

**Multi-tiered design of pension systems  
(public pension, enterprise annuity  
and individual pension)**

# Situation Analysis

[Topic 1.3.4]



By:  
**Dong Keyong**

Sun Bo  
Wang Gengyu

*December 2015*

## **China Pension System in transformation:**

### **Current Scheme, challenges and paths of reformation**

**DONG Keyong, SUN Bo, WANG Gengyu**

**Renmin University of China**

#### **Abstract**

This report is based on framework and achievements of China's pension system, and analyzes its long-term risk and institutional dilemmas. The primary conclusion is that the core issue of China's current pension system is the huge future gap of pension fund, and it is hard to cope with the risk of aging population. This problem dues to that the existing pension system does not clearly define the responsibilities among the government, market and individuals. The proposal of China's pension reformation is to establish the three-pillar mode pension system: transfer the social pooling account into public pension as the first pillar; merge the refilled personal account by transferred state-owned assets and the enterprise annuity into the occupation pension as the second pillar; promote the personal tax deferral pension plan as the third pillar. The roles and functions of government in the three-pillar pension system are different: for the first pillar, it is fully responsible for the system construction, management service and funding security; for the second and the third pillar, they are system construction and operation supervision.

**Key Words:** Institutional framework, the three-pillar model, public pension, occupational pension, personal pension

Content

Preface ..... 5

1 The current pension system structure and achievements ..... 6

    1.1 The current pension system structure ..... 6

        1.1.1 The first layer: the basic pension ..... 6

        1.1.2 The second layer: Occupational pension..... 7

        1.1.3 The third layer: individual tax deferred pension ..... 8

    1.2 The achievements of current pension system ..... 9

        1.2.1 Promoted the transformation of the planned economic system to the market economy system 9

        1.2.2 Established a pension system in line with the social and economic development .. 9

        1.2.3 Achieved the principle of overall coverage and basic payment ..... 9

        1.2.4 Explored the path of overcoming China aging population crisis ..... 10

2 The long-term risk and challenge of China's pension system..... 11

    2.1 The long-term risk ..... 11

        2.1.1 The core issue: Huge long-term debt, difficult to cope with aging population risk11

        2.1.2 The structure of pension system is unbalance, and government's liability is too heavy12

        2.1.3 The pension payment level is too low, and the basic livelihood security is facing challenges 14

    2.2 Institutional predicaments ..... 15

        2.2.1 The basic pension system is still essentially the PAYG mode..... 15

        2.2.2 The size of personal empty account continues to increase..... 16

        2.2.3 The contribution base is not real, and the contribution rate is too high ..... 16

        2.2.4 The defects of basic pension payment calculated by social average wage ..... 18

        2.2.5 The pension implicit debt has not been resolved ..... 18

3 China's pension reform objectives: three-pillar system ..... 18

    3.1 The evolution of the three-pillar pension model..... 18

        3.1.1 The connotation of the three-pillar pension model ..... 18

        3.1.2 Development and perfection of the three-pillar model ..... 20

        3.1.3 International practice of the three-pillar model..... 20

    3.2 The reform plan of the three-pillar pension system in China ..... 21

        3.2.1 The first pillar: public pension plan ..... 21

        3.2.2 The second pillar: occupational pension plan ..... 22

        3.2.3 The third pillar: personal pension plan..... 22

    3.3 The advantages of the three-pillar pension system in China ..... 22

        3.3.1 Help to deal with the ageing risk, and reduce the pension debit ..... 22

        3.3.2 Clarify the relationship among government, market and employees ..... 23

        3.3.3 Achieve the redistribution and incentive pension system ..... 23

        3.3.4 Highlight the pension investment, and will not increase the contributions of employers and employees ..... 23

        3.3.5 The system reform could be achieved through a smooth transition process without the need for significant structural adjustment. .... 23

4 The reform path of China's three-pillar pension system ..... 25

    4.1 Principles of China's pension reform..... 25

    4.2 The first pillar: transfer the social pooling accounts into the public pension plan ..... 25

        4.2.1 Reducing the replacement rate of public pension aim to reduce the future pension debit 25

        4.2.2 Strengthen the collection and management method of pension contributions ..... 27

        4.2.3 Reform the payment of public pension plan with integration of incentive and redistribution. 28

    4.3 The second pillar: merge the refilling personal account and the enterprise annuity..... 28

        4.3.1 Transfer the state-owned assets to refill personal accounts..... 29

        4.3.2 Invest to achieve fund value preserving and increasing..... 29

    4.4The third pillar: individual saving account..... 32

---

4.4.1 Introduce the tax incentives with the reforms of China tax system .....	32
4.4.2 Should pay more attention to the fund investment.....	32
5 The evaluation and solution to the key issues in the reform.....	33
5.1 Assessments on contributions and payments of public pensions.....	33
5.1.1 The calculation model of revenue and expenditure.....	33
5.1.2 The basic parameters setting .....	33
5.1.3 The calculation results of fund balance.....	35
5.2 Estimate the payment level of individual accounts .....	35
5.2.1 The model and basic parameter setting .....	35
5.2.2 Simulation calculation of relative payment level of individual account.....	36
5.3 Solutions to cash-out the transferred state-owned assets.....	37
5.3.1 Ways to transfer the state-owned assets .....	37
5.3.2 Way to reduce the holding of state-owned assets.....	38
5.4 Solutions to the problem of "middle worker" .....	38
5.4.1 Definite payment level for the old worker and the new worker.....	38
5.4.2 "Middle worker" transition payment level.....	39
5.5 Assessment of the NDC mode in China basic pension system.....	39
5.5.1 The concept and practice of NDC .....	39
5.5.2 Analysis on the NDC system in Sweden.....	43
5.5.3 China is lack of NDC institutional basis .....	44
Appendix 1: The balance of current social pooling account (billion) .....	47
Appendix 2: The balance of public pension after the reform (billion) .....	48

## Preface

With the trend of the aging population, the existing China pension system faces many challenges, which need to be further reformed and improved. According to the communiqué of the third Plenary Session of the 18th CPC Central Committee: “Adhere the basic old age insurance system of the combination of social pooling and individual accounts, improve the individual account system, improve the incentives of ‘pay more and get more’ mechanism to ensure the interests of the insured person”; “Strengthen the management and supervision of social insurance fund, promote the diversified investment operations. Launch some preferential policies, such as tax exemption, tax deferred, etc., to accelerate the development of enterprise annuity, occupational pension, and commercial insurance, to build a multi-level social security system.” The above discussion is a clear direction for the design of China pension system. However, due to the problem of the pension system is intertwined with each other, the pension system reformation in the paths of the above constraints; the views of the parties are not uniform. This report is based on China pension system practice and international pension system reform trend, with the analysis of evolution and problems of China's pension system and the related reform proposals, and the reformation thoughts and suggestions to China's pension system will be proposed. The study of this report is developed by the following premises:

Firstly, the study ranges limit to urban pension system, including employees from government institutions and companies excepting urban and rural resident's pension insurance. The reason is that the China pension system contains two parts which are the urban and rural resident's pension insurance and urban employee's pension system. But there has huge distinctions such as contribution method, payment level, management mode, insured population and so on.

Secondly, it needs to take all-round measures to perfect China pension system, and the academic circles have agreement as well as disagreement about it. This report will focus on discussing the controversy points, excepting the consensus such as delay retirement age. The current author agrees that delaying retirement age is an important and sustainable step of improving China's pension system.

Thirdly, China urban employee's pension system faces challenges, but its core issue is unsustainable for the coming peak of ageing population. Consequently, this report will focus on

how to realize the long-time sustainable development of China's pension system, and the related reformation proposals will focus on the medium-term and long-term development.

With such basic study background and premise, this report will be presented as followings:

The first part is the structure and achievements of China current pension system, emphasizing on the institution structure of urban employee's pension system, and its more than twenty years' achievements.

The second part is the risks and institutional predicaments faced by China pension system. The risks are mainly including long-term funding gap, unbalanced system structure, and low payment level. The institutional predicaments are mainly including that the combination model of "Social Pooling Account and Individual Account" is not really implemented, the empty individual account operates for a long time, and the contribution base is fake, while pension implicit debt is unsolved, etc.

The third part is the goal of China's pension system reformation: the realization of the three-pillar model. It mainly includes the international practice of the three-pillar model pension system, and the proposal, function and the advantages of three-pillar pension system in China.

The fourth part will discuss the path of three-pillar pension system reformation in China: establish the PAYG first pillar with social pooling accounts; refill and separate the personal accounts, to constitute the second pillar with enterprise annuity and occupation pension; develop the third pillars pensions with implementation of preferential tax policies as soon as possible.

The fifth part is the solutions to relevant problems in the reformation. It mainly includes public pension payments evaluation, individual account payment level estimate, and the cash-out way of transferred state-owned assets, transition problem of old workers and middle workers, and evaluation of NDC model of basic old age insurance system.

## **1 The current pension system structure and achievements**

### **1.1 The current pension system structure**

#### **1.1.1 The first layer: the basic pension**

The first part is the basic old age insurance system of urban workers. The state council's "Decision on the Reformation of the Old-Age Insurance System for Enterprise Employees" in 1991 and "The notification on deepening the reform of the old-age insurance" in 1995 triggered the

prelude of old-age security system reformation in China. The state council's "Decision on Establishing a Uniform Basic Old-Age Insurance System for Enterprise Employees" in 1997 and "Decision about Perfecting the System of Basic Old-Age Insurance for Enterprise Employees" issued in 2005, marked the establishment of basic old age insurance system with the "Combination of social pooling and individual account" mode in China.

The basic pension part of social pooling account is pay-as-you-go (PAYG) mode, through the insurance fund transfer between current and retired workers to promote social redistribution. The individual account part is the accumulation funding system, designed to reduce the pension crisis from peak of aging population and at the same time to keep economic efficiency. The goal of employees' basic old age insurance system is to guarantee the basic lives of retirees and the policy targets of replacement rate is about 60%. At the end of 2014, the number of participates is 341.24 million, including 255.31 million contributors and 85.93 million pensioners. The total revenue of basic old age insurance fund is 2.531 trillion Yuan in 2014, and the total payment is 2.176 trillion Yuan with the cumulative balances 3.18 trillion Yuan.

