The Basic old-age insurance of China: Challenges and Countermeasures

Zhen Li[1]

1. Introduction

China established the basic old-age insurance system (BOAI) for urban employees in 1997. China's basic old-age insurance plan has been in operation for about 15 years. It now faces big challenges: the high contribution rate, insufficient pension benefits, and the system running into deficits. The reasons for these challenges include low contribution base, few contribution years, low retirement age (especially for women), and low interest rate on individual accounts. So this paper proposes reform of the BOAI and the establishment of the third pillar of old-age income system through "Exemption of tax on contributions and investment returns, Tax on pensions" (EET).

This paper suggests separating the Individual account system from the BOAI so that employees can make decision on funds. It also suggests raising the requirements for pension so that retirees can obtain sufficient pension for "basic Protection" and the maintenance of the system.

Raising the thresholds is in conflict with extending courage. For the dual economy structure in China, there is a lot of labor force in the informal sector or in unstable employment. A dual pension system for different labor groups with different income levels might be more suitable for a developing China.

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2. History of China’s Urban Employee’s Pension System

2.1 China's urban employee’s pension system under the planned economy (1952 1991)

In the early 1950s of the 20th century, based on the Soviet model, China established an urban pension system. China's urban enterprise workers followed the earliest retirement plan in February, 1952 after The State Council promulgated the "Labor Insurance Regulations”. The main features of the welfare system in China were “low-wage, high-employment, high subsidies, high welfare", enterprises had unlimited liabilities for their employees’ health, old age, sickness, death and disability. Because almost all enterprises were state-owned, the final liabilities went to the state. The retirement system was an important part of the Labor Insurance System. In order to facilitate the distinction between the existing basic pension insurance systems, we call this the traditional retirement system.

Characteristics Of the traditional retire system consistent with the socio- economic system at that time:

i. The protection target was state-owned enterprise workers and collective workers. Under the planned economy system, from 1956 to the 1980s, China’s economy was almost entirely state-owned. In the1980s, China began to reform and open up to the world, then a small amount of the collective economy began to emerge. So the urban pension system was targeted at state-owned enterprise workers and workers of collective enterprises, the latter made up a very small number of the total.

ii. The system had high coverage rate. It covered all urban state-owned enterprises and collective enterprises.

iii. The system’s high level of retirement pension was another characteristic. At that time of the implementation of China's low wages and welfare policies, pension was 80% of the last wage of a worker.

iv. There were strict conditions to obtain pensions. Workers must work for 30 years. In 1949 China's population life expectancy was 46 years, the retirement ages were differentiated in the early 1950’s: retirement age for female blue-collar workers was 50 years, for female cadres it was 55 years, and 60 years for men. Relative to population life expectancy at that time, retirement age requirements were high.

v. The state - enterprise model. Enterprises and individuals did not pay contributions; pensions were part of cost of labors of enterprises which operated the pension plans, so it appeared to be enterprise insurance plan. But at the final analysis, the government was responsible for retirement pension. So we called this system "the state-enterprise model".

2.2 Transition from enterprise pension system to the social insurance system reform pilot program (1991-1997)

The traditional retirement system was the product of a planned economy. With the transformation of the planned economy system to a market economy, the state government retreaded from traditional pension system, it could not adapt to economic development. As a result, lots of problems were created that include the following:

i. The majority of state-owned enterprises operated in losses and could not afford the pension system;
ii. Very small risk pool;
iii. The traditional pension system could not cover the labors working in newly; emerging ownership such as private firms, joint ventures, so on; and
iv. Labor mobility between different ownership of firms was hampered.

Thus from 1991-1997, the Chinese government began to build some local pilot social pension insurance system.

2.3 Establishment Of the Basic Old-Age Insurance（1997——）

In 1997, the Chinese government established ***the Urban Employee's Basic old-age insurance(BOAI)*** and extended it throughout cities and towns nationally.

3. Contents of the Basic Old-Age Insurance

3.1 Features of a hybrid System

Policymakers wanted to root the values of efficiency and equity into the BOAI. In the 1990s, China reflected "egalitarian" values in the planned economy era, while the values of the German social insurance, Neo-liberalism, the World Bank "three pillar scheme" proposal as well as the success of the privatization of social security in Chile, Singapore funded system had an influence on China's policymakers. These different sources of ideas and practices impacted the structure of the China's basic pension insurance system.

Policymakers also hope the BOAI could achieve the multiple coals of wide coverage, basic protection, and sustainability.

Under these rules and goals, the BOAI was designed as a hybrid system consisting of the Social Pooling and the Individual Account. The Social Pooling is a public pension plan financed by employers, and the Individual Account is a compulsory private pension plan financed by employees. It is called the *first pillar* of old-age pension system, but it is a combination of the first and second pillars in terms of the World Bank's definition in 1994. The social pooling was designed as a defined benefit plan with pay-as-you-go financial system, and the Individual Account system was designed as a defined contribution plan with funded financial system.

