table 1.3 shows the pension gap was expanding during 2000 to 2004. It is can be seen that the average wage of GOPI and enterprise was near, but the pension per capita and pension replacement rate were very different. From 2000 to 2004, the pension replacement rate of Urban Enterprise Basic Pension system declined from 66.8% to 50.3%, and the difference to the pension replacement rate of GOPI expanded from 10 percentage points to 20 percentage point.

From 2000 to 2004, the average wage of enterprises and public institutions rose by about 70%, and that of government organs rose by 78.3%; while the average pension of enterprise rose 27.5%, and that of public institutes and government organs rose by 51.7% and 68.6% respectively. As a result, the differentials of pension between enterprise to public institute and government organ increased by 19% and 32.2% respectively.

Table1.3 The comparison of pension and wage between enterprise and GOPI (in 2000 to 2004)

Year	2000	2001	2002	2003	2004	difference in 2000 to 2004
Average pension (Yuan per year)						
Enterprise	6142	6373	7364	7732	7831	27.5%
Public Institute	9655	10490	12110	13809	14644	51.7%
Government Organ	9451	11570	12988	14654	15932	68.6%
Average wage (Yuan per year)						
Enterprise	9189	10453	11873	13578	15559	69.3%
Public Institute	9634	11491	13246	14564	16489	71.2%
Government Organ	10020	12125	14005	15736	17869	78.3%
Pension replacement rate (%)						
Enterprise	66.8	61.0	62.0	56.9	50.3	-24.7%
Public Institute	100.2	91.3	91.4	94.8	88.8	-11.4%

Government Organ	94.3	95.4	92.7	93.1	89.2	-5.5%
Difference of pension (%)						
Public Institute / Enterprise	157.2%	164.6%	164.4%	178.6%	187.0%	19.0%
Government Organ / Enterprise	153.9%	181.5%	176.4%	189.5%	203.4%	32.2%

Source: The author calculates on the basis of *China's Labor and Social Security Statistics Yearbook 2005*, National Statistics Bureau, 2005.

After the year of 2006, the pension gap between enterprise and GOPI continued to expand. After the wage reform in 2006, GOPI pension is divided into two parts: one is retirement wage, the other is Pension Subsidy which accounts for large proportion of pension. In Shaanxi province as an example, wage reform determined Pension Subsidy standard from 660 to 1760 Yuan per month which accounted for 47% to 125% of average wage (16918 Yuan) in 2006.

The “double track” status of pension system has been heavily criticized and is considered to be an unfair social policy. The investigations to "What is your most concerned issues during NPC & CPPCC?" which is organized by People's Daily Online and People's Daily Press continued from 2002 to now. The investigation result in 2012 showed that more than 92% of respondents hoped to increase the pension of enterprise⁴; in 2013, 97% of respondents expressed dissatisfied to the increase extent of pension and 98% of respondents considered to change “dual track” status of pension system⁵; in 2014, 86.29% respondents supported to coincide the two pension systems of GOPI and enterprise⁶.

(2) Labor mobility between GOPI and enterprise are not smooth

After enterprise pension system was established in 1993, the resistance of labor mobility from GOPI to enterprises was increased. Because in Fiscal-Beard pension system, if staff and civil servants left to enterprise, his/her accrued pension rights with no contribution in GOPI wouldn't be added to “work years” when he/she participated in enterprise pension system, which meant he/she gained inadequate pension when retiring. Even though retrospect contribution by the enterprise was allowed, the employer would be hesitating to pay for such huge labor cost in lump sum.

(3) Ageing of GOPI staff will increase local governments' pressure on pension expenditure

Seeing from Table 1.4, grouped by 5 years, it can be found that more than 40% of staff in post will retire in next 5~15years, and more than 40% of retirees are aged 60~69 years old who will receive pension at least for 10~20 years. Aging problem in GOPI will become more serious in next 10 to 20 years.

Table 1.4 The proportion of staff at different age group (in 2013, %)

⁴ *Social security in the "NPC&CPPCC" survey top again ,by more than ninety percent netizens hope to improve the pension.* People's Daily Online,20/2/2012. <http://politics.people.com.cn/GB/17159215.html>

⁵ http://news.ifeng.com/gundong/detail_2013_03/05/22735599_0.shtml

⁶ *To report to the people: in 2013, introduced the New Deal with social security.* People's Daily Online,26/2/2014. <http://politics.people.com.cn/n/2014/0226/c1001-24468137-2.html>

Age	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
proportion of staff at different age group	0.0	2.5	14.6	18.2	15.7	17.2	15.7	9.5	6.4	0.1
Age	40-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90+
proportion of staff at different age group	1.0	3.5	15.1	23.3	19.4	16.1	11.3	6.8	2.7	0.8

Source: Provided by the research team of *Study on China's Pension System Reform*

The pension expenditure of public sectors in OECD countries accounts for 2%⁷ of GDP on average, while the above proportion was much smaller relatively, between 0.5% ~ 0.6% (see Table 1.5). Despite the overall expenditure scale can be controlled, the local governments especially the grassroots governments have difficult to afford.

Table 1.5 Proportion of GOPI pension expenditure in GDP

Year	2011	2012	2013	2014
Fiscal expenditure for GOPI pension (100 million Yuan)	2737.75	2848.84	2851.41	3294.67
GDP (100 million Yuan)	484123.5	534123.0	588018.8	636138.7
Proportion of GOPI pension expenditure in GDP	0.57%	0.53%	0.55%	0.58%

Source: Final Fiscal Accounting in every year published by Department of Treasury and annual National Economic Accounting published by National Statistics Bureau.

After implemented the reform in 1994⁸, the proportion of central fiscal revenue in national fiscal revenue is increasing, while the gap between fiscal revenue and expenditure in local governments is expanding (see Figure 1.1). Local governments have to ask more and more fiscal transfer of central government to offset the gap; thereafter, local governments depend on central government more and more.

⁷ Kings, J., E. Turkisch and N. Manning (2007), "Public Sector Pensions and the Challenge of an Ageing Public Service", *OECD Working Papers on Public Governance*, No. 2, OECD Publishing.

<http://dx.doi.org/10.1787/285530706017>

⁸ In 1994 China began to implement tax system reform, the taxes were divided into central tax, local tax and shared tax by the central and local governments. After this reform, proportion of central fiscal revenue increases, which helps to enhance control power of the central government to macro economy.

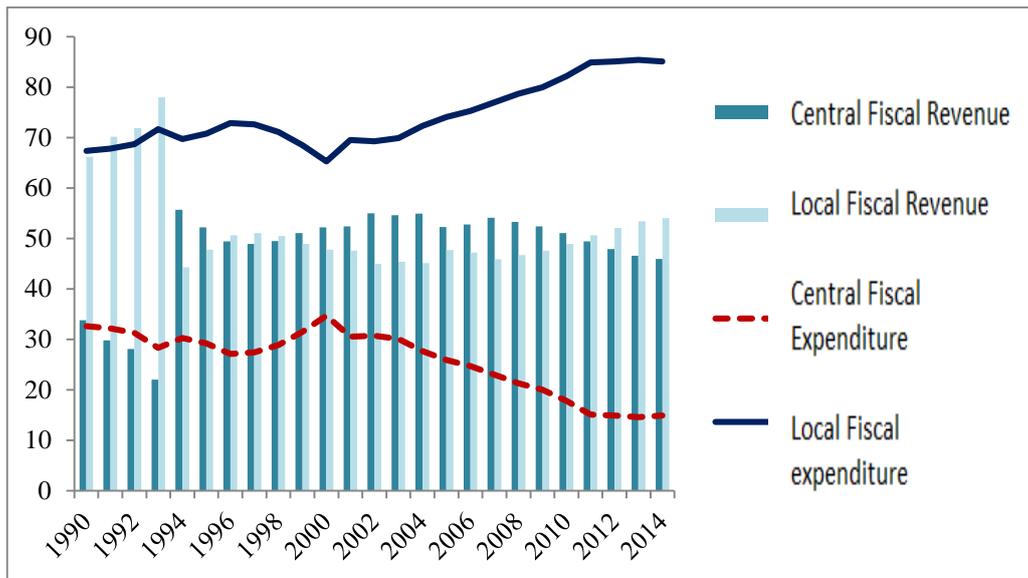


Figure 1.1 The proportion of central and local fiscal revenue and expenditure (%)

Source: Annual data of Fiscal Revenue and Fiscal Expenditure published by National Statistics Bureau.

1.3.2 Reform content

Fairness, liquidity and sustainability is the goal of this GOPI pension insurance reform and it aims to build a social pension insurance that financially independent of GOPI. It will be a social pension insurance system, which source of funds is various and the preservation mode is multiple-level and management socialized.

Coverage and participants. The GOPI pension system covered all civil servants and other staff work in public institutions, not including temporary employees. On basis of official data published by 18 provinces, it is estimated that the number of government organ staff was 11.0666 million and the number of public institution staff was 26.8435 million nationwide, and the sum was 37.9101 million (see table 1.6). According to estimation, the GOPI staff accounted for 9.9% of employment in cities and towns (382.4 million) and 4.9%⁹ of total employment nationwide (769.77 million) in 2013.

Table 1.6 population of the GOPI staff in post (in 2013, 10 thousand)

	population at the end of a year	Government organ	Public institute	Total
Tianjin	1472	13.21(a)	34.97(a)	48.18(a)
Shanxi	3630	45.98	101.39	147.37
Nei Mongol	2498	33.29(a)	71.82(a)	105.12(a)
Jiangsu	7939	54.14	153.20	207.34

⁹ Data is cited from *human resources and social security development statistical bulletin in 2013*.

Zhejiang	5498	51.17	118.75	169.92
Anhui	6030	40.11(a)	103.83(a)	143.94(a)
Fujian	3774	29.14(a)	68.34(a)	97.48(a)
Shandong	9733	84.40	213.00	297.40
Henan	9413	71.92(a)	195.97(a)	267.89(a)
Guangdong	10644	86.62(a)	186.53(a)	273.15(a)
Guangxi	4719	35.39	109.01	144.40
Hainan	895	9.02	21.88	30.90
Chongqing	2970	23.48(a)	60.03(a)	83.51(a)
Sichuan	8107	73.14(a)	159.20(a)	232.34(a)
Guizhou	3502	36.03(a)	76.95(a)	112.98(a)
Shaanxi	3764	44.35	104.36	139.79
Qinghai	578	8.34(a)	15.70(a)	24.04(a)
Ningxia	654	7.42	17.40	24.81
footing	85820	747.16(a)	1812.33(a)	2550.56(a)
nationwide	135516	1106.66 (b)	2684.35 (b)	3791.01 (b)

Note: (a)estimated, employment multiplied by 0.94, 0.94 is the proportion of GOPI staff in total employees. (b)estimated, the sum of staff population in GOPI published by 18 provinces is divided by 0.675145, hereinto 0.675145 is an adjusted proportion of permanent residents in total residents of those provinces.

Source: statistical yearbook 2014 of each province.

Financing: The governments contribute 20% of the total payroll for social pooling and the GOPI staff in post contribute 8% his/her earning to his/her Individual Basic Pension Account. The “earning” is based on the whole remuneration except for the subsidies that always are used to compensate wage insufficiency due to cutting down implicit benefit under traditional planned economy system.

If individual contributive salary is lower than the local serving officer’s average wage of 60% last year, then according to the 60% of the previous year average wage of serving officer to contribute. The ceiling and flour of contribution is 60% and 300% of salary respectively. In Beijing, for example, in 2014 the social average wage is RMB 6463 Yuan per month, if individual contributive wage is 3500 Yuan, the contribution base will be 3877.8 Yuan per month (see Table 1.7).

Table 1.7 Calculation of the contribution base (Beijing, 2014, Yuan per month)

Individual contributive wage	average social wage	Contribution base
3500	6463	3877.8

5000	6463	5000
10000	6463	10000
15000	6463	19389

Source: calculated by the author.

Contribution Years. The GOPI employees must contribute to the pension insurance at least 15 years. Individuals who are insured by the basic pension insurance and reach the legal retirement age, if his/her accumulative contributed less than 15 years, he/she will continue contributing to reach 15 years. If the extended contribution years are still less than 15 years after five years, he/she can contribute a one-time premium to reach 15 years.

Individual Basic Pension Account. Individual basic pension account is calculated with the unified interest published every year by the state, free of tax. The pension shall not be in advance withdrawn. Individual Basic Pension Account balance can be inherited if the contributor was dead.

Pension benefit and its adjustment. Basic pension consists of elementary pension and individual account pension. The contribution base of elementary pension is according to the local GOPI staff monthly average wage and the average number of him self's indexed average wage monthly. It will pay out 1% of the pension while you contribute per full 1 year. For the people get job before the reform and retired after reform, according to the length of contribution year to pay off the transitional pensions. Retired during the reform, continue to be benefited according to the regulations of the state's primary basic pensions.

The basic pension is adjusted according to wage growth rate. The standard of monthly pension of individual account equals to individual account stores divided by pension divisor. Among them, pension divisor is calculated according to the urban population average life expectancy, the retirement age and the interest to define. The pension divisor is almost linear and weak especially for staff aged 55 to 65 years old to encourage deferring retirement age (see Figure 2.1).