The second part is Retirement System for Government Agencies and Public Institutions (RSGAPI). It is under the changing process, and its payment level is tied to working years and wages. Current policy is based on the "Measures for the implementation of RSGAPI" issued by MoHRSS (Ministry of Human Resource and Social Security) and MoF (Ministry of Finance) in 2006: civil servants' pension is calculated by the position and wage before retirement. According to official reports at the end of 2013, the employed civil servants are about 7 million, and public institutions employees are about 30 million. There is no official data for civil servants pension payment. In January 2015, "Decision on Reform of RSGAPI" was issued by the State Council, which announced that the RSGAPI will be reformed into the same system as the enterprise pension system; the contributions will be collected from the unit and individual; the calculation and payment method of pension will be reformed to dissolve the conflict of "double track".

### **1.1.2 The second layer: Occupational pension**

The first part is the enterprise annuity system. Since the late 1980s, some enterprises in China began to implement enterprise annuity plan. In 1991 the state council promulgated the "Decision on the Reformation of the Old-Age Insurance System for Enterprise Employees" to encourage enterprises to set up supplementary endowment insurance for the workers for the first time. In Dec 25, 2000, the state council issued "Pilot Plan to Improve the Urban Social Security System", and

firstly mentioned “enterprise annuity” in the government official documents. On May 1, 2004, the “Trial Measures for Enterprise Annuity” and “Trial Measures for Enterprise Annuity Fund Management” began to implement, with the guidance on the enterprise annuity development and the regulation of the enterprise annuity fund. In 2011 the revised "Enterprise Annuity Fund Management Measures" further improved the basic system structure of China's enterprise annuity plan.

According to “Trial Measures for Enterprise Annuity”, the enterprise annuity, also known as worker supplementary pension, is a voluntarily established pension system on the basis of participating basic old age insurance, with the guidance and encouragement from government, and based on the enterprise economic conditions to improve the employees' retirement economic security. Despite the basic old age insurance could meet basic living standard guarantee for retirees, the goal of enterprise annuity plan aims to provide higher pension needs. This plan is voluntarily set up by the enterprise and employees. Enterprises contributions will not exceed one-twelfth of the total wage each year, and the total contributions from both employers and workers generally will not exceed one-sixth of the total wage each year.

The second part is the occupational pension, which is designed for the employees in government and institutions, to make up for the payment decline after transformation. Occupational pension policy and the RSGAPI transformation launched together. The “Notice on Occupational Pension Reformation for RSGAPI from the State Council General Office” formally issued on April sixth, 2015, points out the implementation of occupational pension system since October 1, 2014. The contribution of occupational pension is shared by the unit and employees. The proportion of unit contribution is 8% of the total wages, and employee’s contribution is 4% of one’s total wages. Specific implementation rules have not been released, but the establishment of the occupational pension system is a foregone conclusion, and it will complement and improve China pension system framework.

### **1.1.3 The third layer: individual tax deferred pension**

Individual tax deferred pension is the third layer of China pension system. Since 1980s, Chinese government has begun to introduce and study individual tax deferred pension policy. The state council emphasized that the individual tax deferred pension will be established in appropriate time in 2014. The work plan insurance regulatory commission suggested the pilot program will be launched in 2015, and Shanghai is the only city on the list. Overall, the individual tax deferred pension began to grow up in China.



## **1.2 The achievements of current pension system**

### **1.2.1 Promoted the transformation of the planned economic system to the market economy system**

The state-owned enterprises are the main part of traditional planned economic system in China, and the endowment insurance liability shall be borne by the enterprises in the first place. Under the background of transformation from planned economy to market economy, the pension burden of state-owned enterprises is too heavy compared with the private enterprises. The current combination of social pooling and individual account has broken the boundary of different ownership enterprise: all enterprises established in accordance with the unified pattern of old age insurance. This created fair competition conditions for the state-owned and private enterprises in the market economy system, for the establishment of the modern enterprise system laid a solid foundation. During the state-owned enterprise restructuring in 1990s, the pension system reformation made the pension liability socialization, and created conditions for the state-owned enterprise bankruptcy and reorganization.

### **1.2.2 Established a pension system in line with the social and economic development**

Traditional old age insurance is obviously divided into different types, which limits the flow of labor force among different ownership enterprises and different regions. And social characteristics of the current endowment insurance, complied with the requirements of free labor mobility. In addition, modern pension system emphasizes the state, enterprises and individuals sharing the pension liability. The personal individual accounts make employees directly to undertake the duties of a part of the pension, and revise the past idea that pension should be responsible by the state, which reduced the national financial burden.

### **1.2.3 Achieved the principle of overall coverage and basic payment**

One of the core features of current pension system is the widely coverage. According to the officially data, participates of urban employees old age insurance are 341.24 million, including 255.31 million contributors and 85.93 million pensioners by the end of 2014. China current pension system has covered the most urban workers, which greatly extends the traditional insurance limit of state-owned and collective enterprises. At the same time, the current basic pension insurance reformed the payment method, reduced the original replacement rate, which is up to more than 70%, and reduced the pressure of the system. The adjustment mechanism also has been established in 2005. After eleven years' consecutive adjustment, the national average pension payment is 2100 Yuan a month in 2014, which could guarantee the basic life of the elderly.

### 1.2.4 Explored the path of overcoming China aging population crisis

China entered the aging society in 1999. The traditional pension system is single pay-as-you-go mode, and it is difficult to deal with the coming ageing population crisis. Multi-pillar pension system is generally widely adapted by countries around the world. The current pension system in China contains the basic old-age pension plans with government responsibility, the individual account with personal responsibility, and supplementary pension plans such as enterprise annuity and occupational pension plans. Besides, the third pillar of the personal tax deferral insurance plan will be implemented soon. The reformation of China's old-age security system conforms to the trend of the worldwide development of the pension reform, and has significant meaning to cope with the aging crisis.

## 2 The long-term risk and challenge of China's pension system

### 2.1 The long-term risk

#### 2.1.1 The core issue: Huge long-term debt, difficult to cope with aging population risk

There are two kind of funding gaps in China pension system, one is “current gap” or reality gap, and one is “future gap” or whole caliber gap. The reality gap is that the collection of pension insurance does not cover the spending every year. The future gap refers to the total “current gap” estimated after the period of system transition. According to the statistic of MoHRSS, the current pension gap is as high as 123.1 billion Yuan in 2014, excluding 354.8 billion Yuan fiscal subsidy. In fact, the average growth rate of participants in the basic pension system is 4.04% in last ten years. It has been lower than the average growth rate of retired worker, which is 6.64%, over the past decade. The pension fund mainly depends on the number of contributors, which means the pension incomes will continually be less than the expenditure, and then led to the emergence of the pension fund gap.

The “future gap” is closely related with long-term economic operation condition and population development, and there is not a common understanding. Different institutions and scholars have given different estimates. Ma et al. (2012), from Deutsche Bank, said that the accumulative total gap in China’s pension system will be equivalent to 75 percent of the current gross domestic product (GDP) in 2050. Cao et al. (2012) calculated the “gap value” will reach 68.2 trillion Yuan in 2033, 38.7 percent of the total GDP.

Table 2-1 The estimate of China pension system's fund gap

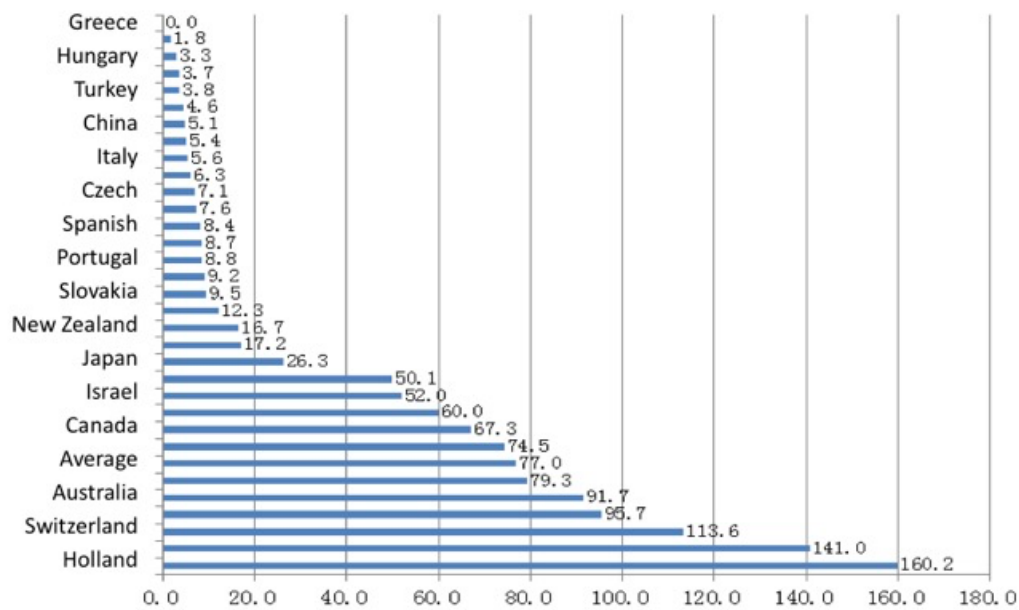
Estimator	Published time	Based time	The gap size
Ma Jun (Deutsche Bank)	2012	2050	75% of GDP in 2050
Cao Yuanzheng (China Bank)	2012	2033	38.7% of GDP in 2033
Gao Peiyong (Chinese Academy of Social Sciences)	2011	2050	95% of GDP in 2050

### 2.1.2 The structure of pension system is unbalance, and government's liability is too heavy

Most countries in the OECD takes three-pillar pension mode and it aims to make the state, employers and individual share the pension liability. In the three-pillar mode, the first pillar is public pensions, offering participants the basic life guarantees. The second pillar is occupational pension with tax preferences policies. It encourages employees' contribution during the work phase accumulation, asks enterprise to match a certain proportion of funds, and these funds will be invested to realize fund value preserving and increasing. The third pillar is voluntary pension plan with the same preferential tax incentive for individual voluntary participation. It aims to provide much more pension for flexible workers and high earners. Overall, the second and the third pillar are more and more important for the guarantee of national pension system in the three-pillar pension system.