3.2 Parameters of the BOAI

Contribution rate for employer is 20% of employees' wages and employee pay 8% of his or her wage which goes into the personal account, the total rate is 28% wages; the lower and upper limits of the base of contribution wages are 60 and 300 percent of the social average wage of the previous year respectively; the minimum contribution period is 15 years; retirement age is 60 years for men, 55 years for women cadres, and 50years for female workers[2]. The BOAI gives one-year deposit interest rate to assets of individual accounts.

3.3 Policy expectations on pension level

Because the replacement rate of traditional retirement system was too high, the new system decided to offer basic protection only, which must comply with the "basic protection" principle. Under this principle, the pension level decreased through hybrid modifications. First, modify the final wage replacement rate of workers into social average wage replacement rate. Second,

[2] The decision about establishing the unified basic old-age insurance system for enterprise employees,1997.

decrease the replacement rate from 80% to 60%. The level and structure of pension under the new system are as follows:

Target replacement rate: 59% of the social average wage, in which, 35% is paid by the social pooling system and 24% paid by the individual account system[3].

Adjustment mechanism of pension was set up with linkage to inflation and average salary to ensure that pension income will not decline relatively.

3.4 Determinants of pension level

Basic pensions are calculated and paid as follows: when the insured person reaches retirement age and the minimum 15-year-contribution period is satisfied, social pooling pension is calculated on the basis of the previous year's local average wage and the person's record of monthly average contributory wage of life time; each full contribution year qualifies for 1% of the basis of social average wage and one's average wage separately. Individual account pension: each month equals the total accumulated amount divided by planned payment months, which are determined by the average life expectancy on retirement, personal retirement age, interest rate and other factors. For those retiring at 50, 55 and 60-year-old, the planned payment months specified as 195,170 and 139 months respectively.

3.5 The Evolution of coverage and its significance

In the pilot programs on reforming the traditional pension system the government had to address the issue of transforming the traditional pension system into the social insurance system, therefore, the system covered only the state-owned enterprises and collective enterprises. Up to the 1990s, enterprises beyond the state-owned and collective ones had developed, and more labor was employed. Under this context, the coverage extended to all enterprises with different ownership in 1997, including state-owned enterprises, collective enterprises, foreign-funded enterprises, joint ventures enterprises, private enterprises, joint-stock enterprises and so on.

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[3] Hu Xiaoyi. On Gradually increasing the management level of old-age insurance [J]. Chinese Social Security, No.1, 2004, p.21.

In 2005, coverage was extended further to self-employees and flexible employees (without long-term stable employment), who could enjoy the favorable contribution treatment pension while enjoying the same calculation method with ordinary employees. Contribution rate for them was 20% of their wages, of which 12% goes into the social pool, and 8% into individual accounts[4].

Expansion of coverage to self-employees and flexible employees signified "the Urban Employee's Basic Old-age Insurance "became the old-age insurance for all labors".

Table 1 Main contents of the basic pension insurance system ("First Pillar")

System Structure		Social Pooling	Individual Account
Type of System		PAYG System, DB	Funded System, DC
Protection Target		All urban enterprise workers, self-employees, flexible employees	
Contributions of employees		20% of total wages (employer)	8% of personal wage (employee)
Contributions of self-employees, flexible employees		12%	8%
System Parameters	Retirement age	Male 60, female cadres 55, female workers	
	Contribution base	60-300% of average social wage	
	Minimum contribution period	15years	
Rate of return on individual account		One-year bank interest rate	
Monthly Pension		basic pension = (indexation of the average monthly wage of local workers in the previous year +the insured person's average monthly contribution wage) * 1/2 * n * 1%	Individual account accumulation amount (determined by the one-year bank rate) divided by 139,175,190 relative to the insured person's retirement age
The expected replacement rate		35%	24%

[4] Decision of the State Council on enterprises to improve the basic old-age insurance system, 2005

4. Challenges of the Basic Old-Age Insurance

The BOAI has been playing a very important role in China. Social insurance instead of enterprise insurance promoted flows of labor force between ownership of enterprises, it provides basic protection for 80 million retirees. On the other hand, it faces a lot of difficulties

4.1 Brief description of the challenges

First of all, the 28% contribution rate is already too high when the old-age dependency ratio is relatively young, without room for further increase when the population will age very fast in the near future. Secondly, the average replacement level decreased rapidly over the past ten years, from 78% at beginning of the BOAI to 44% in 2011. Because of the high Engel coefficient of urban China, which is 37%, as well as the lack of other institutional income support in this case, there is no room for pension to decline further. Thirdly, the contributions from employees which are supposed to be a funded system are being paid to the retirees, individual accounts are notional accounts in most regions, and the liabilities of the individual accounts are larger than the surplus of the BOAI. All in all, the basic old-age insurance is not sustainable.