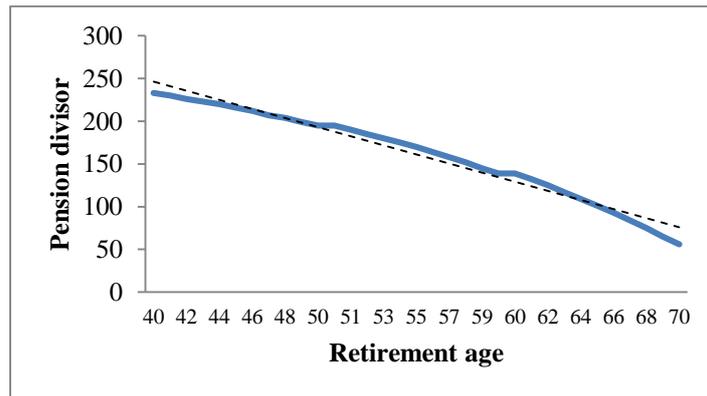


Figure 2. 1 Pension divisor and its trend

Transitional program for "transition worker". The staff that are employed before the reform and retire after the reform and meet qualification conditions can receive the elementary pension, individual account pension, and transitional pension extra.

In Shaanxi Province, there is a 10-year transition period for the people who employed before the reform (1/10/2014) and retired after the date. During the transition period, make a comparison between the pre-reform benefit and the benefit after reform. If the benefit of new system (including occupational pension benefits) is lower than the old system, then according to the old standard approach to pay off. If the benefit of new system is higher than the old way, then pay off 10% of the extra part to the first year retirees, pay off 20% to the second year retirees, and so on, pay off 100% of the extra part until the end of transition period (1/1/2024 to 30/9/2024). Retired after the transition period¹⁰, according to the new system to pay the pension.

Fund supervision. The basic pension insurance fund of GOPI is financed by the provincial level or provincial transfers. The fund account established alone, and independent with enterprise employees basic pension insurance funds. It implements budget management of the fund, financial accounts into the social security fund, the income and expenditure are independent and earmarking.

Pension transferring. When GOPI participant leave to enterprise or public sector in other province, his/her individual contribution and its investment revenue can be transferred to pension management agency in receptive place; and his/her employer' (government') contribution will be transferred at 12% contribution rate, which means 25% of contribution from employers will not transferred to receptive place.

Occupational Pension system. The employees of GOPI are insured by the basic pension, in the meantime, 8% of the total wage, individuals contribute by 4%, respectively payment, to contribute to the occupational pension schemes.

Organization and management. The Human Resources and Social Security Department of China is responsible to manage the basic pension insurance of the GOPI in Beijing and the occupational pension fund. The management of the basic pension insurance of GOPI, which workplace outside Beijing, is responsible by the local government. The local social insurance agencies responsible for the GOPI pension insurance registration, payment reporting, relationship between the transfers, the benefit approved and paid work.

Comparison of systems. After the reform, the GOPI pension system has completely changed the front clear fiscal responsibility, personal responsibility, from a single-level pension security into a multi-level security. (see Table 1.9)

Table 1.9 Comparison of GOPI pension systems before and after the reform

	Before	After
System mode	Government supporting	Social insurance
Financing	Paid by governments	Contributed by governments and staff, and subsidized by governments
Benefit	Determined mainly by participant's position/title	Elementary Pension is relative to position/title and work years; Individual Account Basic Pension and Occupational Pension are determined by contribution and its investment revenue;
Participant's obligation	none	Contribute to Individual Basic Pension Account as well as Occupational Pension Account.

¹⁰ Opinions about GOPI pension system reform, shaanxi province. http://www.gov.cn/xinwen/2015-10/21/content_2950971.htm

1.3.3 Supporting policies for GOPI pension reform

(1) Increase the basic wages and pensions of retirees in GOPI

After the salary reform in 2006, the GOPI all serving officer's basic wages vary with the changes in positions and ranks, only basic wage no adjustment. Civil service and GOPI promotion with a long cycle, so their salary growth slower than companies employee, for example, wage level automatically every 2 years to the next level, increase of 5-6%, the level of GOPI wage growth significantly lower than the town companies serving officer average wage. Post wage increase associated with the promotion of positions and titles, positions and titles per level promotion pay increase of 25-30%, but need at least 5 to 10 years, and the vast majority of people can only 2-3 level promotion. Companies serving officer average wage, by contrast, all the year round to keep more than 10% annual growth rate, for example, 2006-2014 average annual compound growth rate of 13.2%¹¹. The GOPI did not form a normal wage adjustment mechanism, wage growth rate significantly slower than the social average

This reform needs the GOPI on-the-job personnel according to his or her wages by 8% and 4% respectively contribute to the basic pension insurance and occupational pension, this means that the contributor's wage will be reduced 12%. Due to the salary of some civil servants at the grass-roots level and rank low young people is not high, coupled with the GOPI wages always not according to the economic growth rate and social average wage rises for automatic adjustment, therefore, the contribution to insurance will make its income greatly reduced. According to the Ministry of Human Resources and Social Security, if the 12% of his salary payment, the salary of GOPI in about 40% will be lower than town companies serving officer average wage. Therefore, on January 12, 2015, the State Council issued a scheme about "Adjusting the GOPI staff basic wage standard and increase the GOPI retirees pensions" ([2015] no. 3), will increase the office basic wages of civil servants and public institution staff by 20% on average, the greater the rise in the lower positions and ranks. At the same time, increase the GOPI pension by 10%. The funds needed for the wage increases and pension all from the governments at various levels and the central fiscal transfer payment.

(2) Establish compulsory occupational pension system

The notice about *the GOPI occupational pension* ([2015] no. 18) was released on March 27, 2015 by the State Council, aimed at build the occupational pension system, as the GOPI compensatory pension insurance system. Including basic content:

Contribution. The GOPI contribute 8% of the worker total wages 8%, individual contribute 4% of salary payment.

Accounts management. Individual contribution calculate in individual account, the GOPI contributes in an accounting mode, calculated with the interest published by the state unified plan, when workers retire, according to the cumulative amount of the account of the worker's occupational pension account and pay off by the local government.

Pension transfer and continuity. Changes in employers, professional along with the pension personal account transfer. If the new employment did not practice the occupational pension or annuity system, the occupational pension personal account by the original management agencies continue to manage operations.

¹¹ According to the data from National Bureau of Statistics, calculated by the author.

Payment of benefit. When individual retired, he(her) can choose a one-time to buy commercial pension insurance products, or choose a monthly plan receive occupational pension until finished, select either no longer changes after receiving way. It can inheritance the occupational pension personal account.

Organization and management. Managed by the society insurance agency organization at all levels.

Fund Management. Investment management, conducted by the market. It does not allow all people can participate in fund investment operation decision, that is to say, the individual contributor of the occupational pension has no choice of the fund investment.

So, after the reform, the GOPI pension insurance system consists of two parts, basic pension insurance and occupational pension and the pension consists of elementary pension and individual account pension and occupational pension. The man insured by the previous system not to take part in the new system, "transition worker" in addition to the above three pension, also receive the transitional pension. The transitional pension of specific payment is determined by the local governments (see Table 1.10).

Table 1.10 The GOPI pension insurance in 2015

	Basic pension insurance	Occupational pension
Financing methods	The GOPI contribute according to 20% of the total amount of wages, personal contribute according to 8% of his salary	The GOPI contribute according to 8% of the total amount of wages, personal contribute according to 4% of his salary
Benefit	Basic pension monthly = (Last year's serving officers monthly average salary + individual indexed monthly average payment wage) ÷ 2 × contribution year × 1%. Individual account pension monthly = individual account calculation ÷ pension divisor. "Transition worker" transitional pension received with specific measures by local government s.	The first choice: Buy commercial pension insurance products one-time. The second choice: Paid monthly. Cannot be changed after it is selected.

Source: According to the "Reform decisions about the GOPI pension insurance system"(2015,NO.2) and the "Notice about occupational pension system in GOPI"(2015,NO.18),collated by the author.

After the reform, the GOPI pension insurance system and urban basic pension system for enterprise, the difference is the parameters (see chapter 2). It is mandatory of the GOPI occupational pension, at the beginning of system implementation can be covered, and enterprise pension system is voluntary, since 2004 the implementation of this system, have operated more than 10 years, currently covered 23.0865 million people, of all employment in cities and towns (at the end of 2014 to 2014) of 5.9%¹².

(3) Formulate the manage methods of pension insurance fund

By the end of 2014, the town enterprise basic pension insurance fund balance reached 3.5645 trillion Yuan cumulatively, the funds only can be used for bank deposits and buy bonds, and the former accounted for more than 95%¹³. Most of these bank deposits was 1-3 years short-term, and not matched the long-term pension insurance fund, which affected the profitability of the fund. The average profit rate of fund of basic pension insurance during 2001 to 2011 annually was less than 2%, and less than 2.47% the average inflation

¹² According to the ministry of human resources and social security fund supervision: the national enterprise pension fund business data (in the second quarter of 2015)

"<http://www.mohrss.gov.cn/SYRlyzhshbzb/zwgk/szrs/qttjcl/201509/W020150912763024435640.pdf>

¹³ According to the national audit office announced in August 2012, the national social security fund audit results, 95.02% of town enterprise fund of primary pension insurance is bank deposits, urban residents pension insurance fund is all bank deposits.

rate over the same period, reducing by more than 600 billion Yuan¹⁴. The GOPI pension insurance system reform involved 38 million the GOPI workers. These people had a strong political voice and lower tolerance for the losses of profit because the fund cannot be invested.

In August 2015, the central government issued the measures for the administration of the pension insurance fund investment (hereinafter referred to as "investment management method"), and made specific provision in investment on the basic old-age insurance fund management. "Investment management method" applies to enterprise employees, the staff GOPI and urban and rural residents' pension funds and the entire existing public pension plans. Investment and supervision adopts the principle of prudent regulation, in order to obtain high yield as much as possible with ensuring the basic old-age insurance fund under the principles of security.

Provincial institutions entrusted investment. According to the rules, the provincial institutions entrust investment operations and the institutions authorized by the State Council are entrusted with investments. Although there is no clear trustee, concerning that Guangdong and Shandong respectively signed an agreement with the National Council for Social Security Fund in March 2012 and in February 2015, which was entrusted with running 100 billion Yuan that was fund of primary pension insurance for enterprise employees, the National Council for Social Security Fund will be the institute to invest and operate the enterprise basic pension insurance fund.

Investment scope. Fund of basic pension insurance is limited to domestic investment. Comparing with the net fund assets, investment proportion on the wages shall not be less than 5% of that, and investment proportion on the bond fixed income securities, stocks and the major construction projects shall not exceed 135%, 30% and 20% of that respectively.

2. Prediction and Evaluation on GOPI pension system of 2015 reform

In 2014, the actuarial team of MoHRSS cooperated with the research team of Centre of International Social Security of CASS to predict GOPI pension system fiscal sustainability. This chapter will use actuarial results of this research to evaluate the GOPI pension system operation effect.

2.1 Demographics in GOPI

China's public sector has 37.91 million in-staff employees and 16.28 million retirees. Assuming the staff amount of GOPI will not increase and be static at 37.91 million in 2015-2024 and change in accordance with the overall demographic after 2025. It can be predicted that in-staff employees will reach 42.21 million and retirees will reach 25.51 million by 2050, and increase by 11.3% and 56.7% respectively (Table 2.1).

Table 2. 1 Demographic Prediction of GOPI (2015 to 2090, 10 thousand)

	2015	2020	2025	2030	2035	2040	2045	2050	2060	2070	2080	2090
Staff in post	3791.0	3791.0	3848.3	4121.4	4173.6	4210.6	4228.8	4220.7	4011.2	3798.0	3606.0	3452.3
retirees	1628.3	1729.1	1799.7	1898.5	1971.1	2107.6	2308.0	2550.7	2572.4	2684.8	2872.5	2993.9

Source: Zhang, Yinghua, "Notional Defined Contribution Pension System of GOPI and Analysis on Its Long-term Fiscal Sustainability", *Research on Development*, No.3, 2015, p.8.

¹⁴ Bing-wen zheng: *China's pension insurance fund "shrink" nearly 600 billion Yuan in the past ten years*, business network, 9/11/2012.

The average age of GOPI staff is higher than that of enterprises because GOPI staff has experienced longer period education in general, which results in higher dependency ratio in GOPI. Assuming retirement age is deferred gradually from 2015 to 2035 and reaches 65 years old for male staff and 60 years old for female staff by 2035. The dependency ratio in GOPI is 43% in 2015, reaching 50% in 2040, and in the whole prediction period 10 to 15 percentage points higher than dependency ratio of Urban Enterprise Pension system as well as 15 to 30 percentage points higher than dependency ratio nationwide (see Table 1.12).

Table 1. 1 Dependency Ratio of GOPI or Urban Enterprise Pension system (prediction value, 2015 to 2090, %)

Year	2015	2020	2025	2030	2035	2040	2045	2050	2060	2070	2080	2090
GOPI pension system	43.0	45.6	46.8	46.1	47.2	50.1	54.6	60.4	64.1	70.7	79.7	86.7
Urban Enterprise pension system	32.2	27.5	27.0	29.1	32.9	38.3	44.6	53.4	65.4	63.0	65.2	66.9
National Population	13.7 ¹⁵	18.0	-	25.6	-	38.1	-	44.0	53.6	49.1	50.5	54.0

Note: National population dependency ratio equals to the amount of population aged 65 and over divided by the amount of population aged 15 to 64. The prediction value is based on medium rate of fertility.