According to the OECD statistics, the second and the third pillar of OECD countries taking the weighted average of the proportion of GDP is 77% at the end of 2012, while the second and the third pillar pensions in China are only 1.1% of GDP (Figure 2-2).

Figure 2-2 Ratio of National Pension asset size to GDP in OECD



Source: OECD, pension market in focus 2013

In American three-pillar pension system, for example, the asset scale of occupational pension as second pillar is the largest part and followed by the third pillar as personal pension, the least part is the public pension. Focused on the payment level, the public pension can provide 30-40% replacement rate, and the second and third pillar can add up to provide 40% - 50% replacement rate. Despite the government pension’s burden is small, the pension for individual old-age security is sufficient.

Table 2-3 Structure comparison between US and China Pension System 2014

	Pillars	Pillar 1: Public Pension	Pillar 2: Occupational Pension	Pillar 3: Individual Pension	Total
US	Size(trillion \$)	2.8	15.18	7.44	25.4
	Portion of total asset	11.0%	59.7%	29.3%	100%

	Layers	The Basic Pension	Enterprise Annuity	Individual Tax Deferred Pension	Total
China	Size (trillion ¥)	3.1	0.77	0	3.87
	Portion of total asset	80.1%	19.9%	0	100%

On the contrary, in China’s pension system, because of the lack of tax incentives and the contribution ratio of basic pension system is too high, the development of Enterprise Annuity is very slow. By the end of 2014, 73300 enterprises across the country have established the enterprise annuity plans, with 22.93 million participants. It’s only 6.7% of the participant workers in basic old age insurance, and majority of workers can’t access to the second pillar pension plans. The balance of enterprise annuity fund is RMB 768.9 billion Yuan in the end of 2014, which is 24.17% of total basic pension assets, and its old-age security function is quite limited. In addition, the third pillar individual tax deferred annuities have not really established, and the national finance will face great pressures in the long term.

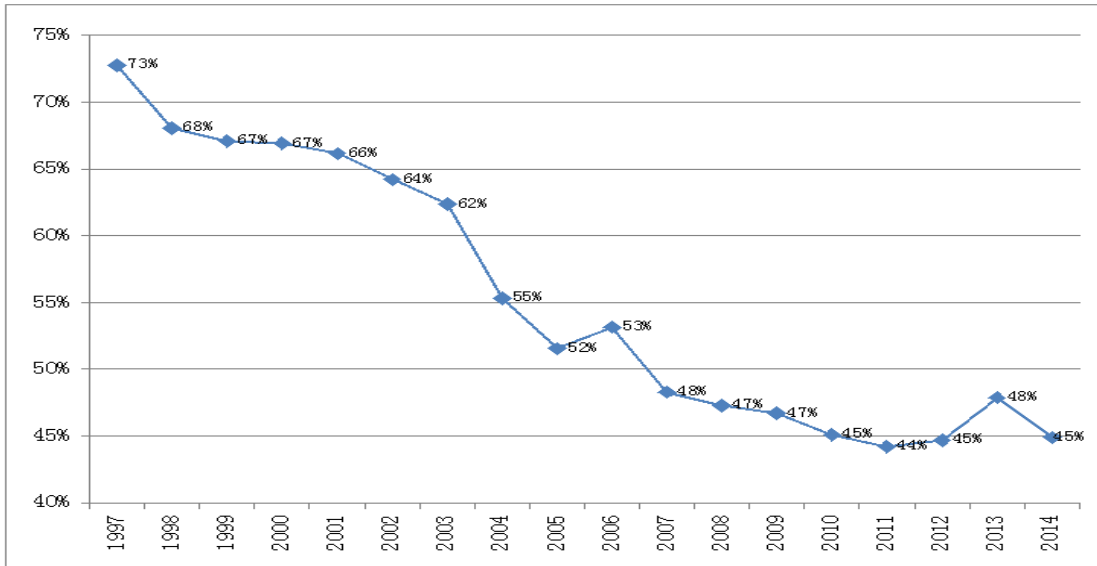
**2.1.3 The pension payment level is too low, and the basic livelihood security is facing challenges**

The current China pension system, the basic old age insurance aims to guarantee the retiree’s basic life, and the enterprise annuity plan is a supplement to the system. So the policy aim of the basic old-age insurance replacement rate level is about 60% of the social average salary. But because the enterprise annuities plan coverage is very limited, only about 10% of the basic old-age insurance participants, while the fund accumulation is also very small, the most retirees can only rely on the basic old age insurance after retirement. So at the very beginning of the system establishment, the replacement rate of basic old-age insurance is set at high level, around 70%. However, the basic old-age insurance replacement rate continued to decline from 70.79% in 1997 to 45% in 2014<sup>1</sup>. According to the international Labor organization conventions, the warning line of pension replacement rate is around 40-50%. Although after more than a decade of payment

<sup>1</sup>Calculated by the 1997-2009 human resources and social security development statistical bulletin

adjustment, the basic pension replacement rate in China is still in a low level, and the retired worker’s basic life faces risks.

Figure 2-4 the development of replacement rate of China basic pension system



Source: human resources and social security development statistical bulletin in 1997-2014

## 2.2 Institutional predicaments

### 2.1.1 The basic pension system is still essentially the PAYG mode

The basic old age insurance of China current pension system is a “social pooling plus individual accounts” mode. The social pooling part is pay-as-you-go mode, which could promote social redistribution among social members through the process of fund collection and payment. The individual accounts are partly fully funded, attempt to reduce future pension’s crisis by the accumulation and investment of the fund. The perfect combined model should be able to realize the combination function of redistribution and encourage, embodies the principle of combining social aid between each other and personal responsibility. However, because there is no clearly system design for the transitional costs and implied debt in the process of reformation, so in the actual execution, when the social coordination account fund is insufficient, lot of personal account fund will be borrowed, which lead to the "empty account" of individual accounts. Comprised with former reform of pay-as-you-go system, this kind of situation has no real difference. "Combined mode" is just a design of payment, while the retirees pension is still from the current contributors, it is actually still the PAYG model. In other words, the institutional advantages of combined mode have not been performed, and the initial target of the system is unreached.

### **2.2.2 The size of personal empty account continues to increase**

The basic pension system of China includes individual account with fund accumulation properties. Its original target is the introduction of personal pension liability, to lighten the national financial burden. But due to the reformation process, the scale of "empty account" of individual accounts continues to expand, from 740 billion in 2004 to nearly 3 trillion Yuan in 2013.

During this period, the three provinces of northeast China began trials to refill personal accounts for old-age in 2001, and the state council decided to fully fund the personal old-age pension accounts step by step in the whole country in 2005. However, the state council approved the Liaoning province to borrow personal account fund in 2009, which means the suspension of the trial<sup>2</sup>. Empty individual account means that the individual pension rights cannot be protected, and it is not conducive to encourage individuals to participate pension system.

### **2.2.3 The contribution base is not real, and the contribution rate is too high**

The contribution rate of China's current pension system is 28%. The OECD countries public pension average contribution rate is about 20%. If considering China's "five social insurance and housing fund"<sup>3</sup> as a whole, the total social insurance contribution rate of China is 58.5%: enterprise pays 40.3% and individual pay 18.2%. Excessive contribution burden not only affect enterprise competitiveness, but also the individual current wage income.

---

<sup>2</sup>FuTao. For billions of individual account pension fund units - from Liaoning social security "borrow" phenomenon about [J]. Modern economic information, 201 (5): 168-169

<sup>3</sup> Five social insurance and housing fund are respectively: basic old age insurance (enterprise 20%, individual 8%), medical insurance (10%, 2%), unemployment insurance (1%, 0.2%), birth insurance (0.8%), (0.5%) of industrial injury insurance, housing accumulation fund (8%, 8%).



Table 2-5 the contribution rate of public pension in OECD countries

Country	1999	2005	2010	Country	1999	2005	2010
Austria	22.8	22.8	22.8	Korea	9	9	9
Belgium	16.4	16.4	16.4	Luxemburg	16	16	16
Canada	7	9.9	9.9	Holland	37.7	28.1	31.1
Czech	26	28	32.5	Poland	32.5	32.5	35
Finland	21.5	21.5	20.9	Slovakia	28.5	26	24
France	24	24	24	Spain	28.3	28.3	28.3
Germany	19.7	19.5	19.5	Sweden	15.1	18.9	18.9
Greece	20	20	20	Switzerland	9.8	9.8	10.1
Hungary	30	26.5	26.5	Turkey	20	20	20
Italy	32.7	32.7	32.7	U.S.A	12.4	12.4	12.4
Japan	17.4	13.9	14.6	Average	20.7	20.2	21

Source: OECD, Pension at glance 2013

The contribution rate cannot be changed because of the law, the enterprise usually try hard to reduce the contribution salary base in order to seek more profit. The government policy sets the contribution base can be determined between 60-300% of local social average wages, but many companies would like to determine the base at the lowest level. Mr. Bay, who is professor at Tsinghai University, his survey in 2010 also shows the same facts. Higher contribution rate aims to raise more pensions, but fake contribution base largely hedges high contribution rate. In addition, because pension linked the social average salary and the salary is usually higher than contribution base, which can increase the pension's payment. Sum up, high contribution rate lead to fake base, and further affect the sustainability of the pension system.