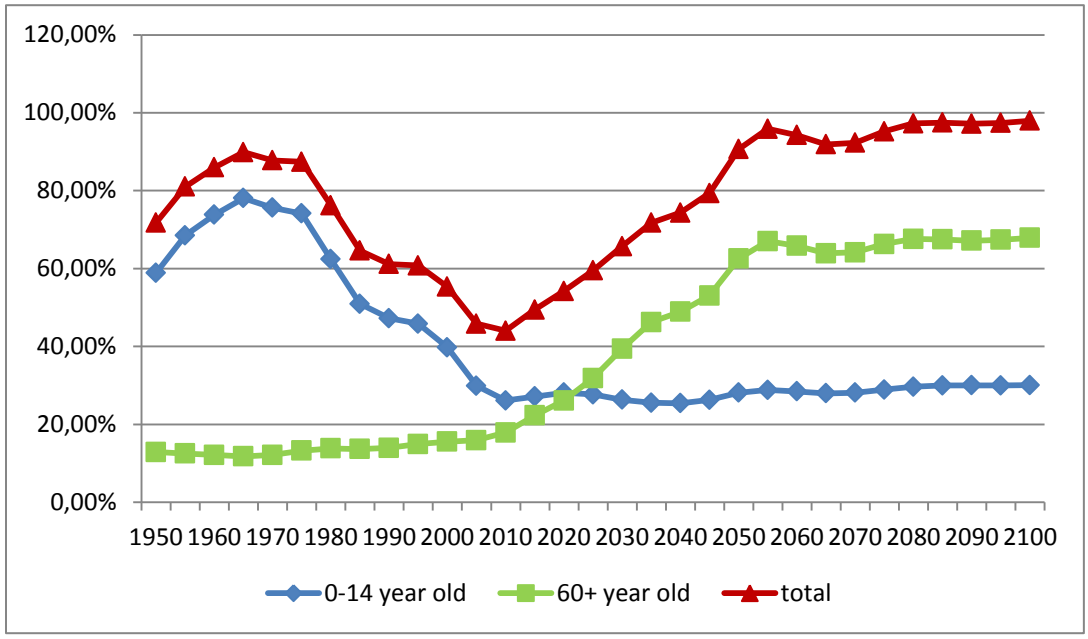
The most serious challenge is that policymakers do not recognize the unsustainability status of the system. Apart from contributions by employers and employees, from 2002 on all levels of government began to pay the system transition costs to convert the empty individual accounts into accumulating individual accounts, which covered the liabilities of personal accounts spending by increasing the current system income. As a result, there was surplus in the system and the regulators as well as some scholars maintain that the BOAI has no deficit problems. Consequently, regulators do not recognize the structural and parameter problems in the system, nor did they take actions to change the high contribution rates, the low pension, and also the financial unsustainability problem.

4.2 Generally young but fast aging population

From the following graph we can see that China is still at the stage of a young age population structure, especially the total dependency ratio is very low. In the 1990s when the Basic Old-Age Insurance was devised, China's elderly dependency ratio was only 15% (elderly dependency ratio

= the population aged 60 and above / population aged 15-59), and this indicator is 18% now, which is still young. But the challenge is that China's population is aging fast. It is forecasted that China will experience rapid aging in the next 40 years, and by 2050 the elderly dependency ratio will reach 63%[5].

Figure 1 Development and future trends of China's population dependency ratio (1950-2100)



Source: UN, World population Prospects: 2012 Version, http://esa.un.org/undp/wpp/index.htm

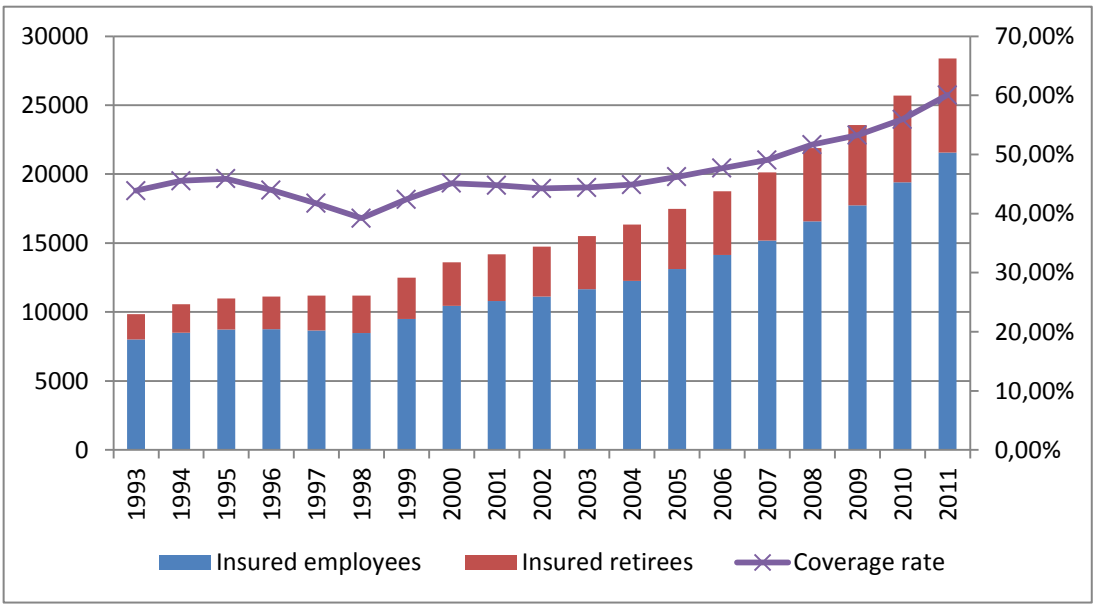
4.3 Coverage rate is mingled with hope and fear