Source: Zhang, Yinghua, "Notional Defined Contribution Pension System of GOPI and Analysis on Its Long-term Fiscal Sustainability", *Research on Development*, No.3, 2015, p.7; Zheng Wei, "Characteristics of China's Aging Trends and the Potential Impact on Economic Growth", *Quantitative and Technical Economics Research*, No.8, 2014, p. 14.

2.2 Financial Sustainability Prediction of GOPI Basic Pension System¹⁶

2.2.1 Analysis on Payment Ability of GOPI Basic Pension

(1) Revenue of GOPI Basic Pension Fund

The revenue of GOPI Basic Pension comes from:

First is employers' contribution which is at the ratio of 20 percent based on total payroll and is used to pay Elementary Pension of retirees.

The second is employees' contribution which is at the ratio of 8 percent based on their wages. Employees' contribution is credited to their own Individual Pension Account which will be used to pay for Individual Account Pension in the future.

The third is investment return of accumulated funds.

The fourth is fiscal subsidy in the case of deficit.

¹⁵ In 2014. Data comes from: National Bureau of Statistics, *National Economic and Social Development Statistics Bulletin 2014*, February 2015.

¹⁶ If not indicate specially, the data in this section are from: Zheng BingWen (ed.), *China Pension Development Report 2014*, Economic Management Publishing House, December 2014.

(2) Balance of GOPI Basic Pension Fund

Hypothesis. Increasing the retirement age from 2018, to delay the retirement age for female and male at the same time, increase the retirement age of female workers by 1 year every 2 years, and increase the retirement age of female cadres and all male workers by 1 year every 4 years; by 2037, the retirement age for female will reach 60 years old, and the retirement age for male will be 65 years old.

The average remaining life expectancy of the population aged 60 will gradually increase from 20.65 years projected by the sixth census in 2010 to 29 years in 2090.

The total fertility rate will gradually increase from 1.44 in rural areas and 0.98 in urban areas according to the sixth census in 2010, and will remain unchanged when it reaches the generation replacement standard of 2.1 for rural areas and 1.6 for urban areas in 2050.

Assuming the actual GDP growth rate will drop from 7.5% in 2014 to 2.0% in 2090, and the nominal GDP growth rate will drop from 9.5% in 2014 to 2% in 2090.

It is forecasted and assumed that the proportion of fiscal revenue accounting for GDP will gradually increase from 22.7% in 2013 to 25% in 2030, and then will remain stable afterwards, from which, it can be calculated that the fiscal revenue growth rate will drop from 10.15% in 2014 to 2.51% in 2090.

It is calculated and assumed that the growth rate of average salary of staff in post will drop from 9.36% in 2014 to 3.09% in 2090. It is assumed that accounting interest rate of Individual Pension Account equals the growth rate of average salary of staff in post in the previous year.

Assuming ROI of accumulated balance of Basic Pension system and ROI of Occupational Pension fund is 7%.

The Pension Divisor is calculated based on interest rates, life expectancy, wage grow rate and benefits adjustment rules, so it is dynamic (see Table 2.1). It should be noted that the assuming Pension Divisors are greater than those set in the existing reform scenario. For example, the pension divisor is 161 in 2015 for a 60-year-old retiree, and when he/she is 70 years old, the divisor will adjusted to 171, in contrast, the existing divisors are too low.

Table 2. 2 Dynamic Pension Divisor¹⁷

Age Year	60	65	70	75	80	85	90
2015	161	135	110	86	66	51	39
2020	166	140	113	90	69	53	41
2025	171	144	118	94	72	56	43
2030	176	149	122	97	76	58	44
2035	182	153	126	101	79	61	47

¹⁷ 如未加特殊说明，本章的测算数据和测算结果均来自郑秉文主编：《中国养老金发展报告 2014》，经济管理出版社 2014 年 12 月出版。

2040	187	158	131	104	82	63	48
2045	193	163	134	108	85	65	50
2050	198	168	139	112	88	68	52
2055	204	173	143	116	91	71	53
2060	210	179	148	119	94	73	55
2065	216	184	152	123	98	75	56
2070	221	188	157	127	101	78	58
2075	227	194	161	131	104	80	59
2080	232	198	165	134	107	83	61
2085	236	203	169	138	110	85	62
2090	240	206	173	141	112	86	64

The calculation result is as following:

Revenue. In the calculation period, the fund revenue will keep increasing, but the growth range will increase first and then decrease, and fund revenue will account for 4%~6% of homochronous fiscal revenue. Before 2050, the ratio will rise from 4% to 5.5%, after 2050, it will rise slightly from 5.5% to 6%, primarily as a result of expectation that the permanent staff of GOPI will increase first and decrease.

Expenditure. In the calculation period, fund expenditure will decrease first and then increase, which will account for 4%~9% of the homochronous fiscal revenue. **Before 2035**, the **delay retirement policy** restrains the growth in the number of beneficiaries, and the ratio of fund expenditure to homochronous fiscal revenue drops; **after 2035**, the transition period of delay retirement will be over, and the **dependency ratio** will rise and remain high, the scale of the fund expenditure will begin to expand (see Figure 2.1).

<p>Ratio of Fund Revenue in Fiscal Revenue Ratio of Fund Expenditure in Fiscal Revenue i</p>

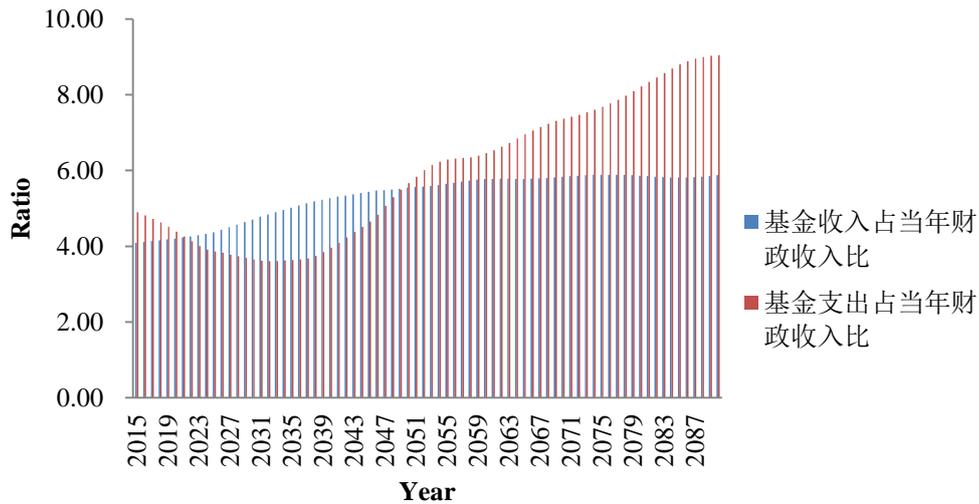


Figure 2. 2 The ratio of fund revenue and fund expenditure to homochronous fiscal revenue respectively (%)

Current gap between fund revenue and expenditure. Table 2.3 shows current gap as well as the scale of the gap in the calculation period. Before 2021, the gap will account for less than 1% of the fiscal revenue, and will reduce year by year. The fund gap in the period is mainly due to the **historical debts** of the new system will pay pension for participants who have retired under old system; after 2050, the scale of current gap will expand year by year, and will finally reach 3.2% of homochronous fiscal revenue, which is mainly because the system dependency rate rises and breaks -through 50%. Overall, the current fund gap will be basically controlled within 3% of homochronous fiscal revenue, and the gap in all years will not exceed 0.8% of GDP.

Table 2. 3 Current gap accounts for homochronous fiscal revenue and GDP (%)

Year	2015	2016	2017	2018	2019	2020	2021	/	
Ratio to fiscal revenue	0.81	0.70	0.58	0.47	0.33	0.18	0.02	/	
Ratio to GDP	0.19	0.16	0.13	0.11	0.08	0.04	0.01		
Year	2050	2055	2060	2065	2070	2075	2080	2085	2090
Ratio to fiscal revenue	0.12	0.64	0.68	1.18	1.53	1.79	2.36	2.99	3.16
Ratio to GDP	0.03	0.16	0.17	0.29	0.38	0.45	0.59	0.75	0.79

Accumulated fund balance. In 2015-2021, due to unbalanced contribution revenue and pension expenditure, there is no accumulated fund balance in the Basic Pension. After 2021, the accumulated balance will begin to increase, the ratio of which to homochronous fiscal revenue will increase from 0.1% to 26% in 2050; after 2050, the fund will again occur current gap, and the accumulated balance will begin to reduce, by 2079, the ratio of the accumulated balance to homochronous fiscal revenue will fall to 0.7%, by 2080 the accumulated balance will run out (see Table 2.4).The year that the fund runs out (in 2080) is 30 years later than the year that current gap occurs (in 2050).

Table 2.4 The ratio of accumulated fund balance to homochronous fiscal revenue (%)

Year	2015	2020	2025	2030	2035	2040	2045	2050
Ratio of accumulated fund balance to homochronous fiscal revenue	0.00	0.00	1.36	5.41	11.72	18.74	23.98	25.82
Year	2055	2060	2065	2070	2075	2080	2090	/
Ratio of accumulated fund balance to homochronous fiscal revenue	24.46	22.95	20.21	15.19	8.43	0.00	0.00	/

History Debts of the system. That is Transition Cost of pension system which equals to the current value of the pension rights and interests accumulated under the old system, including two parts of the “old workers” pension expenditure and “transition workers” pension expenditure which is corresponding to deemed contribution. The overall historic debts is expected to 60.6 trillion YUAN which accounts for 430% of fiscal revenue in 2014. The history debts do not exceed 5% of homochronous fiscal revenue, which declines by one percentage point approximately every 10 years, by 2056, the historic debts of “old workers” will be paid off, and all historic debts will be digested completely by 2066, it requires 50 years to repay all historic debts (see Table 2.5)。

Table 2.5 The proportion of history debts in homochronous fiscal revenue (in 2015 to 2090, %)

Year	2015	2020	2025	2030	2035	2040	2045	2050	2060	2067
“Old workers” pension expenditure	4.83	3.59	2.57	1.76	1.16	0.70	0.37	0.18	0.02	0.00
“Transition workers” pension expenditure	0.07	0.56	0.64	0.65	0.58	0.50	0.41	0.29	0.11	0.05
Total	4.90	4.15	3.21	2.41	1.74	1.20	0.78	0.47	0.13	0.05

(3) Potential payment risk of Basic Pension

Ageing will expand pension expenditure and fiscal subsidy. The dependency rate of GOPI population will exceed 60 percent in 2050. According to the principle of PAYG system, the contribution rate will reach 33.3 percent in order to balance the fund revenue and expenditure. Except for ageing, the GOPI pension system will face tow challenges:

Firstly, in the beginning period of GOPI pension system, the scale of accumulates OP fund is too small to raise the whole pension level. The staff of GOPI is aging, and the dependency rate has reached 40.7% in 2013. According to principle of PAYG system, the replacement rate must be 49.1% in the existing employers' contribution rate 20% to social pooling. This replacement rate 49.1% is much lower than before reform. For ensuring adequate pension of those "transition workers", fiscal subsidy is necessary.

Secondly, financial risk is amplified just because the existing Pension Divisor is too low. The dynamic divisors in prediction above are higher than those of existing system. The sixth census shows that the Chinese population life expectancy was 74.8 years in 2010 compared with 71.4 years in 2000. The dynamic

divisor is 161 when retiring at 60 years old, which is much higher compared with 139 in existing system. Pension divisor must be adjusted periodically according to demographic change and economic growth. Explicitly, the existing divisor does not take the change of life expectancy into account, which means the Individual Pension Account fund will run out long before participants' death quite possibly. So, if the Pension Divisor is static, the pension system will suffer to longevity risk.

2.2.2 Analysis on affordability of local fiscal revenue

The central and local governments and the public institutes affiliated contribute for their staffs separately. In China, there are five levels governments such as central, provincial, municipal, county (district) and subcounty (street authority), and the fiscal revenue and social expenditure (thereby the contribution capacity) are quite different even in same government level.

(1) Large gap of fiscal capability between provinces

In GOPI pension system, the governments contribute as employers, and the contributions are 20 percent to Basic pension system and 8 percent to Occupational Pension system on the basis of total payroll. In some undeveloped regions, the local governments cannot afford the contribution by their Local Fiscal Revenue. Table 2.6 shows the difference of Local Fiscal Revenues per capita between provincial governments. The total amount of national population is 1.36 billion and the total amount of Local Fiscal Revenue is 6.9 trillion Yuan in 2013, thereby 5 071 Yuan per capita on average. The maximum per capita Local Fiscal Revenue is 17 312 Yuan (in Beijing where have 21.55 million population and 366.1 billion Yuan Local Fiscal Revenue in 2013) while the minimum one is 2 352 Yuan (Gansu province where have 25.82 million population and 60.7 billion Yuan Local Fiscal Revenue in 2013), and more than 6 times gap between them.