#### **2.2.4 The defects of basic pension payment calculated by social average wage**

The payment calculation of basic old age pension plan links to social average wage, affected system sustainable development. At present, the basic pension of social pooling account is the main part of China basic old-age pension fund. The payment of basic old age pension plan should be linked with last year's social average wages. Such payment method leads to several problems. First of all, it is harmful for stable fund system. As above discussion, the pension payment level is higher than the contribution level. It is not only decreased the enthusiasm of contributors, but also increased the basic old age insurance payment pressure. Secondly, it is restricting the basic old age insurance plan as national level's implementation. The last year social average wage is difficult to determine at national level: if taking the national average wage base, it will lead to early retirement in undeveloped regions; if taking the local social average wage, the reverse redistribution effect as low level of pension payment areas may subside developed areas.

#### **2.2.5 The pension implicit debt has not been resolved**

Implicit debt refers to the accumulation capital of the current pension system if it immediately stops running, in order to achieve the promises to give the retirees and promises of working contributors. For the reality of China, it is the demanding capital of existing old-age insurance system at the establishment of the combination mode of pension system in 1997. According to official statistics, by the end of 2012, the cumulative personal empty account size of basic old age pension insurance in China is 2.5 trillion Yuan. The Labor Department in 1995, the World Bank in 1996 and the national economic restructuring office in 2000, respectively estimate the old-age insurance implicit debt, and the value is 2.8 trillion Yuan, 1.9 trillion Yuan and 6.7 trillion Yuan. The important reason of implicit debt scale increasing is that the pension reform in China is at the same time of social economical transition, and monetization have also taken place in the wage distribution system reform. The low salary welfare under the planned economy system is replaced by market wages. As the wage growth rate remains high, and social salaries and pensions are positive binding, as a result, pension payment increase fast with the increase of wages, which leads to a raise of pension debt within a certain period.

### **3 China's pension reform objectives: three-pillar system**

#### **3.1 The evolution of the three-pillar pension model**

##### **3.1.1 The connotation of the three-pillar pension model**

In the influence of the population aging crisis gradually appearing in the eighties of the 20<sup>th</sup> century, it's hard to be sustained in financial balance with PAYG model pension system, burdening the national financial, the elderly living security facing to challenges. In this context, the

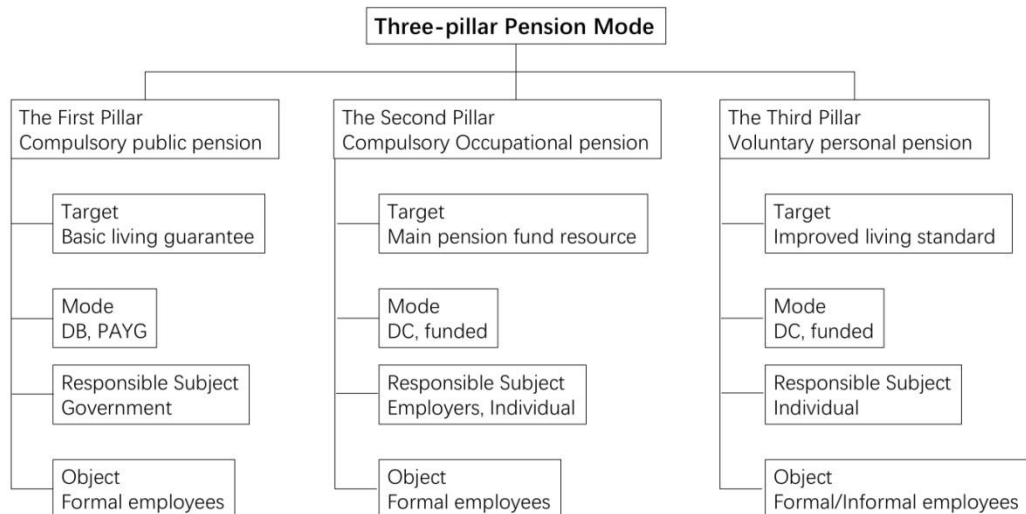
World Bank proposed the "three-pillar" pension system in 1994, after summarizing Chile's pension reform experience, trying to respond to above problems. The core idea is not finding solutions to the aging problem by seeking in a pension system, but through different modes of multiple pension pillars. The main points are as follows:

The first pillar is a public pension scheme implemented by the government's legislation to provide the minimum pension for retirees, and the government has the ultimate responsibility for the first pillar pension. Generally take the PAYG model, financed by taxation from the current working generation and payments for retirement generation, reflecting intergenerational redistribution.

The second pillar is mandatory occupational pension plan, generally funded by enterprises and individuals, reflecting the corporate and personal pension liability. It is the main part of the three-pillar pension system. Different from traditional pay as you go system, the occupational pensions generally take determined contribution and fully funded system. The sources of pension funds are contributions from the participants during the work period and fund investment earnings. The retirement payment is depending on the level of pension accumulation, reflecting actuarial balance, which could be better to cope with the aging population crisis. Total accumulation system will promote the development of capital accumulation and financial markets, and reduce the dependence on the first pillar. It should be noted that in some countries, such as United States, the second pillar of the occupational pension also is taken voluntary implementation, with tax incentives and state support.

The third pillar is a voluntary personal savings pension plan, and it takes full accumulation mode. It is usually funded by the individual voluntary contributions, the state to give tax incentives, embodying the individual pension liability. The goal of third pillar is to provide more financial resources for those who want to have more income after retirement.

Figure 3.1 The Framework of Three-pillar Pension Mode



### 3.1.2 Development and perfection of the three-pillar model

After the three-pillar model raised by the World Bank, it has been promoted and applied in many countries. But it has also been a number of questions. Those are mainly concentrated on two points: one is three-pillar pension model is based on employment as the premise, and those who have no employment experience are excluded. The other one is elderly people not only needs economic compensation, but also need to take care and spiritual consolation services. Therefore, the World Bank put forward the "five pillars" of the reformation in 2005. The core idea is based on the original three-pillars; it increased zero pillar and fourth pillar.

The zero pillar is none contributory pension plan and it is funded by the government financial, aims to eliminating poverty in old age. This pillar provides the minimum level of economic security for the lifelong poor people, and retired workers who are not eligible to receive formal pensions. Zero pillar is an essential part of any complete retirement system.

The fourth pillar refers to the informal support from family members for the elderly. The elderly consumption also includes non pension resources, such as transferring payment within the family, the maintenance of medical care and housing, and other services.

### 3.1.3 International practice of the three-pillar model

After World Bank report recommended the three-pillar pension model in 1994, all OECD countries have basically established a multi pillar pension system. Due to the different country conditions, the traditional pension systems are diverse, so as the multi pillar pension system reformation also exist differences, such as the funding and management method of first pillar and

the second pillar exist various differences and the payment level of zero pillar also has different numbers. But generally speaking, almost every world major economies have established a multi pillar pension system. The summarized information is as the following:

Table 3-2 Pension systems in some OECD countries

	Zero Pillar	First Pillar	Second Pillar	Third Pillar
U.S.		Social Security	401(k) plans, 403(b) plans	Individual retirement account
Australia	National Pension		Superannuation	Individual retirement account
Canada		Public pension	Retirement pension	Individual saving pension
U.K.		National Pension State Second Pension	Occupational Pension	Individual Pension
Chile		Public Pension	Individual account	Private supplementary Pension
Holland		National Pension	Occupational Pension	
Hong Kong			MPF	
Singapore			CPF	
China		Social pooling accounts Individual accounts	Enterprise annuity	

### 3.2 The reform plan of the three-pillar pension system in China

#### 3.2.1 The first pillar: public pension plan

The first pillar of the public pension in China should be transferred from current social pooling accounts, taking PAYG mode to achieve the function of redistribution between different generations. The protection level should not be too high, and aim to prevent poverty in old age. The national finance should take all responsibility of first pillar, to ensure the old age safety. For the view of system development, it should achieve national co-ordination level, truly reflect the large

numbers law of insurance, and reform the payment method, gradually decoupling the pension payment level and local social average wages, to promote the labor mobility.

### **3.2.2 The second pillar: occupational pension plan**

This pillar plays an important complementary role for the participants, making their life has a certain improvement despite the basic maintenance. The second pillar should be encouraged by the state tax incentives, and initiated by employer taking full accumulation funded mode. In addition, from the perspective of the enterprise, occupational pension is also an important mean of profit sharing, human resource incentive, and maintaining the staff stability. From capital formation perspective, due to the fund accumulation character of occupational pension in long term duration, it is the important long-term capital to provide stable funds for capital market, and provide a powerful support for economic development. Chile's total accumulation of pension funds provides a better capital supply for the country's economic development, and it is a successful interaction model of the pension funds and economic development.

### **3.2.3 The third pillar: personal pension plan**

The third pillar of personal pension plan will be established for the freelancers cannot participate in the second pillar, or for higher income to provide an additional pension savings plan. Its characteristic is the tax incentives, individual voluntary participation, and fully funded system mode. Because the participation of the plan is decided completely by oneself without implications for employers, it's very flexible and convenient. It encourages individuals planning for their own retirement, and it can also help to reduce the country's future pension burden.

## **3.3 The advantages of the three-pillar pension system in China**

### **3.3.1 Help to deal with the ageing risk, and reduce the pension debit**

The most significant trend in the development of China's population is getting old before getting rich, and the pension facing a huge funding gap, which lead to the national financial enormous pressure. The biggest constraint in current pension system is the national finance cannot bear huge pension expenditure, and the fundamental reason is the first pillar of the basic pension taking the most part of current system. With PAYG mode, it is very hard to cope with the aging population crisis. In the three-pillar pension system, government's fiscal responsibility is limited to the first pillar. After the reformation of the first pillar, the public pension contribution rate and payment level are reduced, corresponding to the future pension fund gap has been reduced. And the reducing of the payment level will be compensated by the second or third pillar of the full accumulation funded system. The core advantage of three-pillar mode is balance the duties of

PAYG and accumulation fund plans completely, and co financing of pension funds, to deal with the aging crisis.