Coverage rate is an important indicator of fairness in social security system. From the perspective of fairness, China's Basic old-age insurance is worthy of recognition. Thanks to low threshold requirements, coverage rate is over 60% of labors in urban China, it is relatively high compared to the underdeveloped countries where a lot of labors are largely in the informal sector. On the other hand, there are massive uncovered peasant workers.

[5] UN, World population Prospects: 2012 Version, http://esa.un.org/undp/wpp/index.htm

With the first principle being "wide coverage", the Chinese governments at all levels made great efforts for this goal, not only manifested in the design process by lowering the threshold to encourage the low-income earners, self-employees, flexible employees to participate in the BOAI system, but also in the implementation process by offering other favorable terms. For example, some local governments encourage the elderly employees who are not insured to pay lump-sum contributions with the lowest contribution base, lowest rate and shortest contribution period for pension eligibility. Of course, regulators understand that such an approach cannot only achieve high coverage but also get current income to maintain the current balance of payments. In 2005, allowing the self-employed and flexible workforce to participate in the insurance at a lower rate played a significant role in increasing the coverage rate.

Figure 2 The number of insured Chinese urban employees and changes in coverage rate 1993-2011 (In ten thousands)



Source: Human Resource and Social Security Department: Social Security Bulletin, 1994-2012

From the point of fairness, the higher coverage rate of the self-employed persons and flexible workforce, the better it is. While judging from the sustainability point of view, the increasing insured self-employed could be a problem. In 2011 non-employee status insured persons reached 21%[6], the contribution rate of this population is 20% and formula for calculating

[6] Zheng BingWen ,Editor: "China Pension Development Report: 2012," Economic Management Press, page 16

pension from the social pool is the same as regular employees. Redistribution is advantageous for this group, but because the number of this group is enormous, the sustainability of the system is poor. Moreover, this group of the population generally chooses the lowest contribution base and minimum contribution period. Data from Chongyi County in Jangxi province showed, the proportion of insured enterprise employees to insured self-employees had changed from 63:33 in 2005 to 51:49 in 2011.Self-employed workers will take back all they contributed to the system within 4-7 years after they get retired[7]. So extending coverage in this way leads to enormous future liabilities on the BOAI.

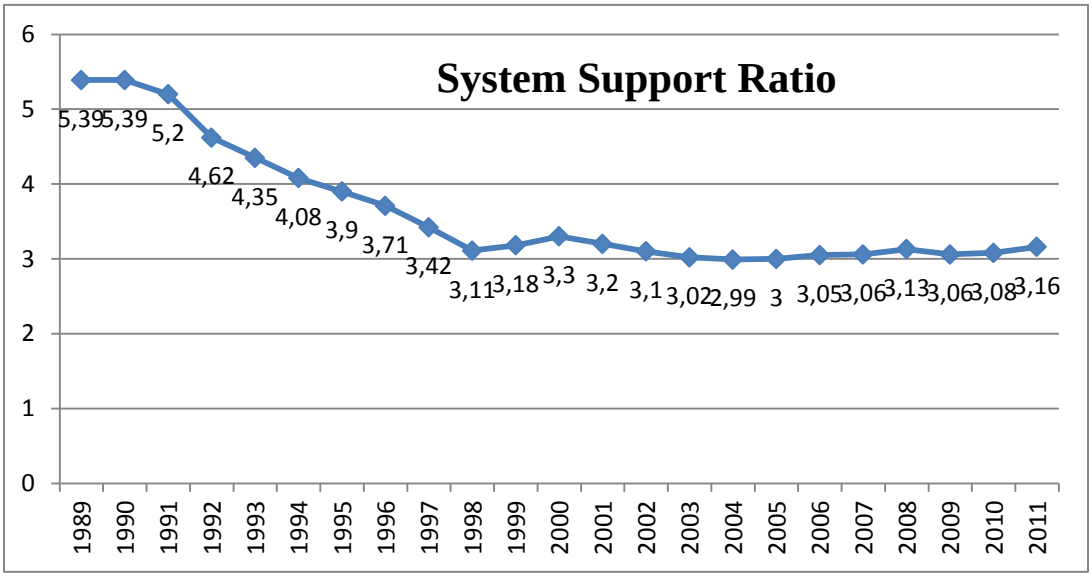
4.4 The dramatic aging ratio in the BOAI