Table 2. 4 The gap of Local Fiscal Revenue per capita between provinces (in 2013)

Provinces	Population by the end of year (10 thousand persons)	Local Fiscal Revenue (100 million YUAN)	Local Fiscal Revenue Per capita (Yuan)
Nationwide	136072	69011.16	5071.7
Beijing	2115	3661.11	17311.8
Tianjin	1472	2079.07	14122.1
Hebei	7333	2295.62	3130.7
Shanxi	3630	1701.62	4687.9
Inner Mongolia	2498	1720.98	6890.5
Liaoning	4390	3343.81	7616.9
Jilin	2751	1156.96	4205.2
Heilongjiang	3835	1277.40	3330.9
Shanghai	2415	4109.51	17015.5
Jiangsu	7939	6568.46	8273.2
Zhejiang	5498	3796.92	6906.0
Anhui	6030	2075.08	3441.4
Fujian	3774	2119.45	5615.9
Jiangxi	4522	1621.24	3585.1
Shandong	9733	4559.95	4684.8
Henan	9413	2415.45	2566.0
Hubei	5799	2191.22	3778.6
Hunan	6691	2030.88	3035.4

Guangdong	10644	7081.47	6653.0
Guangxi	4719	1317.60	2792.1
Hainan	895	481.01	5372.8
Chongqing	2970	1693.24	5701.2
Sichuan	8107	2784.10	3434.2
Guizhou	3502	1206.41	3444.7
Yunnan	4687	1611.30	3438.1
Tibet	312	95.02	3045.2
Shaanxi	3764	1748.33	4644.9
Gansu	2582	607.27	2351.8
Qinghai	578	223.86	3874.4
Ningxia	654	308.34	4713.3
Xinjiang	2264	1128.49	4983.8

Source: The author calculates based on *China Statistical Yearbook 2014*.

(2) Large gap of fiscal capability between municipal governments

The Local Fiscal Revenue is not only greatly different between provinces, but also between municipal governments in same province. For example, there are 17 municipal governments in Shandong province. In 2013, the total Local Fiscal Revenue of Shandong province sums up to 432.4 billion Yuan and total population in Shandong province is 9.612 million, so Local Fiscal Revenue per capita in Shandong province is 4 498 Yuan. The gap between the maximum 10197 Yuan (in Qingdao) and the minimum 1664 Yuan (in Heze) is more than 5 times (see Table 2.7). Calculated by employed population, the Local Fiscal Revenue per employed person is 6571 Yuan, and the maximum 13807 Yuan (in Qingdao) is greater 3.5 times than the minimum 3026 Yuan (in Linyi).

Table 2. 5 Gap of Local Fiscal Revenue between municipal governments in Shandong province

Cities	Local Fiscal Revenue in 2013 (10 thousand Yuan)	Population by the end of 2013 (10 thousand)	Local Fiscal Revenue per capita (Yuan)	Employed population by the end of 2013 (10 thousand)	Local Fiscal Revenue per employed population (Yuan)
Province-wide	43239198	9612.05	4498.4	6580.4	6570.9
Jinan	4820722	613.25	7860.9	454.4	10609.0
Qingdao	7889313	773.67	10197.3	571.4	13807.0
Zibo	2730688	425.28	6420.9	316.3	8633.2
Zaozhuang	1307206	395.96	3301.4	291.3	4487.5
Dongying	1837943	186.99	9829.1	148.2	12401.8
Yantai	4372295	651.17	6714.5	493.3	8863.4
Weifang	3839158	882.88	4348.4	563.1	6817.9
Jining	3022366	847.79	3565.0	548.2	5513.3
Taian	1688136	558.8	3021.0	405.1	4167.2

Weihai	1952242	253.75	7693.6	198.4	9839.9
Rizhao	1000923	290.13	3449.9	207.7	4819.1
Laiwu	467616	126.52	3696.0	110.6	4228.0
Linyi	2161016	1090.43	1981.8	714.1	3026.2
Dezhou	1500169	578.81	2591.8	351.7	4265.5
Liaocheng	1355503	597.52	2268.5	407.7	3324.8
Binzhou	1700901	381.64	4456.8	285.4	5959.7
Heze	1593001	957.46	1663.8	513.5	3102.2

Source: The author calculates on the basis of *Shandong Statistical Yearbook 2014*.

The local governments is responsible not only to pay for pension to whom have retired before GOPI pension reform, but also to contribute in pension system as employers for in-post employees, and also to subsidy when the pension system suffers to deficit. When the local governments cannot afford social expenditure, they need to depend on grants of the central government.

(3) The local governments depended on central government greatly since tax reform in 1994

Since tax system reformed in 1994, the Local Fiscal Revenue accounted for 48% of the country's total fiscal revenue) on average, 20 percentage points lower than before, while the proportion of local fiscal expenditure accounted for 75% of the national fiscal expenditure which 5 percentage points higher than before. It shows the local governments have more responsibility on social affair while have less fiscal revenue (see Figure 2.2).

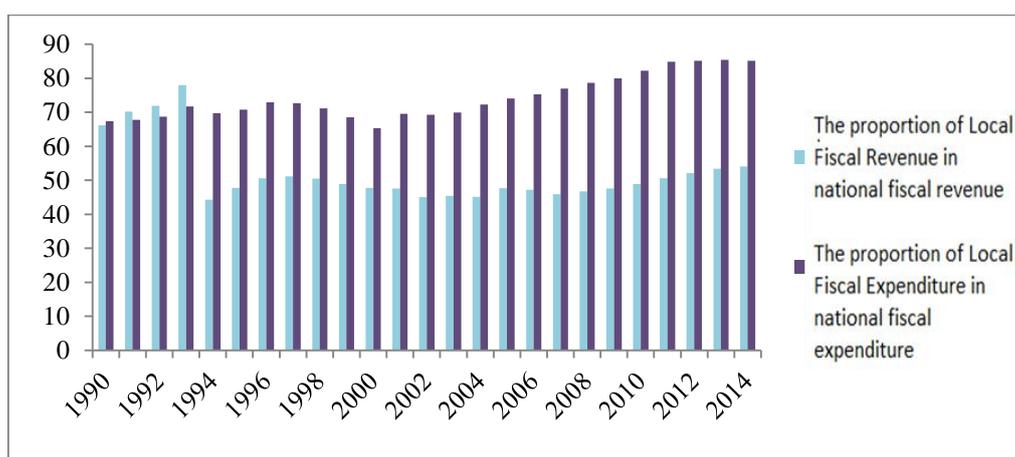


Figure 2. 3 The proportion of Local Fiscal Revenue in national fiscal revenue and the proportion of Local Fiscal Expenditure in national fiscal expenditure (in 1990 to 2014, %)

Source: Final accounts of Local Fiscal Revenue and Expenditure released by Ministry of Finance in every year

In recent years, the increased social spending programs have expanded the scale of local fiscal expenditure, and local governments need a lot of central government transfer payments. In the disclosed official data, most of SOEs governed by central government are monopolistic and profitable and the

proportion of pension subsidies to them in central fiscal expenditure are smaller than the proportion of subsidies to local enterprises in local fiscal expenditure (see Table 2.8).

Table 2. 6 Fiscal expenditure of pension payment to GOPI retirees and fiscal subsidy to Urban Enterprises' Basic Pension system (100 million Yuan)

		Fiscal subsidy to Urban Enterprises' Basic Pension system		Fiscal expenditure of pension payment to GOPI retirees	
		Amount	Proportion	Amount	Proportion
2011	Local Fiscal Expenditure	2130.73	97.2%	2477.99	90.5%
	Central Fiscal Expenditure excluding fiscal transfer	60.99	2.8%	259.76	9.5%
	Total	2191.72	100.0%	2737.75	100.0%
2012	Local Fiscal Expenditure	2451.54	97.0%	2570.8	90.2%
	Central Fiscal Expenditure excluding fiscal transfer	75.76	3.0%	278.54	9.8%
	Total	2527.3	100.0%	2848.84	100.0%
2013	Local Fiscal Expenditure	2762.64	96.9%	2936.76	91.5%
	Central Fiscal Expenditure excluding fiscal transfer	88.77	3.1%	271.67	8.5%
	Total	2851.41	100.0%	3208.43	100.0%
2014	Local Fiscal Expenditure	3191.96	96.9%	3339.22	91.0%
	Central Fiscal Expenditure excluding fiscal transfer	102.77	3.1%	328.79	9.0%
	Total	3294.67	100.0%	3668.01	100.0%

Source: The author calculates based on fiscal final accounting of fiscal expenditure on nationwide, central level and local level.

Because of lack of official data about central government transferring payment to subsidy pension expenditure of local GOPI, the central government transferring payment to subsidy social security and employment affairs of local governments can be used to replace. In all local fiscal expenditure in social security and employment affairs, 40 percent comes from central government transfer payment (see Table 2.9). Accordingly, the central government transfer payment for GOPI pension is an important resource of local fiscal GOPI pension expenditure, which indicates that local GOPI pension depends to large extent on central government.

Table 2. 7 Fiscal expenditure to social security and employment affairs on different government levels (100 million Yuan)

	National fiscal expenditure	Central Fiscal Expenditure				Local Fiscal Expenditure			
		total	Central level	Transfer to local governments		total	Net Local Fiscal Expenditure	Be transferred by central government	
				Amount	Proportion			Amount	Proportion
2011	11109.4	4715.8	502.5	4213.3	89.3%	10606.9	6393.6	4213.3	39.7%
2012	12585.5	5753.7	585.7	5168.0	89.8%	11999.9	6831.9	5168.0	43.1%
2013	14490.5	6571.8	640.8	5931.0	90.2%	13849.7	7918.8	5931.0	42.8%
2014	15968.9	7066.1	699.9	6366.2	90.1%	15268.9	8902.7	6366.2	41.7%

Note: Net fiscal expenditure of local governments equals to Local Fiscal Expenditure to social security and employment affairs deducts Central fiscal transfer payment in it.

Source: The author calculates based on fiscal final accounting of fiscal expenditure on nationwide, central level and local level.

It is no hard to imagine that the local governments game ceaselessly with central government for gaining more fiscal transfer payment. Actually, for balancing benefit of all local governments, central government has to subsidy not only to local governments with deficient pension fund but also to those with adequate pension fund. This is not efficient either in economy or in politics.

2.3 Evaluation to management of Occupational Pension fund

2.3.1 Characteristics of OP

(1) Mandatory

China's Enterprise Annuity system covers the urban enterprises employees, occupational pension system is intended for GOPI employees. Enterprise Annuity first appeared in 1980s, but developed very slowly until 2004 the former Ministry of Labor and Social Security issued the Enterprise Annuity Trial Measures. Enterprise Annuity is voluntary, and ask issuers to meet the following three conditions: First, to participate in the Basic Pension system and fulfill contribution obligation; and second, with the corresponding economic affordability; third, has established collective negotiation mechanism. These three conditions for small and medium enterprises appear to be too harsh, so even if the Enterprise Annuity can play an important positive role in human resource management, but enterprises issuing plans are not many, and more concentrated in large enterprises or SOEs. After 10 years of development, by the end of 2014, China had 73,261 enterprises to have issued Enterprise Annuity plans, covered 22.928 million workers, accumulated 768.895 billion YUAN; but only 33.5 thousand YUAN per participants. The Enterprise Annuity system only plays limited role of supplementing social pension schemes.

Occupational Pension is supplementary for GOPI pension; to the contrary with Enterprise Annuity, it is mandatory and covers all GOPI in post staff when it begins to carry out. That means all of 38 million GOPI staff will participate Occupational Pension system this year.

(2) Contribution by both governments and staff in post

In GOPI Occupational Pension system, the governments and the staff in post contribute 8 percent of total payroll and 4 percent of individual wage respectively. In contrast, the sum contribution rate in Enterprise Annuity system is 1/6, 4.7 percentage points higher than that in GOPI Occupational Pension system. Thereafter, the amount of OP contribution on nationwide average is slightly lower than that of Enterprise Annuity (see Table 2.10).

Table 2. 8 Contrast of Occupational Pension with Enterprise Annuity

Contribution rules		Average salary of workers in post o in 2014 (Yuan)	Amount of contribution (Yuan)	
GOPI Occupational Pension	Enterprise Annuity		GOPI Occupational Pension *	Enterprise Annuity
Employers (governments): 8%; Employees (staff in post): 4%	Less than 1/6 of payroll are tax exempted	57346	7569.6; including 2523.2 Yuan (individual contribution)	Maximum 9557.6; including 4778.8 Yuan (individual contribution)

Note*: Occupational Pension contribution is calculated on the basis of 1.1 times of average salary of workers in post.

Source: The author calculates according to the regulations in *Management Act of Occupational Pension Fund of 2015* and *Enterprise Annuity Trial Act of 2004*.

(3) Bookkeeping for government's contribution replaces real money in Individual Occupational Pension Account

Individual contributions of all Occupational Pension Accounts are real money that can be invested while contribution of governments as employers are bookkeeping until the insured retires. This is a compromise is to ease the financial pressure and promote reform to implement smoothly.

After the reform, because government at all levels continue to not only burden pensions, but also to contribute in Basic Pension system and Occupational Pension system for GOPI staff in post, fiscal expenditure will be significantly increased. Table 2.11 shows this situation. It is found that before reform the governments only pay for pension of retirees, which accounts for 2.6 percent of current fiscal revenue in 2014, and after reform the governments have to spend additional expenditure, that is contribution for staff in post, which will increase fiscal expenditure up to 4.34 percent. That means fiscal expenditure will increase sharply by 65.8 percent. For some undeveloped regions, it is hardly to afford it in short-term. Therefore, the government's contributions to Occupational Pension system are in a virtual bookkeeping method.