### **3.3.2 Clarify the relationship among government, market and employees**

In the three-pillar pension system, the government has full responsibility of the first pillar public pension. The second pillar occupational pension is shared by employers and individuals, and the third pillar of personal pension is mainly reflected the individual's self pension responsibility. Three-pillar pension system is get rid of the unlimited pension liability of government in the traditional single PAYG mode, realized the burden sharing among government, enterprises and individuals.

### **3.3.3 Achieve the redistribution and incentive pension system**

The existing old-age security system try to integrate redistribution effect of PAYG model and the incentive effect of accumulation model into one system, but because of the defects in system design and practice difficulties, this goal has not been achieved. The three-pillar pension system will not to seek the PAYG and fully funded mode into one system. The first pillar of the basic pension takes the PAYG mode, to protect the basic livelihood of the elderly, embodies the PAYG system in social redistribution advantage. The second pillar of occupational pension plan and the third pillar of personal pension plan take fully funded system, raising the retirement life level through worker self accumulation, representing the accumulation of advantage of self motivation.

### **3.3.4 Highlight the pension investment, and will not increase the contributions of employers and employees**

Number of comparative studies show that the contribution level of pension insurance in China is much higher in the worldwide. Trying to raise the contribution of the basic pension system in China to achieve system financial sustainable is not feasible. After the reformation of the three-pillar pension system, the system should pay more attention to investment of pension funds, especially the second and the third pillar of the private pension funds to invest in capital market, to achieve funds accumulation and growth, increasing pension funding, and enhancing sustainability of the financial system.

### **3.3.5 The system reform could be achieved through a smooth transition process without the need for significant structural adjustment.**

The multi pillar pension system is not the subversion of the existing system, but the promotion and deepening based on the current pension system. Therefore, the construction process of the multi pillar system takes full consideration of the existing models. In multi pillar system, the first pillar of

the basic pension plan transferred from the current basic old age insurance, both the two kind of plans are implementation of PAYG mode, and there is no need structural adjustment. The second pillar of occupational pension plan integrated by the personal accounts of basic old-age insurance and enterprise annuity, and taking into account the existing policies and regulations, there only need transfer personal account provisions for enforcement, the original enterprise annuity remained voluntarily pattern. Such architecture tries to keep the cohesion and the existing system, and retain the basic experience and management of the existing system. That can effectively reduce the reform resistance, the reform cost, and realize the reform smoothly.



## 4 The reform path of China's three-pillar pension system

### 4.1 Principles of China's pension reform

The pension reform process in China should pay attention to the following principles: First of all, institutional sustainability. Due to aging population and earlier pension reserve is relatively insufficient, one of the central challenges the pension system facing is a long-term financial sustainability. Therefore, to promote the long-term sustainable development of the system is one of the basic principles of the pension system reformation. The second is the system wide coverage. Pension insurance is a means to achieve the national old-age insurance, only to achieve the widely coverage can achieve the goal. Third is pension Sufficiency, China's basic pension payment has been eleven consecutive raised since 2006, but China's current pension replacement rate is still in the 40-50% level. It is lower than the international warning line. Despite the long term pension gap, the system still should ensure that the appropriate level of payment. Fourth is the system fairness. The pension system has the redistribution function, especially for basic pension as to prevent poverty in old age and adjust social income by redistribution, which must take the fairness as starting point of system design.

### 4.2 The first pillar: transfer the social pooling accounts into the public pension plan

In three-pillar mode, the core target of the first pillar is to promote social redistribution, in order to prevent the elderly poverty. PAYG mode is effective means to promote social redistribution. Therefore, this report proposed that the social pooling account in the basic pension insurance as a whole part of an independent, transformation of public pensions into the first pillar of the multi pillar pension system.

#### 4.2.1 Reducing the replacement rate of public pension aim to reduce the future pension debit

From the world perspective, public pensions in the three-pillar pension model are designed to prevent the elderly poverty, and the replacement rate is relatively low. The average contribution rate of public pension in OECD is 21% in 2012, and the replacement rate is 42.2%. The contribution rate of the social pooling account in China basic pension is 20% in 2013, and the replacement rate is about 48%, there is still space for downward adjustment.

Table 4-1: The public pension contribution rate of OECD countries (%)

Country	1999	2005	2010	Country	1999
Austria	22.8	22.8	22.8	<b>Korea</b>	9
Belgium	16.4	16.4	16.4	<b>Luxemburg</b>	16
Canada	7	9.9	9.9	<b>Holland</b>	37.7
Czech	26	28	32.5	<b>Poland</b>	32.5
Finland	21.5	21.5	20.9	<b>Slovakia</b>	28.5
France	24	24	24	<b>Spain</b>	28.3
Germany	19.7	19.5	19.5	<b>Sweden</b>	15.1
Greece	20	20	20	<b>Switzerland</b>	9.8
Hungary	30	26.5	26.5	<b>Turkey</b>	20
Italy	32.7	32.7	32.7	<b>U.S.A</b>	12.4
Japan	17.4	13.9	14.6	<b>Average</b>	<b>20.7</b>

Source: OECD, Pension at glance 2013

Table 4-2: The public pension replacement rate of OECD countries (%)

Country	RR	Country	RR	Country	RR
Australia	11.8	<b>Hungary</b>	44.4	<b>Poland</b>	28.7
Austria	76.6	<b>Iceland</b>	15.0	<b>Portugal</b>	53.9
Belgium	42.0	<b>Ireland</b>	29.0	<b>Slovakia</b>	26.0
Canada	38.9	<b>Israel</b>	19.4	<b>Slovenia</b>	62.4
Chile	3.2	<b>Italy</b>	64.5	<b>Spain</b>	81.2
Czech	50.2	<b>Japan</b>	34.5	<b>Sweden</b>	35.8
Denmark	28.9	<b>Korea</b>	42.1	<b>Switzerland</b>	34.5
Estonia	25.5	<b>Luxemburg</b>	87.4	<b>Turkey</b>	64.5
Finland	57.8	<b>Mexico</b>	4.0	<b>Britain</b>	31.9

France	49.1	<b>Holland</b>	29.2	<b>U.S.A</b>	39.4
Germany	42.0	<b>New Zealand</b>	38.7	<b>Average</b>	<b>42.2</b>
Greece	95.7	<b>Norway</b>	46.1		

Source: OECD, Pension at glance 2013

It is suggested that the public pension to maintain the current social pooling account contribution rate 20% unchanged, and adjust the payment level to the basic equivalent of the OECD state, that is about 40%. In this case, the basic pension replacement rate level will be lower than it is now, to reduce the future pension gap and the national financial burden. According to current author’s estimates, adjusted for the level of contribution and payment, the gap of public pensions will not appear before 2040 (see the 5.1 part of this report). Part of the decline in the level of public pension payment will be compensated by the increase in the level of individual account pension, to ensure the basic living standards of the elderly to be guaranteed.

#### **4.2.2 Strengthen the collection and management method of pension contributions**

The current policy of pension insurance allow that the contribution base can be determined by the local average wages between 60-300%, many enterprises will determine the payment base at the lowest level. Public pension system should eliminate the current basic pension contribution fake base, otherwise the pension contributions will be severely affected, and it is not conducive to the true assessment of the pension operation. And to achieve authenticity of base pay, meaning payment efficiency, thus providing possible to reduce the payment burden.

From China's actual situation, to solve these problems: one is to optimize collection management system. The employer wage situation that tax departments master is more authentic. In order to ensure the authenticity of the collection base, the current author proposes that the employer social security contribution base and tax base must be consistent. The second is to establish an incentive mechanism. The pension calculated in many countries, generally select the average wage during the highest-wage work years as the base, for example, select the salary of highest-paid 10-year in 40 work years to calculate pensions. Under this system design, the presence of contribution base and benefits has a positive correlation, which can inspire pay more and get more. It is suggested that the positive incentives between the individual payment and the treatment plan are strengthened in the process of the public pension plan.

### **4.2.3 Reform the payment of public pension plan with integration of incentive and redistribution.**

The core function of the first pillar is to realize the social redistribution, which is mainly reflected in the mode of payment. The current basic old-age insurance payment associated with the local social average wage, to achieve a certain social redistribution within the overall area. However, due to different social average wage in different regions, the pension benefits of workers between the overall planning area is very different, and there is no social redistribution function in these area, which is the current basic pension transfer the root causes of difficulties.

Therefore, it should reform the basic pension plan, realize the social redistribution in a wider range and solve the portability issues of the pension insurance. This can refer to the United States the first pillar pension insurance - old age pension calculation method, Survivors and Disability Insurance (OASDI) program. First of all, the pension of the OASDI scheme is only related to the average monthly wage of the participants, without any relationship with the social average wage in the place of residence, no matter where to pay and where receive, So the pension benefits of the insured will not be changed because of the change of residence, so there is no pension transfer problem. Secondly, OASDI pension plan according to different levels of the average monthly wage indexation segment content ratio calculations showed good redistributive effect, specifically speaking, if the insured person index monthly salary is low, the pension payment proportion is higher, if the insured person average indexed monthly wages are higher, the proportion of pension payment is lower. Therefore, the first pillar of the basic pension level only link to the personal average of wages, and local social average wage decoupling, avoid the regional differences generated in the average wage linked to the region; plan hair according to the average wage of segment and different proportion of payment, so high salary pension replacement rate is relatively low, and low wages and pension replacement rate level is relatively high, between different income social redistribution.

### **4.3 The second pillar: merge the refilling personal account and the enterprise annuity**

In the three-pillar system, the second pillar of the occupational pension is the main source of income after the insured's retirement; the payment level depends on the size of contributions and investment income. In our three-pillar pension system. On the basis of a number of channels to supplement individual account funds gap, complementing a personal account funds gap and corporate pension plans merged to form the second pillar pension plans. They were to become

mandatory individual account pension and the voluntary nature of corporate pension plans respectively. For individual account pension, maintain the current 8 percent contribution rate unchanged, real posting run, through market-oriented investment, and increase the value and enhance self-support capabilities.