China's old age dependency ratio is not high, but the covered population in the basic old-age insurance is aging very fast. In 1978 the ratio of urban employees to retired population was 30:1, and then decreased rapidly to 3.4:1 in 1997 at the time of the establishment of the BOAI. In 1998 it further decreased to 3:1. From Figure 1 we know that during the same period the elderly dependency ratio of the total population increased from 8% to 11%, indicating an aging population is not the only reason for aging pension system.

Statistically speaking, the ratio of insured employees to insured retired is 3:1 in the current pension system. However, not all the three employees insured actually pay their contribution continuously. According to the Human Resources and Labor Protection survey, 23% of the insured employees suspended contribution in 2011. So the actual contributing population to the retired population dependency ratio is worrisome.

[7] Rongwen Yang, A Study on the Basic Old-age Insurance of Flexible Employees, http://www.cnss.cn/new/bjzm/yjt/201205/t20120516_253078.htm

Figure 3 Support ratio of the Basic Old-Age Insurance (1993-2011)



Source: China Statistical Yearbook(1988-2012). http://data.stats.gov.cn

4.5 Overburdened working generation

Currently China's social insurance system has five schemes: pension insurance, medical insurance, unemployment insurance, work injury insurance and maternity insurance.

According to the Ministry of Human Resources and Social Security statistics, of the world's 173 countries and regions with social insurance systems, China's five social insurance contribution rate, of about 40% of wages, ranks no. 13 in terms of high contribution rates. Of the 40% of payment, employers contribute 30%, employees bear 10 percent of their wages[8].

Basic old-age insurance rates alone reached 28 percent, which may be the world's highest. It is a big burden for the working generation. In a survey conducted by the Chinese Entrepreneur Survey System in March of 2013, 55.8% of the 1000 entrepreneurs selected "social security, the tax burden is too heavy" as the biggest obstacle to enterprise development; for three consecutive years for all twenty options it ranked second place; and western regions, small businesses, non-state-owned enterprises and foreign-funded enterprises select "social security, the tax burden is

[8] High contribution rate of old-age insurance. http://insurance.hexun.com/2012-09-21/146112151.html.

too heavy," with an even higher proportion. As can be seen, there is no further space for companies to increase the contribution rate.

4.6 Generation of insufficient retirement pensions

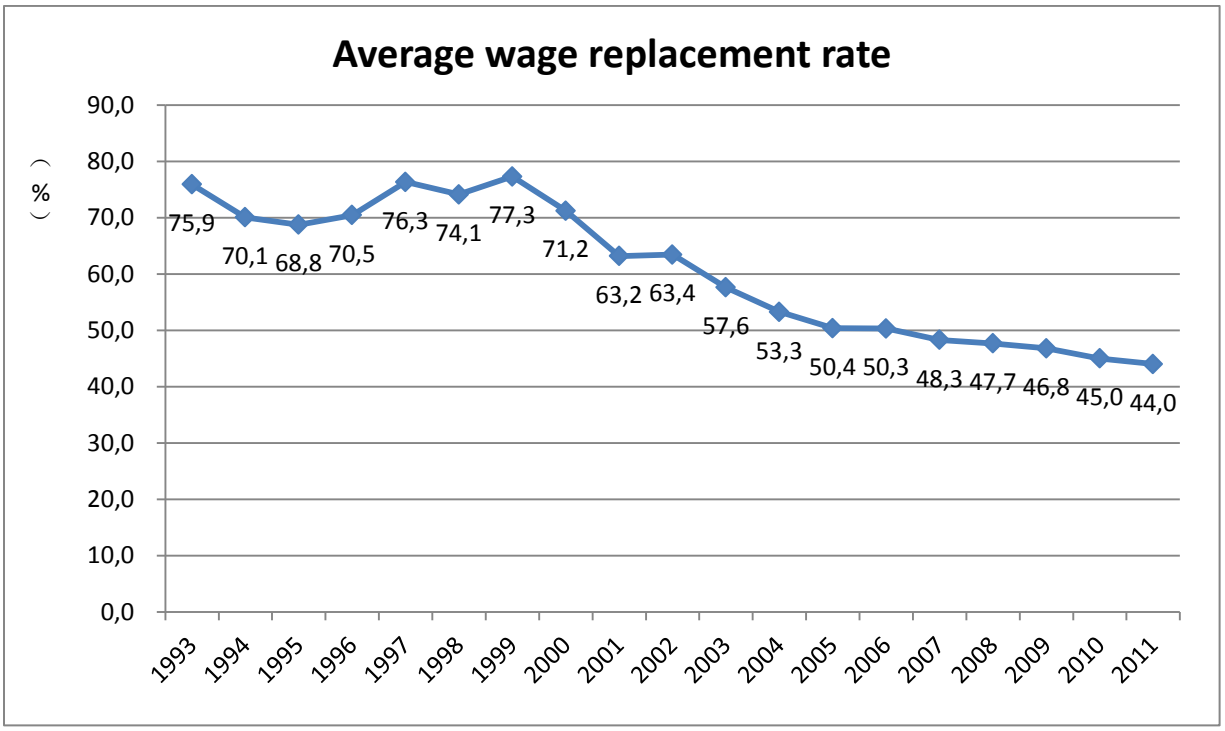
Figure 4 shows the total amount of annual pension paid against the previous year's social average wage replacement rate. According to the system design, the expected pension level is 59% of the social average wage. However, the fact is that this rate decreased from 76% in 1997 to 44% in 2011, which has been significantly lower than the goal of the system design. Since 2003, although the government has tried for nine consecutive years through increased pension adjustment mechanism, it did not curb pension downward trend.