表 2. 9 Fiscal expenditure will increase sharply (take the year of 2014 for an example)

Retirees (10 thousand)	Total pension of "old retirees" (100 million Yuan)	Nationwide fiscal revenue (100 million Yuan)	Staff in post (10 thousand)	Average salary of workers in post (Yuan)	Contribution (Yuan per person)		Ratio of governments' contributions to current fiscal revenue (%)		
					Basic Pension system	Occupational Pension system	Pension for "old retirees"	Contribution to Basic Pension system for staff in post	Contribution to Basic Pension system for staff in post
786	3669	140349.7	3790	57346	11469.2	4587.7	2.61	3.10	1.24

Source: Total pension of "old retirees" in the table equals to fiscal expenditure for pension of GOPI in *Nationwide Final Accounting of Fiscal Expenditure of 2014* and the data of fiscal revenue in the table comes from *Nationwide Final Accounting of Fiscal Revenue of 2014*, both are released by Ministry of Finance in 2014. The data of retirees and staff in post of GOPI is provided by the project team of "China's Pension Reform".

(4) Defined Contribution payment

Unlike Defined Benefit (DB) mode of Occupational Pension system in most developed countries, GOPI's Occupational Pension system starts on the use of Defined Contribution (DC) payment mode. This means that the investment risk of accumulated fund and inflation risk in the long term will be taken by the participants. The DC payment revolutionizes the mode of complementary pension of GOPI.

2.3.2 Pension benefits and its influencing factors

(1) Pension Divisor of Occupational Pension

In GOPI pension reform, when retiring the participants will perform one-off obligations to choose to be paid pension in either lump-sum or annuity way. In annuity way, the accumulated fund in participant's Occupational Pension Account is withdrawn monthly, and the Annex 1.8 shows the pension divisor that is same as pension divisor of Urban Enterprise Basic Pension and pension divisor of GOPI Basic Pension. Just like the analysis above, the pension divisor is too small to deal with longevity risk.

(2) Influences of contribution years and investment revenue on Occupational Pension benefits

The Occupational Pension benefits are determined by accumulated contribution and its investment revenue. So the scale of Occupation Pension Account fund is influenced by two factors: one is contribution years; the other is ROI which is more important in "new normal" of China's economy development trend.

Assuming the average salary grows up by 4 percent from the year of 2014, and assuming all the contribution of employers and employees is real money and can be invested in capital market. Occupational Pension replacement rates of different contribution years and at different ROI are shown in Table 2.11. If the ROI is 2%, the Occupational Pension replacement rate is 17.8%, 21.7% and 24%, corresponding to contribute for 20 years, 30 years and 35 years respectively; if the ROI is 7%, the replacement rate is 46.4%, 91.3% and 128.1% respectively. Though the calculation is too simple, it indicates that Occupational Pension benefit level is concave function of contribution years and ROI, which shows that deferring the existing retirement age (55 years old on average) and improving ROI are very important to Occupational Pension benefits level.

Table 2. 11 Occupational Pension replacement rates of different contribution years and at different ROI (%)

ROI \ Contribution years	2%	3%	4%	5%	6%	7%
1	12.2	12.4	12.5	12.6	12.7	12.8
2	12.5	12.7	13.0	13.2	13.5	13.7
3	12.7	13.1	13.5	13.9	14.3	14.7
4	13.0	13.5	14.0	14.6	15.1	15.7

5	13.2	13.9	14.6	15.3	16.1	16.8
6	13.5	14.3	15.2	16.1	17.0	18.0
7	13.8	14.8	15.8	16.9	18.0	19.3
8	14.1	15.2	16.4	17.7	19.1	20.6
9	14.3	15.7	17.1	18.6	20.3	22.1
10	14.6	16.1	17.8	19.5	21.5	23.6
11	14.9	16.6	18.5	20.5	22.8	25.3
12	15.2	17.1	19.2	21.6	24.1	27.0
13	15.5	17.6	20.0	22.6	25.6	28.9
14	15.8	18.2	20.8	23.8	27.1	30.9
15	16.2	18.7	21.6	24.9	28.8	33.1
16	16.5	19.3	22.5	26.2	30.5	35.4
17	16.8	19.8	23.4	27.5	32.3	37.9
18	17.1	20.4	24.3	28.9	34.3	40.6
19	17.5	21.0	25.3	30.3	36.3	43.4
20	17.8	21.7	26.3	31.8	38.5	46.4
21	18.2	22.3	27.3	33.4	40.8	49.7
22	18.6	23.0	28.4	35.1	43.2	53.2
23	18.9	23.7	29.6	36.9	45.8	56.9
24	19.3	24.4	30.8	38.7	48.6	60.9
25	19.7	25.1	32.0	40.6	51.5	65.1
26	20.1	25.9	33.3	42.7	54.6	69.7
27	20.5	26.7	34.6	44.8	57.9	74.6
28	20.9	27.5	36.0	47.0	61.3	79.8
29	21.3	28.3	37.4	49.4	65.0	85.4
30	21.7	29.1	38.9	51.9	68.9	91.3
31	22.2	30.0	40.5	54.5	73.1	97.7
32	22.6	30.9	42.1	57.2	77.4	104.6
33	23.1	31.8	43.8	60.0	82.1	111.9
34	23.5	32.8	45.5	63.0	87.0	119.7
35	24.0	33.8	47.4	66.2	92.2	128.1

Source: The author calculates.

(3) Effect of accounting interest rate on Occupational Pension benefits

It is regulated that the contribution rate of Occupational Pension is 8% (by employer) in bookkeeping way and 4% (by employee) in real money way. That means 2/3 of total contribution of Occupational Pension is virtual.

The accounting interest rate of the virtual contribution influences largely on Occupational Pension benefit level. For example, if RIO is 7%, the accumulated contribution from staff at 4% rate of individual is invested in capital market and gain 7% RIO every year, while the accounting interest rate of accumulated virtual contribution from governments at 8% rate of total payroll is 2% (almost equals to average interest rate of one-year deposit in last 10 years), the replacement rate is 27.4% and 44.9% in the case of contributing for 20 years and 30 years respectively (see Table 2.13).

Table 2. 10 The Occupational Pension replacement rate in the case of 2% fixed accounting interest rate to government's virtual contribution and 2% to 7% RIO to individual real contribution (%)

Contribution years \ RIO	2%	3%	4%	5%	6%	7%
1	12.2	12.3	12.3	12.4	12.4	12.4
2	12.5	12.6	12.6	12.7	12.8	12.9
3	12.7	12.9	13.0	13.1	13.3	13.4
4	13.0	13.2	13.3	13.5	13.7	13.9
5	13.2	13.5	13.7	13.9	14.2	14.4
6	13.5	13.8	14.1	14.4	14.7	15.0
7	13.8	14.1	14.5	14.8	15.2	15.6
8	14.1	14.4	14.8	15.3	15.7	16.2
9	14.3	14.8	15.3	15.8	16.3	16.9
10	14.6	15.1	15.7	16.3	16.9	17.6
11	14.9	15.5	16.1	16.8	17.5	18.4
12	15.2	15.8	16.6	17.3	18.2	19.2
13	15.5	16.2	17.0	17.9	18.9	20.0
14	15.8	16.6	17.5	18.5	19.6	20.9
15	16.2	17.0	18.0	19.1	20.4	21.8
16	16.5	17.4	18.5	19.7	21.1	22.8
17	16.8	17.8	19.0	20.4	22.0	23.8
18	17.1	18.2	19.5	21.1	22.8	24.9
19	17.5	18.7	20.1	21.8	23.8	26.1

20	17.8	19.1	20.7	22.5	24.7	27.4
21	18.2	19.6	21.2	23.3	25.7	28.7
22	18.6	20.0	21.8	24.1	26.8	30.1
23	18.9	20.5	22.5	24.9	27.9	31.6
24	19.3	21.0	23.1	25.8	29.1	33.2
25	19.7	21.5	23.8	26.7	30.3	34.8
26	20.1	22.0	24.5	27.6	31.6	36.6
27	20.5	22.5	25.2	28.6	32.9	38.5
28	20.9	23.1	25.9	29.6	34.4	40.5
29	21.3	23.6	26.7	30.7	35.9	42.7
30	21.7	24.2	27.5	31.8	37.5	44.9
31	22.2	24.8	28.3	32.9	39.1	47.4
32	22.6	25.4	29.1	34.1	40.9	49.9
33	23.1	26.0	30.0	35.4	42.7	52.7
34	23.5	26.6	30.9	36.7	44.7	55.6
35	24.0	27.3	31.8	38.1	46.7	58.7

Source: The author calculates

3. Public sector pension system in EU countries and their experiences

Public sector pension systems in EU countries could be divided into two basic modes "independent system" and "hybrid system": Germany, France, Denmark, Luxembourg, Spain (central government civil servants) and Belgium, which have independent civil service pension plan; Britain, civil servants in Sweden, the Czech Republic, Hungary, Poland, Greece, Austria and other countries participate in the national plan, but there will be some differences in the treatment of issuance. Compared with the private sector pension system, public sector pensions calculated and paid more generous, with a higher level of treatment, for example, Germany, Denmark, Spain, the Netherlands, Portugal, the United Kingdom and other countries of the civil service pension calculated and paid in accordance with the last month wage, Austria is in accordance with the highest wages during their career, and all are defined benefit type.

Recent years, for the heavier fiscal burden and fiscal pressure spending on pension system, increasingly dissatisfied with the treatment gap between the private sector and public sector and extending retirement age to avoid human resources loss¹⁸.EU countries have reformed their public sector pension system.

¹⁸ Kings, J., E. Turkisch and N. Manning (2007), "Public Sector Pensions and the Challenge of an Ageing Public Service, *OECD Working Papers on Public Governance*, No. 2, OECD Publishing.

Specific measures below¹⁹:

First, reduce the benefits of public sector pension , including Finland, France, Germany, Italy, Portugal and Sweden;

Second, public sector employees will be integrated into the general pension system, including Austria, the Czech Republic, Greece, Hungary, Poland and Spain;

Third, Defined contribution will be introduced to the pension system, including Denmark, Hungary and Poland, but Hungary stopped payment to the fund accumulation system at the end of 2010, and gradually back to the PAYG system, Poland in early 2011 also dropped contribution rate to the fund from 7.3% to 2.3%.

Fourth, the establishment of public-sector pension reserve fund, such as Belgium, Finland, Germany, Ireland and Sweden.

The following is the introduce of EU public sector retirement system from basic pension and occupational pension.

3.1 The basic pension

3.1.1 Germany

German basic pension of civil servants are directly payed by the government through the budget, without individual contributions. Retirement age is 65 years old, special occupations (police, firefighters and prison staff)are 60 years old, required for at least 5 years service; early retirement age is 63, and each year in advance with pension decreased by 3.6 percent, up to 10.8% reduction ; pension level according to the last month's wage, less than 10 years of seniority with 35% of total pension;10 to25 years of seniority, one year beyond for additional 2% of the original salary; more than 25 years of seniority ,each year with additional 1% of the original wage; pension will not exceed 75 percent of the last month's wage. In addition,if the total pension or other statutory supplementary pension exceeds a predetermined maximum that civil servants and their survivors receive , then pension reduced correspondingly. If pensioners or their survivors receive income through paid work, such income plus total monthly pension over the salary before retirement, the excess deducted from the pension.

Since 1992, to enhance financial capability of the system, the German public sector pension system has undergone several reform: in 1992 the basic pension system reform reduced early retirement pension benefits, and gradually expanded to the public sector ; in 1997 launched the civil service pension reform bill, in 1998 introduced pension reserves. "Pension Reform Act of 2001," measures are as follows: ①2003- 2010, the pension benefits growth rate declined by 0.5% per year , whereby pension replacement rate from 75% down to 71.75%. ②50% of the cut down on pensions to expand pension reserves. ③Civil servants who conduct voluntary savings , can receive the special allowances or tax incentives provided by the State in accordance with "Retirement Assets Act" .

German public sector pension are from the finance, under the pressure of old aging, lowering treatment to alleviate the financial burden. Indeed, from the 1990s German began to reduce civil service pensions, to

<http://dx.doi.org/10.1787/285530706017>.

¹⁹ Pond's, Sven Leeson, Boyer ink: "Public Sector Implicit Pension Debt: An International Comparison", "Social Security Research," 2012 4, page 10.

2006, retired civil servants and judges pensions are 3.4% lower than 1994²⁰. 2003--2010, the highest wage replacement rate dropped to 71.75% from 75%, replacing the 60 percent rate of survivors' pension to 55%. Every year German civil servants have a vacation allowance and Christmas allowance, but from 2004, the year-end allowance of pensioners declining from 4.17% to 2.085% in 2007. After lowering treatment, the size of the public sector pension spending under control, measurement data showing that the proportion of civil service pension expenditure accounts about 2% of financial revenue, gradually decline to 1.8% in 2050²¹.

3.1.2 France

France public-sector pension system is independent of the private sector, within the public sector also including different sub-systems according to different industries, including the central government civil service plan, CNRACL, EDF-GDF, SNCF, RATP pension plan, and so on. The central government civil service pension are from the financial burden, but local civil servants join the contributory pension system.

Individual contribution rate is 7.85% of local government civil servants, the unit need to rata payment, usually about 25%. French public sector basic pension base on the last six months salary, replacement rate of 75%, while the private sector base on the best 25-year average salary, replacement rate of 50 percent. Since 2003, the minimum contribution from 37.5 years increased to 40 years in 2008 to get full basic pension for civil servants, until 2012 the condition reached 41 years²². In addition, basic pension of civil servants is no longer linked with changes in wage, but according to price changes.