#### **4.3.1 Transfer the state-owned assets to refill personal accounts**

Due to our country's personal account funds by borrowing, the scale of the empty account reached 3 trillion Yuan. Therefore, we must run through the transfer of state-owned shares to complement the personal account gap to achieve real accounts running. At present China listed company of state-owned equity (including overseas) market capitalization is around 20 trillion Yuan<sup>4</sup>, transfer of state-owned equity of personal accounts funds need about 3 trillion, with meticulous possibility. Transfer of state-owned shares of individual accounts is the state-owned assets for repayment of government debt, with internal rationality, helps to maintain the credibility of the government, and does not increase the government's current financial burden; therefore the allocation of state-owned shares can become a main way to complement personal accounts.

It's proposed to distinguish the attributes of the industry and to determine the state-owned equity transfer scale according to different proportion. For fossil energy, aircraft manufacturing, financial services and other strategic industries which need to be absolutely controlled by country, we should maintain 51% of state-owned shares and allocate the rest to the individual account; for transportation, electric power, environmental protection and other utilities industry related to national economy and people's livelihood, we can reserve 34% relative holding right and allocate the rest to individual account; for textile and garment, light manufacturing, bio medicine, real estate and other competitive industries, we can allocate a larger proportion to individual accounts, with 10% retained or completely allocated. In accordance with the above ideas, currently, state-owned assets that are available for allocation estimate at more than 5 trillion Yuan, which can not only complement the empty accounts of personal accounts, but also leave some leeway.

#### **4.3.2 Invest to achieve fund value preserving and increasing**

On the basis of a number of channels to supplement individual account funds gap, complementing a personal account funds gap and corporate pension plans merged into the second pillar pension plans, respectively becoming mandatory individual account pension and voluntary nature of enterprise annuity plan. For individual account pension, maintain the current 8% of the

---

<sup>4</sup> Including the SASAC, the Ministry of finance, local state owned assets supervision and Administration Commission and other holdings of shares of listed companies, including overseas listed H-shares and red chips. According to public information, the relevant department to provide data is as the criterion.

payment rate unchanged, real posting run, through market-oriented investment, increase the value and enhance self-support capabilities.

According to contribution for 35 years, receiving payment about 14 years and the second pillar pension with reference to foreign average of more than 6% of the nominal rate of return on investment calculation, personal pension can achieve about 30% of the level of treatment (for details see in Section 5.2), and plus the payment level of public pension 40%, the total reached 70%, and the current system is basically equivalent to the level of payment. For a small part of the workers who participated in the enterprise annuity plan, the level of payment can be further improved.

According to the average investment income data of the stock and bond market in our country during 2001-2012, we simulate the return of the pension investment in different combinations of the above products. The results show that scientific and reasonable investment can effectively achieve the pension value.

Table 4-3: Simulation of social pooling and individual account investment returns in 2002-2012

	<b>Social pooling (Public pension)</b>	<b>Individual account</b>
Asset allocation ratio		
Debt ratio	80%	20%
Proportion of financial bonds	10%	40%
Stock ratio	10%	40%
	Historical investment return simulation	Historical investment return simulation
2002	1.63%	-5.78%
2003	0.12%	0.67%
2004	-4.18%	-7.46%
2005	8.48%	-0.19%
2006	14.02%	48.25%
2007	14.25%	63.44%
2008	8.04%	-17.64%
2009	8.44%	40.21%
2010	1.08%	-0.69%
2011	3.14%	-8.13%
2012	2.86%	3.28%
Average return on investment over the past ten years	<b>5.12%</b>	<b>7.91%</b>

Data source: according to wind related data processing

## **4.4 The third pillar: individual saving account**

### **4.4.1 Introduce the tax incentives with the reforms of China tax system**

Taking IRA in the United States for example, to encourage individuals to save more for retirement to reduce the country's future pension burden, especially convenient individual operators and employee who did not participate in 401 (k) plans, passed by Congress in 1974, the Employee Retirement Income Security Act launched preferential tax deferred individual retirement account plan, tax preferential policies granted by the government, not to tax during individual contributions and investment stage, only to tax in receive stage. In 2014, for example, tax credit under the age of 50 is \$5000, \$5500 over the age of 50. And IRA has a more flexible management mechanism, such as a person from a business turnover, if companies do not have 401k plans next, it is allowed to transfer funds to an IRA account, and so on measures to promote the development of the IRA, the current IRA Program is the largest single pension plan. Thus, China's third pillar pension plan development must be given more adequate tax incentives to mobilize private initiative.

### **4.4.2 Should pay more attention to the fund investment**

Due to long-term survival of the individual account funds, there should be a reasonable way to invest by both the requirements to deal with inflation and to achieve asset growth of the demand. The first is to have a suitable investment targets and personal pension docking. First is to have suitable investment subject and individual pension docking, from the point of view of foreign, personal account funds investment choice is widely, but due to the nature of its long-term funds, the general configuration of the fund more, especially in recent years to target date funds, life cycle funds as the representative for the development of pension products and provides a rich and reasonable choice for personal pension investment. Therefore, in the development of the third pillar of our personal account, it should allow individuals according to their different risk preferences to choose insurance products, financial products, funds, equity products. Second is the intermediary organization's development and formation. Because many individuals do not have the professional ability to invest, they need a professional investment consultant to provide specialized guidance, the future development of China's third pillar, also need the cultivation from intermediaries.



## 5 The evaluation and solution to the key issues in the reform

### 5.1 Assessments on contributions and payments of public pensions

One of the core objectives of the three-pillar pension system reform is to reduce the future public pension gap, reduce the financial burden of the government. So it is necessary to evaluate the income and expenditure of public pension after reform.

#### 5.1.1 The calculation model of revenue and expenditure

One is the pension income model

Yearly income of pension = Urban labor age population × labor-force participation × employment rate × on-the-job worker system coverage × year per capita wage payment × payment ratio

Another one is the pension expenditure model

Yearly pension expense = urban retirement age population × labor participation rate × system coverage × year per capita pension expenses

#### 5.1.2 The basic parameters setting

Table5-1 Related parameters setting basis

Parameters	Parameters setting	Setting basis
Urban labor age population		According to estimates of the Sun Bo population model, based on the fifth population census
urban retirement age population	72.6%	According to Cai Fang, after 2000 China's labor force participation rate will below 70%, and continue a downward trend <sup>5</sup> .
labor-force participation		The world bank data shows that the labor force participation rate of 2007-2011 in China is 72.6%. Mature economies such as high income countries or OECD members are generally about 72%, so the steady state is set to 72.6%

<sup>5</sup>Ma Zhongdong, LvZhihao, Ye Kongjia.Labor participation rate and labor force growth: 1982-2005[J].Chinese Population Science, 2010, (1) 11-28.

employment rate	90%	According to the 2009 "China Academy of social blue book", Chinese urban unemployment rate at 9.4%, so the employment rate was 90% in the urban setting <sup>6</sup> .
on-the-job worker system coverage	2012 61.9% , Reach 90% in 2012	According to the 2012 national statistical bulletin, urban employment is 371.02 million people, the insured workers is 229.81million people in 2012, accounted for proportion of employment in urban areas was 61.9%, this paper assumes that to 2020 basically achieve full coverage, coverage rate of 90%.
Retired labor participation rate	2012 5.8% Decline year by year to 2.6% in 2020	In 2005 the proportion of workers who retired in was 85.8% <sup>7</sup> . In the long term, it should be consistent with the labor participation rate of the working staff, relatively stable at 72.6% after 2020.
System coverage of retired workers	90%	Assuming that the number of insured retirees in 2012 accounted for 90% of the number of retirees.
The per capita payment base	28752Yuan	National Urban Non private sector employment average annual wage is 46769 Yuan, the average annual wage of urban private units is 28752 Yuan in 2012, here select the lower average annual salary of the private sector as the standard.
rates of wage growth	2012 10% 2020 5% Average annual growth of - 0.63%	Before 2012, China's average wage growth rate was above 10%, given to country's 2020 income doubling plan; we assume that 10 percent in 2012, after the economy has gradually entered the steady stage, wage growth rate is 5% in 2020.
Payment ratio	28%	According to No. 38 states, a personal account for basic old-age insurance payment rate is 8%, the social pooling account rate was 20%, and the total contribution rate is 28%.

<sup>6</sup>Research Institute at China Academy of Social Sciences. Employment situation under the financial crisis [J]. Economic dynamics at home and abroad, 2009, (19):12-15.

<sup>7</sup>Cai Fang.The drawbacks of the one-child policy in China [J]. Far Eastern Economic Review, 2007,(3): 8-9

**5.1.3 The calculation results of fund balance**

According to the results of simulation and calculation of this report (see Appendix 1-2), established in the premise of current population policy, if it continues to the current basic pension system, social pooling funds in 2025 income over expenditure, 2028 fund balances exhausted, fund total revenue cannot meet expenditure. In recent cases, social pooling funds in 2034 income over expenditure, 2047 fund balances exhausted, total fund revenue cannot meet expenditure. Obviously, the reform of the public pension system can effectively reduce the gap which the current basic pension funds are facing, improve the sustainability of public pensions, and reduce the government's financial burden.