Regardless of the wide gap between the actual level of protection and policy design level, the 44% of the average wage is not enough to provide "basic protection" for the retirees. Some scholars argue that the U.S. pension replacement rate is only 40%, and as a developing country, and there is still room for China to decrease the replacement rate. However, they ignore the fact that in the U.S the Engel Coefficient is 6%, that means if $100 per capita is spent only $ 6 is spent on food, while China's Engel coefficient is 37%[9] , which means the elderly in China will spent significant portion of their pensions on food. Besides, the old-age income structure is different, the basic old-age insurance is the only source of income for retirees in China, while only 30% of retired population in the United States completely relies on social pension insurance, and nearly half of the retirees have other systems to provide incomes, such as corporate pension plans and Individual Retirement Accounts[10].

[9] Zhen Li, Wang Haidong. Research on the Replacement Rate of the Basic Pension Insurance[J]. Insurance Studies, No.2, 2012, p. 100.

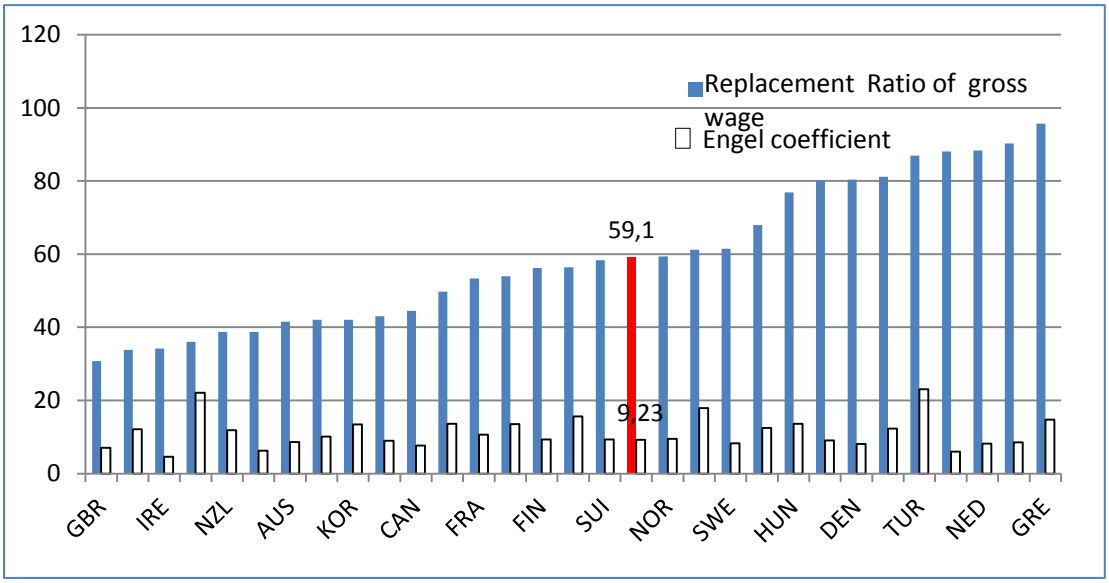
[10] Zhen Li, An analysis on the Basic Old-age Insurance of China, People's Press, 2013, p. 49

Figure 4 The BOAI for urban employees average wage replacement rate (1993-2011)



Source: Human Resource and Social Security Department: Social Security Bulletin

Figure 5 OECD Pension gross average wage replacement rate and Engel coefficient (2006)



Source: OECD database, http://stats.oecd.org/

4.7 Enormous liabilities on individual accounts

According to the system design expectations, the accumulation of funded system of individual accounts is to cope with the peak of future population aging. But because of the Chinese government insufficient financial resources in the 1990s, the government was not committed like the Chilean government to pay transition cost. Moreover, the contributions from employers are insufficient to pay pensions of retirees, so the contributions from employees were used as the current PAYG instead of funded on individual accounts in many regions. The local governments have been funding the system to compensate for the liabilities of individual accounts since 2002, but government spending was far from enough. Table 2 shows that there is only a little bit more than one tenth of contributions paid on individual accounts funded, and about nine of ten had gone. Chinese describe this problem as ‘empty account problem”.