There are three specific agencies for French public sector pension: ① Treasury Pension Board located in Nantes is responsible for national civil servants retirement relating to audit and pension budgetary arrangement, and 27 accounting payment center branches distribute pension; ② France Bordeaux Trust Agency branch located in Bordeaux, are responsible to raise and pay disability insurance and pension for local civil servants and medical system servants; ③ Angers Trust Agency branch, is responsible for mobilizing and paying supplementary pension of public sector workers and contract personnel of state-owned enterprises, banking, electricity. When personnel flow, agreement between three institutions has been settled that people meet the conditions of retirement, pension can be calculated piecewise or several agencies to pay pension together; if do not meet the conditions for retirement, the transfer-out mechanism can transfer agencies and individuals paid pension into the transfer-in mechanism, which pay the final pension at the time of their retirement.

3.1.3 Britain

In April 2013 Britain issued the "2013 public pension law", which reforms public sector pension system. First, the pension adjustment index changed from retail price index to consumer price index, which growth rate much less, and saving pension expenditures. The second is the establishment of defined contribution plan, using average income base instead of the last income to calculate pension. Third, retirement age gradually extend to 67 years old to come to a agreement with national pension, except for firefighters, police and military in the public sector. Fourth, get rid of the dual track between the public

²⁰ Gabriela Maria Graf, AKA – Germany, "The German Civil Servants pension can still be financed", Euro Pension Bulletin, No.33, 09/2009, p.2,

http://portal.versorgungskammer.de/portal/pls/portal/!PORTAL.wwpob_page.show? docname=3749028.PDF.

²¹ Ditto

²² OECD (2013), "France", in Pensions at a Glance 2013: OECD and G20 Indicators, OECD Publishing. http://dx.doi.org/10.1787/pension_glance-2013-56-en.

sector and private sector pension , and transferring among the different system freely. Fifth, increase the contribution rate of high-income employees, the minimum contribution of British local government employees is 5.5%, the maximum rate increase from 7.5% to 12.5%, the high-income employees with annual income more than 150,000 pounds contribute 12.5%. After the reform, the public sector pension replacement rate reduce from 23% to 15%. Pension liability of the government and employers reduced, in 2065 government spending on public sector pension reforms will decline to 0.8% from the former 1.1%²³.

3.1.4 other countries

Belgium. Belgian public sector pension system without individual contribution, contribution rate of employers is 7.5% , while employers and employees in private sector contribute 8.86% and 7.5% respectively, that showing significant contribution liability gap between public and private sector. On the treatment issuance, certain proportion according to the reference wage in both two sector is same, except that: First, reference wage, pension of civil servants reference salary is the average wage of the last five years, while the private sector reference wage is the product of wage ceiling and CPI index, wage ceiling is average of the sum of all working years wage (maximum 45 years); Second, calculation ratio, proportion of public sector pension equal work experience in addition to 60, and up to no more than 75%, while the proportion of private sector pension were 75% (with spouses) and 60% (without spouse).

Czech. Implementing defined benefit PAYG system, in addition to the army, fire police and other armed forces that have special pension system, this pillar covers all personnel engaged in economic activities, all managed by the Czech Social Security Administration. Contribution rate is 28%, 21.5% of employers, 6.5% of employees. Pension is calculated in two parts:basic part of a unified national level, depending on the country's level of economic development and consumption levels; floating part links to retired workers average wage level for nearly 30 years and payment time .

Since the Czech pension system started in the civil service and the danger department staff, then gradually extended to the private sector, thus pensions of the private sector and public sector have certain gap. With the transformation of the Czech economy development in the 1990s, the implementation situation of these various occupational pension gradually improved in the reform. In 1990-1992, unified pension benefits, eliminating prejudice and discrimination, especially discrimination against self-employed staff; in 1995, a unified pension system linking pension benefits with contribution established , the discriminatory pension plan of occupational categories base abolished²⁴.

Poland. Poland's largest pension system is General Pension System, to provide retirement income security for the elderly, employee survivors, employment injury disability, sickness and maternity and other groups . Poland's mandatory retirement age for men is 65 years old, women 60 years old, but in fact, in 2007 the average retirement age is only 57.1 , male 59.7, female 55.8²⁵.

To adopt to aging population, ensure the sustainability of the pension funds ,and accelerate Poland's economic development. In 1999, an overall thorough reform the structure of basic pension from the defined benefit to defined contribution.Thus, the compulsory first pillar pension system is divided into two parts: Non-financial Defined Contribution(NDC)and financial defined contribution(FDC), the former operate and manage by Social Insurance Institution(ZUS) ,the latter by general pension fund societies and other private sector societies. Accordingly, each pensioner has two accounts,NDC can not be traded in the financial

²³ Li Guijiang: "The UK public sector pension reform and its Implications",scientists" 2014 Section 4, page 40.

²⁴ Pu Wei: "Czech pension system reform and Decision", "Russian Central Eastern European markets", 2010 No. 11, p. 37-41. 8.Economic Policy Committee and Directorate-General Economic and Financial Affairs .

"Pension schemes and pension projections in EU-27 Member States, 2008-2060", Occasional Papers 56, October 2009,p.316.

markets, yield growth rate of total wages; FDC may invest in the capital market to obtain return on investment. When reform taken, people who less than 30 years old (born after 1969), must attend FDC; people aged 30 to 50 (born between 1949 to 1968) can choose freely. Contribution rate is 19.52% of the total wage, the employer and employee share average. Since 2011, to fund Open Pension Funds with contribution of employer and employee of 2.3% (previously 7.3%), remaining part remains in NDC for current payment. In 2011, the net replacement rate reached 68.2%²⁶.

After NDC reform, the Polish pension and personal income are close positive correlation, financial status will be significantly improved. Future with aging population, pension expenditure is expected to continue drop share of GDP slightly²⁷.

Austria. Prior to the 2005 reform, the civil servant has special independent pension system, without unemployment or pension insurance, but directly apply for a pension from their employers, because of the different sector (federal government, state government, local government, the railway sector, etc.), the benefits are different.

"Pension System Reconciliation Act" was implemented in 2005, providing that civil servants aged less than 50 in 2005 must join the social pension insurance. Contribution rate of 22.8%, all borne by the state fiscal. The statutory retirement age is 65 for men, 60 years for women, and the retirement age for women will gradually be extended to 65 years in 2024-2033; early retirement pension will be deducted 4.2% each year (who aged between 62-65 years with 37.5 years full pay, the proportion of early retirement deduction is 2.1%), the highest deduction of 15%; one-year delay retirement will be issued additional 2.1%, pension until 68 years old. Pension will be adjusted annually based on the CPI in order to guarantee the purchasing power of pension.

If the retirement pension calculation base are too low, or contribution time too short to causes pension below this baseline, the state will issue subsidies to guarantee minimum standard of living after retirement. Baseline year will be dynamically adjusted according to the situation.

3.2 Supplementary pension

3.2.1 Germany

Set VBL for example, the program is divided into occupational pension and supplementary pension: the former one is statutory right, mandatory program regulated by the Federal Ministry of Finances; The latter is determined by collective agreement, a voluntary plan, including supplementary pension of local government staff and teaching staff, national and state employee old-age insurance, the non-salaried city employees and state employees offered collective agreement voluntary insurance by the Federal Financial Services Supervisory Authority. Manager of VBL can be either independent legal person, independent agency or local government authorities. If it is an independent legal entity, the Council and the Executive Committee shall be set up, the former is responsible for strategic decision-making, policy development, which is responsible for policy implementation, review annual reports, members representing the two sessions are recommended by

²⁶ IZA Research Report No.42, "Pension Systems in the EU-Contingent Liabilities and Assets in the Public and Private Sector", December 2011, p.126.

²⁷ Agnieszka Chłoń-Domińczak, Daniele Franco, and Edward Palmer, "The First Wave of NDC Reforms: The Experiences of Italy, Latvia, Poland, and Sweden", in *Nonfinancial Defined Contribution Pension Schemes in a Changing Pension World*, Volume 1, Robert Holzmann, Edward Palmer, and David Robalino, edited, World Bank, Washington, D.C., 2012, p.66.

the government-appointed and trade unions. In addition, members will also elect two sessions to form a special committee, responsible for finance and investment matters.

Financing of VBL include PAYG system, funds and mixed system ,and other forms of treatment can also choose defined benefit (DB) or defined contribution (DC), and take the points system. After 2006, tax incentives of VBL plan gradually shift the form of the EET to TEE .

In the West region, contribution rate of employers and employees respectively are 6.45% and 1.41% of salary, take the PAYG system, a refinancing plan was introduced in 2002 to this region to provide additional contribution by employers with the 2% highest rate to compensate people have participated in the work before pension system established; In East Germany, after 2004 the PAYG system was shifted into a mixed system, the employer pay 1% wages to PAYG system ,after 2010 all switched to funding system, 2% contribution rate by employers and employees respectively. System does not permit to increase their own contributions. Prior to 2001, VBL require a minimum payment of 120 months, and then changed to 60 months.

If the public sector employees departure, only voluntary supplementary pension insurance relationship programs and funds can be transferred, but fund in PAYG and mixed-fund are non-transferable. 2004, VBL and AKA signed a recognition agreement,that change jobs between the government and the church, without the transfer of pension rights and interests; if an employee requested transfer, the payment must meet at least 60 months; upon retirement, employee can extract pension from two a system .

Supplementary pension fund in Germany implement market-oriented operation, management fees by a certain percentage amount of assets, payment of income, expenses, or other indicators of annuity payments, asset allocation to fixed income securities and cash-based assets, both accounting for more than 50%.

DC and NDC system contribution rate is 4%, in order to ensure purchasing power of retirement income, this defined contribution system provides a guaranteed rate of return, guaranteed rate of return was 3.25% working period, retirement period is 5.25%. NDC take the points system, pension pay points depends on reference salary and age factors.

Employees reach retirement age and retirement time and apply for retirement , you can choose to receive monthly or lump sum. the minimum age is 62 years old to draw VBL supplementary pension , a month early retirement, the treatment will be reduced by 0.3%, the maximum percentage not more than 10.8%. After 2009,the divorce shall split the existing pension rights and interests, in order to guarantee the one out the pension system.

3.2.2 Netherlands

Occupational pension is the largest pillar of Dutch pension system, with semi-mandatory feature, withholding by the employer, the employer contribution enjoy tax benefits, this system covers almost all wage earners, including civil servants. Dutch take defined benefit occupational pension (DB) calculated and paid, the employer to assume pension fund operational risk . In the system design, to encourage longer working life, the provisions of premium payment for each additional year, occupational pension equity increased by 2% (in pre-retirement salary as the base) and 2-2.25% (based on work average wage). Four category operators involved in occupational pension market : First,company-specific pension fund, mainly for large enterprises and services; the second is industry-wide pension fund providers, all companies facing an industry ; third, insurance providers, for all kinds of enterprises to provide more than 3000 kinds of life insurance ; fourth,pension funds for professional groups, for the self-employed and other independent

companies. By the end of 2008, the Dutch pension system consists of 651 pension funds, covering about 6,000,000 employed.

Occupational pension of civil servants is the largest Dutch pension fund, covering government employees, public utilities and education sectors, which assets account for a quarter of market, operate by the ABP, which is a non-profit organization. Centralized management, supervised by the central bank. Employees can choose the following pension products

First, ABP Multi-Option Pension. The principal may retire from 60 years, 5 years after the retirement age up to the national basic pension (AOW). Working longer then pension rights and interests will be higher, but pension depends on the amount of accumulation.

Second, ABP Incapacity Pension. Trustee ill or unable to work during the first two years receive a salary from the employer. Two years later, UWV (Social Security Agency) would be compensated, ABP subsidies play a role in additional income. On condition that the pension rights of people from the first day of illness payment of pension and accept the UWV disability benefits.

Third, ABP Surviving Dependents Pension. In the case of death of the trustee, your partner enjoy survivor's pension. Children under 21 years old and ex-wife can apply.

By the end of 2014, the company provide services for 2.8 million insured persons and nearly 4,000 employers, total assets reached 344 billion, the return on investment is 14.5%. However, the fund's income in 2014 is the first time lower than the fund expenditures, showing the financial sustainability pressure caused by aging population. Currently, in the Netherlands, the total occupational pension and basic pension replacement rate can reach 70 percent of pre-retirement wages²⁸.

3.3 EU major nations public sector pension reform experience

In recent years, the main purpose of the public sector pension system reforms in EU countries are to reduce the financial pressure, a variety of measures, including:

First, reduce the pensions of DB plan. One approach is to directly cut pension, for example, German pension replacement rate of civil servants will fall to 71.75% from 75% in 2030, Luxembourg from 83.33% to 72%, Austria pension replacement rate ceiling up to 80%. UK public sector pension wage replacement rate 23% down to 15%. Another approach is to modify the plan hair base, for example, by modifying the calculation method, Finnish reforms through plan hair base to reduce pension expenditure, 1987 pension plan hair base is the average salary of the last four years; in 1996 changed to the last 10 years of the average wage; in 2005, adjusted the average wage to the entire work period average salary. France implement reform to adjust the basic pension from the civil service and wage movements linked price changes.

Second, delaying the retirement age, especially for women, to extend the payment period. For example, in 2006, minimum retirement age of the Dutch public sector increase from 55 years old to 60 years old. Luxembourg and Finland will extend the payment period from 30 years to 40 years; France, a full pension of contribution years was 150 quarter, and in 2008 extended to 160 quarters. Portugal also extended to 40 years from August 2005.