**5.2 Estimate the payment level of individual accounts**

This report presents the three-pillars of the reform ideas, public pensions by cut rate of substitution to reduce the burden of providing for the aged in the government. At the same time, through make personal accounts, and scientific investment to achieve pension asset accumulation and growth, in order to compensate for the decline in public pension level. As a result, if the level of individual account payment can make up for the decline of public pension payment is the key to the reform, the following is the simulation calculation:

**5.2.1 The model and basic parameter setting**

According to Wu Zhongdeng (2011)<sup>8</sup>, individual account pension replacement rate can refer to the enterprise annuity; personal account payment rate and substitution rate have the following relationship:

$$c = \frac{rs \cdot (1+p)^m (b-p) [(1+b)^n - (1+r)^n]}{(1+b)^n (b-r) [(1+b)^m - (1+p)^m]}$$

Among them, *rs* is the replacement rate. Other related parameters are set as the following table:

Table 5-2 personal account pension replacement rate calculation parameter settings

parameters	Parameter	Parameter	Setting basis
------------	-----------	-----------	---------------

<sup>8</sup>Wu Zhong,Zhang Peng,Han Lin.Based on specific target substitute rate of pension preferential tax policy costs and benefits measured [J].The Journal of Shanghai University of Engineering Science,2011(10):28-35.

	meanings	setting	
<i>c</i>	Personal account contribution rate	8%	Personal account contribution rate, as benchmark case. The payment rate can be changed, in the case of other parameters set, depending on the change in the replacement rate.
<i>m</i>	Payment period or average working age	35 years	The higher the payment time is, the higher the replacement rate is. The general payment period is 30 years; the minimum age is 15 years.
<i>p</i>	Average wage growth rate	5%	Average wage growth rate and GDP growth rate remained consistent
<i>n</i>	Expected number of years	13.67years	Planned years of Personal account pension. The retirement age is 56 years old, and the total number of years is 164 months, the total is 13.67 years.
<i>b</i>	Average nominal return rate on investment	6%	Reference 6%
<i>r</i>	Inflation rate	2%	Reference 2%

### 5.2.2 Simulation calculation of relative payment level of individual account

Generally speaking, when the payment rate is determined, in the case of other parameters unchanged, according to the above model, the rate of substitution can be calculated. If the relevant parameters change, such as the nominal return on investment, the replacement rate will be changed. According to the report of the simulation calculations, in the recent scheme, namely individual account payment rate of 8%, if the rate of return on investment can reach 6%, according to the current personal account requested ages and other requirements, individual account pension can achieve 30.8% of relative payment level, add to 40% of the public pension levels, total level of payment remains in 70%, basically equal to current payment level. In the mid - and long-term plan, namely individual account payment rate of 8%, if the rate of return on investment can reach 7%,

individual account pension can achieve 39% relative level of payment, added to 30% of the public pension levels, total level of payment is about 69%, can still maintain the current payment level.

The specific results are shown in the following table:

Table 5-3 replacement rate of individual account under different parameters

Payment level	Contribution rate	Average contribution years	Average salary increase rate	Expected number of payment years	Average nominal return rate on investment	Inflation rate
<i>rs</i>	<i>C</i>	<i>M</i>	<i>p</i>	<i>n</i>	<i>b</i>	<i>r</i>
30.8%	8.0%	35	5.0%	13.67	6.0%	2.0%
46.2%	12.0%	35	5.0%	13.67	6.0%	2.0%
39.0%	8.0%	35	5.0%	13.67	7.0%	2.0%

### 5.3 Solutions to cash-out the transferred state-owned assets

Considering the direct transfer of state-owned shares to the personal account may lead to a great impact to the market, and each account equity allocation of specific operational problems, we can take turn to and reduced to go step by step alternative ways.

#### 5.3.1 Ways to transfer the state-owned assets

The first step of the transformation is transferred state-owned shares to the pension fund management institution. In order to keep the property of state-owned shares, the first part of SASAC holdings listed company shares transferred to the establishment of a new basic pension insurance management institutions (It could be the current NCSSF-National Council for Social Security Fund, and could also be a pension management agency, which will be referred as PMA). It should be noted that, in order to ensure the stability and stable development of state-owned listing company, in the case of shares have been allocated, its shareholders' rights are still under the exercise of the SASAC (State-owned Assets Supervision and Administration Commission of the State Council).

### **5.3.2 Ways to reduce the holding of state-owned assets**

The second step is through the equity pledge, with issuing bonds and commercial loans and to rent from the MoF or the commercial bank to borrow cash in advance, then to refill individual accounts ahead of time. There are two main solutions:

The first solution: The MoF issues special bond to the People's Bank of China or commercial banks directly to get cash, so that can refill the personal accounts. Since then, the PMA use the reduction of state-owned shares and dividend income to pay to the MoF, so that the MoF deal with respond to the maturity of special treasury bonds. After refilling the personal accounts with cash; it needs to immediately carry out asset allocation to achieve market-oriented operation.

If taking into consideration the individual account began to carry out the operation of the market immediately there is a certain risk, we can take the second solution: firstly a PMA gives the transferred state-owned shares pledged to the MoF, and the MoF borrows cash from the PBC and commercial banks and lending to PMA. After obtained bank loans, PMA could allocate the funds to each individual account according to participants' contribution. At the same time, the MoF issued special treasury bonds, which is held by the individual account in cash, and the MoF will pay the debt of the people's bank or commercial bank. Social security A will use the reduction of holed shares and revenue to repay the debt of the MoF, the MoF has received cash assets to deal with Treasury bonds held by the personal accounts. In the meantime, individual accounts would invest in special treasury bonds, with bonds redemption gradually, personal accounts get cash, gradually began to diversify asset allocation, and achieve market operation.

## **5.4 Solutions to the problem of "middle worker"**

### **5.4.1 Definite payment level for the old worker and the new worker**

In 1997 in the reform process of implement integration of accounts of the basic pension system reform process, formed three categories of people: participate in job after the implementation of the reform called the "new worker"; the second is those who retired before the implementation of the reform called the "old worker"; the third is to work before the reform, retire after the reform called the "middle worker". In this paper, as the "three-pillar" reformation, put forward to make it on personal accounts, the effects on these different people are different. "The old worker" retired before 1997, having no business with personal account, so personal accounts had no effect on the "old worker". But considering current pension plan exists a phenomenon that earlier retire, lower payment, it is recommended in the payment of adjustment in the process of the "old worker" "to give

some preferential policies, appropriate to raise the level of payment of this population. In the process of three-pillar reform, those participate in the work as the "new workers" since 1997, whose personal accounts have all been meticulous, after his retirement benefits plan is not affected. Not involved in the transition of the problem.

#### **5.4.2 Payment of "middle worker" during the transition**

As for those "middle worker" who took part in the work before 1997 and retired after that in the implementation of the three-pillars of the reform process, Despite the personal account to do it. But 1997 is the year starting from personal accounts, personal accounts would face short of reserves, in public pension benefits reduced circumstances, could face inadequate retirement protection. We believe that the "middle worker" should be compensated for loss of interest in the reform process to promote the smooth progress of the reform. Specific ideas are as follows, locking a target replacement rate for "middle worker", and we proposed to 70% as a benchmark. The "middle workers", after their retirement, should be evaluated their replacement rate level of public pension and the individual account. If it cannot reach 70% target level should be subsidized by the financial. Taking into account that "middle worker" lack of personal accounts, because of system transition, the "middle worker" gap funding requirements should be borne by the Government, sources of funds can be paid out of the current financial. The transfer of state-owned assets to enrich personal accounts can also be considered as a separate compensation fund.

### **5.5 Assessment of the NDC mode in China basic pension system**

#### **5.5.1 The concept and practice of NDC**

NDC (Non-financial Defined Contribution) mode is a system between PAYG model and funded model, in terms of financing, and PAYG system is consistent, from current workers pay into the pension system, pension payments directly for current retirees. But from the perspective of payment benefits, retiree pension benefits are based on the accounts of individual contributions and investment returns and make payments. From the perspective of operational management, this account is an account management only, does not need to deposit funds, but in retirement, became the principles of pension's calculation. It should be noted that is, because the account does not have the actual capital investment, the fee rate set by the Government, rather than market yields real results.

Since 1990s, the NDC mode start to practice in Sweden, Italy, Russia, Latvia, Kyrgyzstan, Mongolia, Poland and other countries. The reform brief summary as shown in the following table:





Table 5-4 System comparison of NDC mode countries

Country	Poland	Mongolia	Kyrgyzstan	Russia	Latvia	Italy	Sweden
Year	1999	1999	1999	2002	1996	1995	1999
Pillar mode	First DB	First DB	Second DB	Second DB	First DB	First DB	Second DB
Contribution rate of employer (%)	9.76	11.5	0	16	16-10	31.7	10
Contribution rate of individual (%)	2.56	7.5	23	0	0	0	6
Rate of NDC (%)	13.32	15	23	16	16-10	31.7	16
Replacement rate (%)	Downward 10%	Downward 15%	Downward 10%	Stable	Downward 10%	No significant downward	Slightly down
Accounting rate (%)	75% of wages increase rate		75% of wages increase rate	Inflation rate	0.8 of wages increase +0.2of labor force	Inflation rate	Economic growth rate 1.6%
<b>Reform results</b>	The initial reform of financial	Gave up in 2011	Under the inflation, NDC devaluation,	State financial subsidies continued to increase	Forward financial pressure is still in	Pension debt continues to rise	Better sustainability

subsidies, and  
now improve

reform  
stagnation

Throughout the implementation of the national account system reform in the name results in a decade, in general have the following common characteristics: one is the general reduction in the level of payment. These seven countries except Italy, replacement rates in other countries declined 10% percent. Secondly, lower accounting rates are generally adopted: it was linked with the inflation rate in some countries, but lower than the economic growth rate. Sweden accounting interest rate is 2.6%; real rate of return is 3.5%. Thirdly, reform is not easy; the effect is yet to be tested. Mongolia has been terminated on behalf of accounts reform, Italy reforms pension debt continued to rise, while Russia financial subsidies continued to increase to the pension system. By contrast, Sweden on behalf of accounts reform smoothly.

### **5.5.2 Analysis on the NDC system in Sweden**

The core logic of NDC reform for dealing with PAYG of pension crisis of following: first NDC business increased has incentive function, encourages parameter insurance personnel more paid more have, meanwhile, must solution NDC business brings of income again distribution weakening of problem; second, under NDC business, to lower of accounting interest rate and non-high of actual investment returns rate records personal interests, can reduced pension paid, and increased fund balances. The same time, you must consider the acceptability of payment of insured persons for fall. From NDC in practice, Sweden's reform is relatively stable, also due to the above two issues have better institutional arrangements.