Since there are no funds in the accounts, we do not have fund management system to match it. Since there is no investment income, the contributions to the individual accounts just get a recorded lower return which is one-year term interest rate; it is much lower than the social average wage growth rate.

Table 2 Liabilities on the individual accounts 2006-2011 (In millions)

Year	2006	2007	2008	2009	2010	2011
Contributions recorded on individual accounts	9994	11743	13837	16557	19596	24859
Funded on accounts	—	786	1100	1569	2039	2703
Liabilities on Accounts	—	10957	12737	14988	17557	22156

Source: Zheng BingWen, editor, "China Development Report 2012 pension", Beijing: Economic Management Press, 2012,2.

4.8 Surplus in many regions in short-term, huge implicit pension debts in long-term

Despite the individual accounts are used for PAYG, or 28% of the total premium is used for current spending, many places are still not close to improving. After 2005, due to increased coverage, some provincial pension payments position improved, but the situation is still not optimistic. And as it is discussed above, the targets of the extended coverage are the self-employed and flexible workforce and the future of implicit pension debts will be greater since

this part of the population pay relatively less contributions compared to what they will get from the BOAI.

Table 3 The BOAI balance of current income and expenditure by regions**

Year / Province	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
Heilongjiang	-182.83	-120.41	-126.53	-69.94	-42.56	-48.11	-40.25	-30.2	-38.28	-40.68
Liaoning	-155.98	-172.7	-119.48	-62.47	-76.34	-57.23	-36.69	-32.4	-39.18	-38.49
Tianjin	-71.6	-66.5	-44.39	-18.63	0.09	-10.79	0.13	-15.65	-19.72	-14.97
Xinjiang	-60.08	-59.22	-42.25	-37.24	-29.3	-23.69	-17.33	-15	-16.96	-17.68
Jilin	-56.93	-50.48	-24.83	-23.46	-32.27	-25.04	-24.81	-18.89	-23.2	-27.09
Henan	-44.81	-31.42	-50.8	-31.46	-11.44	-1.31	7.8	-22.82	-6.53	-13.68
Shaanxi	-40.91	-25.6	-19.06	-14.99	-13.99	-2.32	-3.21	-12.1	-16.92	-21.51
Jiangxi	-36.74	-30.44	-25.68	-16.81	-14.97	-10.74	-9.56	-8.56	-12.86	-13.06
Hunan	-32.44	-35	-36.67	-22.75	-27.68	-31.33	-15.67	-16.28	-22.05	-16.96
Guangxi	-26.95	31.22	35.62	43.83	24.29	-5.93	-2.11	-0.83	-4.01	-8.21
Shanghai	-25.08	-139.54	-91.86	-88.63	-49.55	-10.67	-8.06	-11.91	-15.38	-23.41
Hainan	-19.72	-20.33	-11.73	-7.98	-8.77	-5.59	-6.91	4.01	-3.98	-3.78
Chongqing	-10.82	-35.71	23.06	5.52	-0.55	-11.64	-8.17	-9.8	-14.62	-23.68
Hebei	-1.62	31	8.96	-10.01	-1.24	-10.26	5.18	-3.36	-8.92	-18.98
Tibet	0.95	2.26	-1.09	-0.73	-3.09	-2.03	-2.25	5.72	-2.05	-1.52
Qinghai	5.55	-0.27	-5.01	-2.56	-1.52	-1.83	-1.91	-2.2	-6.52	-5.48
Inner Mongolia	5.82	-15.37	-9.66	-9.21	-12.56	-10.64	-17.66	-6.55	-10.89	-14.08
Guizhou	12.63	5.54	7.03	3.71	-1.33	-7.89	-7.94	-5.12	-9.61	-10.9
Fujian	24.23	11.76	19.01	22.79	21.39	15.72	16.71	6.99	3.17	-1.48
Xinjiang	24.83	8.35	22.52	20.6	15.27	12.24	6.17	-1.4	-5.53	-3.19
Hubei	27.02	-44.4	-35.89	-27.89	-58.88	-55.07	-9.77	-23.1	-25.02	-26.14
Gansu	27.46	5.5	0.36	1.31	6.67	-2.32	-1.7	-4.3	-9.45	-10.82
Ningxia	31.62	26	6.7	8.26	6.97	-0.89	-0.09	5.97	-1.25	-1.55
Anhui	36.24	4.31	8.41	17.16	12.42	-0.85	-4.43	-7.94	-12.83	-17.69
Yunnan	47.5	0.56	-2.2	-14.74	-15.13	-19.51	-12.63	-15.2	-19.46	-14.39
Shanxi	51.2	50.93	40.43	27.04	30.33	17.62	13.74	7.23	4.23	-3.83
Sichuan	116.36	62.16	115.66	54.16	28.31	7.6	9.28	-2.49	-7.58	-4.84
Shandong	205.73	194.17	203.03	83.54	147.36	88.91	64.29	54.9	23.2	7.42
Beijing	233.92	176.84	113.21	86.93	83.53	60.34	45.86	27.09	18.96	-3.19
Jiangsu	293.32	206.35	195.89	181.19	143.61	72.26	55.09	17.65	13.5	-3.66
Zhejiang	294.11	176.03	156.83	177.54	149.44	130.76	97.9	72.9	68.04	36.57
Guangdong	518.58	425.73	287.07	286.01	212.58	224.86	153.61	120.48	108.32	64.62