Third, lower level of survivor annuity benefits. For example, the Swedish phasing survivor annuities, Netherlands will compress half of survivor annuities.

²⁸ Annual Report 2014, <http://www.abp.nl/en/receiving-pension/pension-products/>

The fourth, the establishment of occupational pension fund. Such as Austria, Spain, Belgium, Poland, France and Italy.

The fifth, change the defined benefit into defined contribution. Thus, not only can enhance the premium payment initiative, but also conducive to the long-term balance of the financial system. In the pressure of aging population and the economic slowdown, the European welfare states have abandoned defined benefit pension system, turning to defined contribution, or to enhance the relevance of treatment and payment. Treatment associated with the payment, work or contribution years, contribution base, billing rates or investment returns and other factors as direct factors of pension levels. Pensioners can make the best decisions basing on the effectiveness of pension and personal time preference. Policymakers can also be made by adjusting the count in the equation coefficients work or contribution years, to guide people to make decisions in line with policy needs of retirement, especially delay retirement.

The sixth, punish early retirement but incentive to delay retirement to avoid wasting of human capital. If the treatment is associated with the contribution can indirectly lead people to delay retirement, then the effect will be more direct incentive mechanism. France, Germany, Italy, the Netherlands, Finland, Portugal, Greece, Luxembourg and Hungary and other countries have regulations that early retirement pension will be reduced by a certain percentage of pension. France, each year ahead of retirement that the pension will be reduced by 5% to the maximum, using date of birth instead of the entry time into pension system to measure eligible for retirement. Luxembourg, deferred one year than the normal retirement age, receive more 2.3% of the last wage until the replacement rate up to 110%; Hungary, delaying one month to retire, multiple final wages by 0.5%. Finnish pension system reform that retire after 55 years old, each year increased 2.5% pension. After 2005, the retirement age of 53-62, the annual pension increase by 1.9 percent, the retirement age 63-68 increased by 4.5% annually.

The seventh is to enhance the portability of pension funds. For example, in Belgium, reform implemented in 2003, if the pensioners delegated to international organizations, the pension rights and interests can work with the mobilization and transfer. Firstly pension rights and interests must be one-time settlement in the country, then the funds can transferred to the new pension system in the workplace. Provision before is subrogation mechanism without the transfer of one-time financial transfer. When Belgian public sector employees move to the private sector, the pension interests enjoy independent calculation. When they conversion work between the public sector, pensions paid according to the treatment of pre-retirement work units, but will take full account of the performance and working life of the entire work period.

The eighth is to establish a risk reserve fund to strengthen the financial sustainability of the system.

4. Policy proposals on improving GOPI pension insurance system

Target of GOPI reform is to achieve justice, liquidity and financial sustainability. Justice embodies in unify treatment, corresponding rights with responsibilities, and narrowing gap between GOPI and Urban Enterprise Pension system; the liquidity reflects in the pension interests can be protected with labor mobility, without "portability loss"; Financial sustainability requires to guarantee certain level of replacement rate, balance of payments, or the deficit is controllable that can be made up without bring unbearable pressure on the government at all levels.

4.1 Strengthen the justice of system

4.1.1 Set reasonable contribution base

GOPI pension system is designed to achieve uniform with urban enterprises basic pension insurance, but the statistics contribution base are inconsistent .Pension contribution base is basically all labor income with higher degree of labor remuneration monetization , while GOPI have much higher proportion of implicit wage, most GOPI remain the reform subsidies (transportation allowance, communications allowance, housing allowance, education and medicaid, heating subsidies which covered by the previous system), but contribution wages of GOPI do not include allowances and subsidies. From the perspective of the unit, it is advantageous that can reduce current contribution expenses, and postpone the financial burden; but from personal point of view, future pension will be affected by the reduced the contribution to personal accounts of basic pension insurance and account of occupational pension .

In view of this, we should improve the supervision mechanism, and establish pension supervision committee which consist of employees and retirees on behalf, principal of the relevant government departments, experts and scholars, to insure pension rights fully understood, and be able to supervise unit to contribute pension insurance in accordance with labor income agreements, to ensure individual right of knowing and future pension benefits.

4.1.2 Ensure the revenue and interests rights of the virtual bookkeeping part of the account

Personal accounts of GOPI basic pension and unit contribution of occupational pension both use virtual bookkeeping way, but with slightly different: the basic pension of individual contributions to personal accounts, but the funds have been incorporated into the social pooling fund for the current payment for retirees. In fact , it is "financial transform "between the social pooling account and individual pension accounts. ²⁹Unit contribution to occupational pension accruals accounts implement virtual bookkeeping without actual capital until retirement , in fact, it postpone the unit payment time from each month of working time to retirement .It is general practice to reduce the current financial burden.

The biggest drawback of "Virtual bookkeeping" is the loss of investment income , and then will affect the participants' future retirement income. "Decision of the State Council on the reform of GOPI pension system" and "Government Organs and Public Institutions Pension Rules", stipulate that personal accounts of GOPI basic pension and unit contribution of occupational pension should calculate interests annually in accordance with the national unity bookkeeping interests rate, but do not clearly defined how to determine the accounting interest rate.

To avoid loss of pension benefits, we should define the accounting interests rate equal or close to the market investment interest rate . Further, in order to protect the safety of the fund account, we also need to determine a security rate.

4.2 Strengthen liquidity of pension system

According to "Decision of the State Council on the Reform of Government Organs and Public Institutions Pension System", if the insured leaves the original unit, and continues to insure in the new unit, the pension payment period can be accumulated; transfer of pension relationship divided into two situations:

²⁹ Hu Xiaoyi, vice minister of human society on the GOPI pension system reform answer,

First, flows between organizations and institutions within the same range of contribution, only transfer pension relationship, without funds; second, the overall range of flow between different GOPI or enterprises, both transfer pension relationship and fund, with all fund in personal accounts of the basic pension insurance and 12% of the social pooling fund according to actual wages for each year to transfer. This shift measure is consistent with the existing connection measure of basic pension insurance for urban enterprise, but according the actual operation of basic pension insurance across region transfer. Resistance of pension fund transfer is not completely eliminated, due to local protectionism and subject opposed of vested interests, local government do not want to transfer the funds especially region in loss.

4.2.1 pension insurance relationship transfer between different contribution regions

In the short term, GOPI pension insurance cannot realize national co-ordination, different financial sources of funds result in fragmentation daily operation, investment management, the gap between the contribution scale and benefits level. In the labor mobility process, if treatment fall, personal against; if treatment uplift, the receiver oppose. Currently policy stipulate that labor mobilize among different contribution region ,leave the 8% personal actual contribution of wages in the original place, for the outflow of labor, this is a kind of compensation for the loss of human capital, but for labor inflows speaking, it is a loss of the pension system, because inflow region accept all the contribution years, but received only partial payment ,equals with 12 % contribution rate, to some extent, increase the financial burden of the inflow.

French pension system is managed by various agencies; transfer of pension insurance relationship is through consultation between agencies. According to the agreement, transfer mechanisms can compute contribution years segments and pay pensions respectively, if pensioners meet retirement condition; if employees do not meet retirement conditions, relationship of pension insurance and all contributions can be transferred to the receiver agency, while meeting retirement condition pension paid by the last receiving agency.

Implications for China: only all contribution from units and individuals transfer to the receiving agencies so that pension will not be an obstacle to labor mobility. Therefore, when public sector pension relationship transfers among different contribution region, in addition to the amount of personal savings accounts, pension should be fully transferred to the labor inflow, in accordance with the actual contribution rate during the work time.

4.2.2 the pension relationship transfer between public sector and private sector

When the GOPI staff departure and employed by enterprise, the transfer issue in addition to the basic pension insurance relationship and funds , but also involves the transfer of occupational pension accounts. For the basic pension relationship between the transfers, agencies can refer to existed methods, but it is more complex for the transfer of occupational pension accounts:

First, the GOPI occupational pension take virtual bookkeeping way, but established enterprise annuity take account operation, two operating mode cannot be directly transferred.

Second, if the enterprise does not establish enterprise annuity plans, in accordance with established practice, occupational pension account will remain in the original unit, which result in occupational pension account holders lose the accounts domination rights and the account fund investment supervision. Over time, some of the accounts may become bad debts.

Therefore, before complete the successful transfer of enterprise annuity with occupational pension accounts, fiscal need to save money to occupational pension accounts. For the enrolled enterprises which do not establish enterprise annuity plan, we need establish a transitional mechanism for the fund under the supervision of an independent government agency, occupational pension funds should be fully transferred from the original unit when departure happens , but in order to avoid personal extraction and discretionary before retirement, so that fund should be transferred to a designated account . Trustee take unified management and execution functions until the funds to be transferred to the enterprises to establish enterprise annuity, and then incorporated the occupational pension fund to annuity account.

4.3 Strengthen the financial sustainability of system

After the GOPI pension reform, calculation and contribution base change from the last month's wages to career wage indexation, so that narrowed contribution base reduce the financial expenses of GOPI pension system. This is in line with the international trend of pension system reform in the public sector, and also to ensure the unify with Urban Enterprise Pension system. However, due to the serious old aging problem, the GOPI pension system still exists financial sustainability problem . So, the following recommendations:

4.3.1 Taking long-term actuarial technology, use reasonable system parameters

Sweden and Poland and other countries to implement the NDC account, combine the advantages of the payment type (DC) and the PAYG system together. because the system is too complicated, result in few followers , but it is still a great reference.

Similarly with the NDC account , China's GOPI pension system also has virtual billing design, the current accounting year deposit interest rate is still the interest rate. If we get experience from the NDC account of Poland as reference , that is taking the factors of economic growth and demographic changes into the account of the accounting rate in this way can the use of actuarial techniques to help determine reasonable and appropriate methods of calculation and payment rates, thus contribute to long-term financial sustainability of system. There are several important parameters in the GOPI pension system: contribution rates, the number of months calculated by individual account pension, accounting and pension growth rates. Parameters of system will have a significant impact on financial sustainability .

Contribution rate. The decisive factor of system revenue collection. From the view of operation of the basic pension insurance system for urban enterprise, because the maintenance burden vary widely, regions with heavy maintenance burden pension bear over 30 percent contribution rate , regions with lighten burden that pension contribution rate is less than 10%. It is foreseeable that this problem in the implementation of the GOPI pension insurance system will also appear. Obviously, this problem, indicating that the contribution rate design is unreasonable, without sufficiently thinking of the differences over the maintenance burden.

Recommendation: a floating rate should be considered, on the basis of the reference rates fluctuated, so the local government can select the appropriate contribution rate based on the actual situation and long-term revenue projections.

Pension divisor. Under the current regime, the number of personal accounts of payment months of basic pension insurance are fixed, such as 60-years-old count the number of months is 139. This means that for people retired at 60-years-old, the amount of personal savings accounts can only be distributed to 71.6 years, thereafter it will be a long-term risk system that individual account pension needs full financial commitment.

Recommendation: consider using dynamic counting of months, as the Swedish and German pension reform have done, considering changes in demographic trends ,the wage growth and changes in market interest rates in the payment number of months.

Accounting interest rate. Accounting rates are the most critical factors of pension treatment. At present, accounting rates of the basic pension insurance for urban enterprise personal account is one-year deposit interest rate, it has long been lower than the inflation rate, leading to the real purchasing power of pensions personal accounts shrinking.

Recommendation: set guarantee interests, when the market interests of return lower than the guarantee interests, using the security interest; when the market interests is higher than the guarantee one , the investment interests of return in accordance with the actual market interests.

Pension growth rate. Pension growth rate can not less than the rate of inflation, otherwise it would be difficult to guarantee the basic life after retirement. Linking the pension with the price level, to ensure that pensions are not devalued; meanwhile, pensions should be linked to a certain percentage of wage growth, which would allow retirees to share the achievement of economic development.

4.3.2 Improve the earning capacity of the pension fund

Reference on the Reform of the United Kingdom. UK public sector pension not only do not set an upper limit of contribution, but also set a higher contribution rate for high-income earners. China's GOPI pension insurance and basic pension insurance for urban enterprise has contribution up-limit, that the wage of three times higher than social average wage income is out of contribution base , which is the protection of high-income groups, in the short term, it may keep high-income groups in the social insurance system, to avoid adverse selection problems, but in the long run, it will reduce the pension income.

In terms of social equity or to enhance the ability of the Fund's income , we need to cancel the contribution up-limit, but considering the system the hardness of implement, we can consider raising the upper limit of the contribution base when needed, to put more income into high-income groups in base pay.

4.3.3 Expand the scope of co-ordination by the "big social co-ordination" to improve the financial sustainability

The so-called "big social pooling" is to the pooling fund of GOPI pension insurance and urban basic pension insurance to the realize free transfer of all wage-earning class employees pension fund .

The reform stipulate that "GOPI pension insurance establish independent account, separately managed with enterprise employees basic pension insurance funds" ([2015] No. 2), it means that the GOPI pension contribution will form an independent pooling fund , not co-ordinate with urban enterprise basic pension insurance fund. This arrangement may be considered a higher dependency ratio of GOPI.Co-ordinate use means that urban basic pension insurance fund may compensate to GOPI. To implement reforms smoothly, in view of the current public opinion trends, separated account management reform may be the path of least resistance, but it weakens the social insurance mutual aid capabilities at all levels, finance will continue to burden the GOPI pension, the aging population problem inside GOPI can not be diluted through population structure by the whole society, the financial endowment do not completely turn to social insurance.