Firstly, the perfect zero pillar effectively alleviate the NDC redistribution of weak defects. NDC core flaw is personal payment and incentive of receiving treatment, and the lack of income redistribution function among different income groups; in particular the low-income groups may face the dilemma of inadequate protection. Sweden's pension system is divided into three-pillars, starting with zero pillar "guaranteed pension (GP)", as the minimum pension benefits for family planning, mainly for low-income groups, and does not require individual payment, General taxes provided by the Government. A 25-year-old person who in Sweden lives 40 years can receive a full guarantee pension. At present, the celibate and non-celibate will receive a guaranteed monthly pension maximum amounts are 7500 Sweden Kronur and 6800 Sweden Kronur. Those live in Sweden for less than 40 years whose level of payment year on year 1/40 Scaling down. Second, the NDC pension, called "income pension"; NDC accumulated pension and pension for income associated DC Plan , Build on top of individual accounts, the total pay for the wages of employees and employers 18.5% , which 16% will be calculated in NDC and 2.5% will be calculated in the system account. Third level for full account accumulated pension, known as the "Premium Pension". Primarily serving residents enjoyed by pension funds, whose rates depend on

employment by industry and insurance personnel age, average rates for the total wage bill of 3%~5%, established by the negotiations between Unions and employers. At present, more than 90% of Sweden working residents have participated in the Premium Pension, and its investment is mainly operated by private firms.

Secondly, Swedish higher level of payment entitlements for NDC business decline in levels of payment space. Sweden NDC system reform is the actuarial balance, but due to its maintenance ratio of population will raise from 33% in 2012 to 45% in 2040, which will make the NDC average accounting rate reduction, and will lead to the decline of pension payment. Under the Sweden Government old-age pension actuarial report predicted that initial retirement pension replacement rate of standard retirees will fall from 57% in 2012 to 49% in 2030. But Sweden third pillar pension coverage is higher, which could offer 10-20% replacement rate to 80% workers. Therefore, in General, despite the NDCs reform reduced the Sweden retirees' pension payment, but Sweden has both higher levels of payment, as well as other pillars provide supplements for the payment, making this payment decreased facing relatively little resistance.

### **5.5.3 China is lack of NDC institutional basis**

Firstly, NDC led to weakening the function of redistribution. The pension payment level under nominal personal pension account system is entirely decided by individual contributions and enrolled time. It's a similar pattern to Singapore's Central Provident Fund, and lack of redistribution of income. It lost the mutual assistance of public pensions and the promotion of equitable. In this regard, Sweden is obtained by a separate pillar as zero pillar, compared to basic old-age pension in China taking play a redistributive function and not zero pillar is similar to the national pension system of accounts in the NDC mode reveals. It would be expected that if the system of basic old-age insurance accounts in the NDC mode, it will take the retirement income gap, some basic lives of the elderly are difficult to guarantee.

Secondly, retirees cannot afford the fall of payment caused by NDC system. Different from Sweden's pension system, which is properly structured, has multiple sources, and payment level is higher. China's old-age pension system, basic old-age insurance is a single large and enterprise annuity cannot be developed for a long time. National pension is highly dependent on the basic old-age insurance. After eleven times upward adjustments, level of basic old-age insurance benefits are only 45% or so, remained near the cordon established by the International Labor Organization. In this

context, if the NDCs reform is implemented because accounting interest rate lower the actual rate in the long term, will lead to further decline in the level of insured pension, old ages may fall into poverty.

Thirdly, as the small pension balance in China, NDC system is difficult to give play to fund investment and expansion capabilities. Sweden on behalf of the account after the period for accumulation of pensions through specialized investment to add value, value-added component part into the insured interests, on the other hand rolled into the Fund to meet the peak long-term pension payments. This is the account in the name of one of the core design. In 2013, Sweden account fund balance is the total wages on behalf of 43%, together with Sweden higher wages, the balance is of a larger scale. Despite the fluctuation of proceeds, but in the long run, their investment income also constitutes a necessary source of funding. At current situations of NDC mode in China, due to the smaller size of fund balances, only 3.5 trillion, which maintains only 16 months to pay. Even if used for investments, return on investment compared with the size and growth rate of the Fund can provide limited support, if taking into account both pension savings can only survive less than 20 years, when the peak of the pension payments is still yet to come. NDCs under the system, do not make personal accounts, and hope that both investment funds and growth and ease pressure on pension payments with greater difficulty.

Finally, the rate of charge is volatile, which will influent the participants' stable expectation of pension payment. As mentioned above, under NDC mode, personal account actually have no funds, but also need to determine a accounting interest rate, it means the duty of government on personal account of debt, accounting interest rate of determine involves personal pension interests and Government future of responsibility, so accounting interest rate is one of the designed cores name account business, to integrated consider economic growth, and wage growth, and inflation, and fund payments situation determination, annually in dynamic adjustment . This will undoubtedly lead to the insured pension accumulation increased volatility, if an automatic balancing mechanism and special accounting rate, pensions cuts can also occur. Also in Sweden, for example, in 2010 Sweden overall imbalance of the old-age insurance system due to system and start the automatic balancing mechanism, when pension growth rate the previous year of 4.6% down to -3%, 2011 Year down to -4.3%. Those situations do not only help to create stable expectations, but also for rational planning of their old age. Sweden only has 5.7 million populations, and its pension system is relatively single for less difficult of policy adjustments and management. China's basic old-age insurance insured workers are now 300 million or more, plus the socio-economic gap between Eastern and Western

areas, if the accounting rate design is not precise, could lead to some pension rights which are not guaranteed.

Therefore, overall, NDC though have been practiced in some countries, succeed in individual countries. But under the framework of China's current pension system, do not have the institutional foundation for a transition to a NDC.

**Appendix 1: The balance of current social pooling account (100 million)**

	<b>Revenue</b>	<b>Payment</b>	<b>Balance</b>	<b>Accumulate Balance</b>
2012	13,371	16,121	-2,750	-2,750
2013	15,808	18,283	-2,475	-5,155
2014	18,460	20,459	-1,999	-7,043
2015	21,359	22,417	-1,058	-8,015
2016	24,508	24,521	-13	-8,027
2017	27,797	26,305	1,492	-6,733
2018	31,318	28,767	2,550	-4,585
2019	35,267	31,887	3,380	-1,819
2020	39,298	34,514	4,785	1,988
2021	42,149	38,056	4,093	5,153
2022	44,841	41,759	3,083	7,469
2023	47,377	45,414	1,963	8,902
2024	50,191	50,082	109	8,980
2025	53,146	54,830	-1,684	7,819
2026	56,254	60,266	-4,012	5,130
2027	59,595	65,768	-6,173	1,110
2028	62,761	71,615	-8,853	-4,494
2029	66,168	77,737	-11,568	-11,609
2030	69,448	84,048	-14,600	-20,336
2031	73,021	90,550	-17,529	-30,519
2032	76,718	97,363	-20,645	-42,174

2033	80,584	104,209	-23,626	-55,135
2034	84,635	111,677	-27,042	-69,553
2035	88,868	119,735	-30,867	-85,547
2036	93,278	128,140	-34,862	-103,101
2037	97,947	137,318	-39,371	-122,367
2038	102,629	148,012	-45,383	-143,949
2039	107,348	158,346	-50,997	-167,518
2040	112,348	168,735	-56,387	-192,843
2041	117,149	179,166	-62,017	-219,911
2042	121,622	190,379	-68,757	-249,076
2043	126,649	202,727	-76,078	-280,436
2044	132,022	215,349	-83,327	-313,816
2045	137,756	228,654	-90,898	-349,204
2046	143,550	242,638	-99,089	-386,692
2047	149,277	255,953	-106,676	-425,914
2048	155,275	269,634	-114,358	-466,776
2049	161,459	283,934	-122,475	-509,304
2050	167,830	298,380	-130,550	-553,359

**Appendix 2: The balance of public pension after the reform (100 million)**

	<b>Revenue</b>	<b>Payment</b>	<b>Balance</b>	<b>Accumulated balance</b>
2012	9,550	8,871	679	679
2013	11,291	10,061	1,230	1,875
2014	13,186	11,259	1,927	3,695



## Social Protection Reform Project

Situation analysis [Topic 1.3.4]

2015	15,257	12,336	2,920	6,375
2016	17,505	13,494	4,012	9,953
2017	19,855	14,476	5,379	14,615
2018	22,370	15,831	6,539	20,124
2019	25,190	17,548	7,643	26,380
2020	28,070	18,993	9,077	33,602
2021	30,106	20,942	9,164	40,687
2022	32,029	22,980	9,050	47,487
2023	33,841	24,991	8,850	53,948
2024	35,851	27,560	8,290	59,831
2025	37,962	30,173	7,788	65,202
2026	40,181	33,165	7,017	69,904
2027	42,568	36,192	6,376	74,057
2028	44,830	39,410	5,420	77,487
2029	47,263	42,779	4,484	80,246
2030	49,606	46,252	3,354	82,250
2031	52,158	49,830	2,328	83,603
2032	54,799	53,579	1,220	84,291
2033	57,560	57,347	213	84,408
2034	60,453	61,456	-1,003	83,873
2035	63,477	65,891	-2,414	82,623
2036	66,627	70,516	-3,889	80,665
2037	69,962	75,567	-5,604	77,922
2038	73,306	81,451	-8,145	74,049
2039	76,677	87,138	-10,461	69,214
2040	80,248	92,855	-12,607	63,552

## Social Protection Reform Project

Situation analysis [Topic 1.3.4]

2041	83,678	98,596	-14,918	57,041
2042	86,873	104,766	-17,894	49,451
2043	90,464	111,561	-21,098	40,754
2044	94,302	118,507	-24,206	31,058
2045	98,397	125,829	-27,432	20,378
2046	102,536	133,525	-30,989	8,654
2047	106,627	140,852	-34,225	-3,930
2048	110,911	148,380	-37,469	-17,318
2049	115,328	156,250	-40,922	-31,528
2050	119,878	164,200	-44,321	-46,484

*The contents of this publication is the sole responsibility of the EU-China Social protection Reform project and can in no way be taken to reflect the views of the European Union*