As mentioned earlier, the Czech Republic, which is a country in transition, after restructuring its economy, the pension system in the public sector and private sector eliminate the difference in treatment between different groups, to achieve social justice, and labor mobility promoted.

Recommendation:GOPI and urban enterprise system have been unified on the basic pension insurance, should gradually unify system parameters and pooling fund, forming a basic pension plan that cover informal

sector (to ensure contribution of employers) ,all employment, and secure universal retirees living. Reasonable gap can exist between pension plans in the public sector and the private sector , but this gap should not appear in the basic pension insurance. Differences of basic pension insurance contribution years only show individual wages (contribution level). Public and private sector pension benefits gap can be reflected in the occupational pension, the employer contribution rates of occupational pension reflect that necessary means of human resource management, the number of occupational pension employer contribution also reflect prices in different human capital in the labor market .

4.3.4 Encourage delayed retirement

Recently, the Minister of Human Resources and Social Security announced in news conference, that postpone the statutory retirement age gradually from 2017. Delay the retirement age has been proposed for years, but has been unable to practice, mainly because of public opposition is relatively large. Under the current regime, the basic pension insurance for urban enterprise personal contribution rate is 8%, the individual total contribution rate of GOPI pension insurance and occupational pension is 12%, while each additional year of contribution, the pension replacement rate only one percentage increased. In other words, under this plan hair mechanism, deferred retirement is actually negative. Unless hidden job wages and bonuses accounts high ratio, 1 percentage does not have any incentive to delay retirement.

Contrast the different delay retirement policies of Germany, France and Austria .It can be found that the public only accept such policy that delay retirement benefits outweigh early retirement. German public sector personal pension without individual contributory , payment of the public sector in Austria borne entirely by the state finance, therefore, the two countries are taking incentive delay retirement mechanism that will significantly reduce the early retirement pension, retirement is significantly delayed increase pensions. Instead, the French local government civil servants required to pay pension premiums, increase the proportion of pensions does not motivate people to take the initiative to delay retirement, the government forced to increase the retirement age only through legal means.

Only when individuals do not bear contribution or contribution rate is relatively low, it is incentive to postpone retirement using that "delay retirement with the additional pension, early retirement reduce pension ,". Therefore, China's GOPI pension insurance can increase the minimum contribution years and the corresponding level of pensions, to inspire people to delay retirement.

4.4 Improve the performance of pension fund investment operations

Operations experience of the basic pension insurance for urban enterprise show that due to personal accounts fund is in the social pooling accounts with social pooling funds for payment, The provinces of deficit expenditure can get central government subsidies, and provinces with profit surplus can form accumulation fund .From the national point of view, the total basic pension insurance fund accumulated surplus reached 3.5645 trillion Yuan.³⁰ Because GOPI pension insurance without national co-ordination, the central government will fund the same "deficit" of provinces subsidy, and the fund "surplus" province will accumulated surplus funds, we will face the operation problem of fund investment .

4.4.1 Independence of trustee's

At present, the investment and operation of basic pension insurance for urban enterprise funds are based on National Council for Social Security Fund as the trustee, for example, Guangdong Province, commissioned 100 billion Yuan in March 2012 for NSSF investment operation, obtained 17.336 billion Yuan of investment income in 2014.³¹ Shandong Province in February 2015 commissioned 100 billion Yuan pension fund for the NSSF investment operation. Since its inception in August 2000, the National Social

³⁰ Human Resources and Social Security Department: "2014 Annual Human Resources and Social Security Statistical Bulletin"

³¹ National Council for Social Security Fund: "The National Council for Social Security Fund Fund Annual Report (FY2014)."

Security Fund Council annual investment rate of return is 8.38%, while the inflation rate is 2.42 percent over the same period, to achieve better increasing the value of the fund. It should be said, the investment performance of the National Social Security Fund Council is quite good.

However, the National Social Security Fund Council belongs to the State Council institutions, whose assets are mainly from the central government budget allocations, the transfer of state-owned capital, investment income and personal accounts . Institutions and assets have close ties with the government, the independence of market institutions will be affected.

From perspective of institutions independence and decentralized of competition: choosing independent market institutions of the GOPI as trustee of the basic pension insurance fund.

4.4.2 Trust management and investment performance evaluation

The establishment of provincial government departments and institutions pension insurance council, entrusted all levels of government in the province, account records on behalf of managed funds and investment operations services; use trust management mechanism, improve the principal - agent mechanism, by choosing the appropriate market institutions investment operations, and establish a sound performance appraisal system occupational pension fund investment operations.

In recent years, from operator feedback of the situation of the enterprise annuity market , the biggest problem is the investment appraisal cycle is too short. Annuity performance generally for one-year short-term assessment period, for the three-year long-term assessment period, and to take the bottom out of the way, forcing the investment manager of corporate pension assets portfolio change hands frequently, greatly improving the management costs.

Recommendation: establish a long-term investment performance appraisal system, lengthen the investment performance appraisal cycle, determine a reasonable target return on investment.

4.4.3 Establish personal limited investment option of occupational pension funds

Occupational pension accounts are personal property, though can not withdraw before retiring for other purposes, but a complete account holders should include the right to choose investment property. Clearing the right of the account owner to choose to invest occupational pension fund, on the one hand there is conducive to enhancing the personal responsibility of the pension, on the other hand can also reduce pressure on the government in terms of increasing the value of the fund.

In order to protect the security of fund , we recommend: limited investment given account holders the option that individuals can choose the investment manager in several compliance mechanism, giving up the right to choose can start the automatic default mechanism to automatically determine the default combination. Of course, the default portfolio investment risk is relatively low.

Prior to the implementation of the right to choose their individual occupational pension account, need to address issues of the unit contribution to occupational pension of account . There are two drawbacks of "Empty Account": First, it can not be invested, if the billing rates is lower than the market rate of investment, and the scale of fund account will be less than the real accumulated account, which of political risks; Second, if the accounting in accordance with the market rate of return, then formed a huge cumulative account size to do real-time at the point of retirement, the future certainly can not afford the financial burden, the system need a second reform. Thus, in the long running, it should be clear occupational pension unit pay liability and achieve real occupational pension account operations.

4.4.4 Set guaranteed return rate

The importance of pension investment security is self-evident, but how to operate in market that achieve profitability and can put an end to excessive investment risk? Supplementary pension insurance operations experience from the German point of view, the pre-established rate of pension fund investments guaranteed return can lock the maximum loss. In fact, when the current National Council for Social Security Fund in local commission entrusted with the management of basic pension insurance fund operations, will be in the trust agreement clearly a guaranteed return rate when the actual rate of return is lower than the guaranteed rate of return, by the trustee compensate for the loss.

References (Omit)

Annex 1. 2 Basic Wage and Duty Wage of GOPI in 1985 wage reform (Yuan per month)

	Position	Basic Wage	Duty Wage							
In Central and Province level	President, Vice President and Prime Minister	40			490	410	340			
	Vice Prime Minister	40			340	340	300			
	Minister and Governor	40	315	300	270	240	215	190	165	
	Vice Minister and Vice Governor	40	270	240	215	190	165	150	140	
	Director General	40		190	165	150	140	130	120	
	Deputy Director General	40		150	140	130	120	110	100	
	Division Chief	40			130	120	110	100	91	82
	Deputy Division Chief	40			110	100	91	82	73	65
	Section Chief	40			91	82	73	65	57	49
	Deputy Section Chief	40			73	65	57	49	42	36
	Section Member	40			57	49	42	36	30	24
	Clerk	40			42	36	30	24	18	12
In municipal level	Mayor	40	190	165	150	140	130	120		
	Deputy Mayor	40	150	140	130	120	110	100		
	Division Chief	40		130	120	110	100	91	82	
	Deputy Division Chief	40		110	100	91	82	73	65	
	Section Chief	40		82	73	65	57	49	42	
	Deputy Section Chief	40		65	57	49	42	36	30	
	Section Member	40		49	42	36	30	24	18	
In county level	County Chief	40	130	120	110	100	91	82		
	Deputy County Chief	40	110	100	91	82	73	65		
	Section Chief	40	82	73	65	57	49	42		
	Deputy Section Chief	40	65	57	49	42	36	30		
	Section Member	40	49	42	36	30	24	18		
	Clerk	40	42	36	30	24	18	12		

Annex 1. 2 Basic Wage and Duty Wage of GOPI in 1993 wage reform (Yuan per month)

Position	Basic Wage	Duty Wage								Seniority Pay
President, Vice President and Prime Minister	90	480	555	630						1 Yuan per work year
Vice Prime Minister	90	400	460	520	580					
Minister and Governor	90	330	380	430	480	530				
Vice Minister and Vice Governor	90	270	315	360	405	450				
Director General	90	215	255	295	335	375	415			
Deputy Director General	90	175	210	245	280	315	350			
Division Chief	90	144	174	204	234	264	294			
Deputy Division Chief	90	118	143	168	193	218	243			
Section Chief	90	96	116	136	156	176	196	216		
Deputy Section Chief	90	79	94	109	124	139	154	169		
Section Member	90	63	75	87	99	111	123	135	147	
Clerk	90	50	60	70	80	90	100	110	120	

Annex1. 3 Matching of rank with position in 1993 wage system (Yuan per month)

Rank	Rank Wage	Matching rank with position										
一	470	Prime Minister										
二	425		Vice Prime Minister									
三	382			Minister and Governor								
四	340				Vice Minister and Vice Governor							
五	298					Director General						
六	263						Deputy Director General					
七	228							Division Chief				
八	193								Deputy Division Chief			
九	164									Section Chief	Deputy Section Chief	Section Member
十	135											
十一	111											
十二	92											
十三	77											
十四	65											
十五	55											

Annex 1. 4 Wage and Subsidy of professional technician in public institute in 1993 (Yuan per month)

Position	Duty Wage										Subsidy
	一	二	三	四	五	六	七	八	九	十	
Professor	390	430	470	520	620	670					30% of salary
Associated professor	275	305	335	365	395	435	475	515	555		
Lecture	205	225	245	265	285	315	345	375	405	435	
Assistant	165	179	193	213	233	253					

Annex 1. 5 Basic Wage and Duty Wage of GOPI in 2006 wage reform (Yuan per month)

Position	Duty Wage	
President, Vice President and Prime Minister	4000	
Vice Prime Minister	3200	
Minister and Governor	2510	
Vice Minister and Vice Governor	1900	
Director General	1410	1290
Deputy Director General	1080	990
Division Chief	830	760
Deputy Division Chief	640	590
Section Chief	510	480
Deputy Section Chief	430	410
Section Member		380
Clerk		340

Annex 1. 6 Basic Wage and Rand Wage of GOPI in 2006 wage reform (Yuan per month)

Rank	Rank Wage													
一	3020	3180	3340	3500	3660	3820								
二	2770	2915	3060	3205	3350	3495	3640							
三	2530	2670	2810	2950	3090	3230	3370	3510						
四	2290	2426	2562	2698	2834	2970	3106	3242	3378					
五	2070	2202	2334	2466	2598	2730	2862	2994	3126	3258				
六	1870	1996	2122	2248	2374	2500	2626	2752	2878	3004	3130			
七	1700	1818	1936	2054	2172	2290	2408	2526	2644	2762	2880			

八	1560	1669	1778	1887	1996	2105	2214	2323	2432	2541	2650			
九	1438	1538	1638	1738	1838	1938	2038	2138	2238	2338	2438			
十	1324	1416	1508	1600	1692	1784	1876	1968	2060	2152	2244			
十一	1217	1302	1387	1472	1557	1642	1727	1812	1897	1982	2067	2152		
十二	1117	1196	1275	1354	1433	1512	1591	1670	1749	1828	1907	1986	2065	
十三	1024	1098	1172	1246	1320	1394	1468	1542	1616	1690	1764	1838	1912	1986
十四	938	1007	1076	1145	1214	1283	1352	1421	1490	1559	1628	1697	1766	1835
十五	859	924	989	1054	1119	1184	1249	1314	1379	1444	1509	1574	1639	1704
十六	786	847	908	969	1030	1091	1152	1213	1274	1335	1396	1457	1518	1579
十七	719	776	833	890	947	1004	1061	1118	1175	1232	1289	1346	1404	
十八	658	711	764	817	870	923	976	1029	1082	1135	1188	1241	1294	
十九	602	651	700	749	798	847	896	945	994	1043	1092	1141		
二十	551	596	641	686	731	776	821	866	911	956	1001			
二十一	504	545	586	627	668	709	750	791	832	873				
二十二	461	498	535	572	609	646	683	720	757					
二十三	422	455	488	521	554	587	620	653						
二十四	386	416	446	476	506	536	566	596						
二十五	352	380	408	436	464	492	520							
二十六	320	347	374	401	428	455								
二十七	290	316	342	368	394	420								

Annex 1.5 Pension divisor of GOPI pension system in pension reform of 2015

Retirement age	40	41	42	43	44	45	46	47	48	49	50
Pension divisor	233	230	226	223	220	216	212	207	204	199	195
Retirement age	50	51	52	53	54	55	56	57	58	59	60
Pension divisor	195	190	185	180	175	170	164	158	152	145	139
Retirement age	60	61	62	63	64	65	66	67	68	69	70
Pension divisor	139	132	125	117	109	101	93	84	75	65	56

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