**where "balance of income and expenditure" refers to current collection of revenue minus expenditure of the fund
Source: ZhengBingWen editor, "China Development Report 2012 pension", Beijing: Economic Management Publishing House, 2012,101.

In the long term, at existing outstanding transition costs, under an accelerated aging trend, China's BOAI faces tougher payment gaps. Ma Jun's calculations on gap between the income and payment showed that: if we do not reform the existing pension system, the requirements of financial subsidies will continue to rise from 2017 onwards and it will reach more than 20% of the current fiscal expenditure in 2050; compared with the size of GDP, pension gap will reach 0.2% of GDP by 2020, 1.4% of GDP in 2030, 3.1% of GDP in 2040, and 5.5% of GDP in 2050. After 38 years of accumulation, in 2050 the total gap in the present value of the pension (with a nominal GDP growth rate as the discount rate to calculate) will reach the current 75% of GDP[11].

5. Cause Analysis on the Predicament of the "First Pillar"

I believe, the main difficulties faced by the BOAI system are caused by its conflicting values and goals.

Its values are fairness and efficiency. For the sake of efficiency, the individual account system was set up in the BOAI, but it is one of the reasons for reducing the pension benefits because its recorded interest is much lower than wage growth rate. For the sake of fairness, the policymaker tried to cover all labors working in both formal and informal sector with one system.

In order to achieve the goal of "wide coverage ", the system reduced the thresholds. When employees join the BOAI with lower contribution rate, lower contribution base, or shorter contribution years, their pension benefits calculated by the formula will be much lower than the goal of "basic protection", and the system sustainability will be seriously harmed in the long term when it redistribute to pensioners with very low benefits because this group of pensioner is a very large one.

5.1 Negative impact of the individual account system on finance of the BOAI and pensions

Problems caused by the Individual Accounts: First, there is no accumulation of individual accounts and there is no real gain, and the system must be credited to the personal account of

[11] Ma Jun: To Resolve the National Balance Long-term risk
http://finance.ifeng.com/opinion/mssd/20120612/6596592.shtml

interest, so the system's future liabilities will increase. Second, both China's economic growth rate and the average social wage growth rate are high, but interest rate of the accounts (one-year deposit rate) is far lower than the salary growth rate. This was one important reason for the reduction in the level of pensions. As the system matures, this problem is even more evident. The following table on individual accounts shows that they are ineffective in China. On the basis of the data of social average wages and bank interests from 1997-2007, my early study showed that a female participant, with average wage, 30 years of contributions, can only obtain her pensions from her individual account at the level of about 4% of social average wages[12].

Someone might argue that investing the assets of the individual accounts on the capital market may gain higher returns; even though it is hard to ensure that the return of the pension funds can be higher than growth rate of wage. In this case, funded pension plan is more expensive than PAYG.

Table 4 Changes in Pension insurance-related control indicators （1998-2011）

Year	GNI growth rate（%）	Actual wage growth rate（%）	Inflation rates（%）	Bank Interest rate -- Yearly（%）
1998	7.8	7.2	-0.8	5.22
1999	7.6	13.1	-1.4	2.25
2000	8.4	11.4	0.4	–
2001	8.3	15.2	0.7	2.25
2002	9.1	15.5	-0.8	1.98
2003	10	12	1.2	1.98
2004	10.1	10.5	3.9	2.25
2005	10.4	12.8	1.8	2.25
2006	11.1	12.7	1.5	2.52
2007	11.4	13.6	4.8	2.79-4.14
2008	8.9	11.33	5.9	2.25-3.87
2009	9.1	12.7	-0.7	2.25
2010	10.3	10.17	3.3	2.75
2011	9.2	8.88	5.4	3.5
Average	9.41	11.93	1.8	2.65

Source: China Statistical Yearbook 2012, People's Bank of China website

[12] Zhen Li, An analysis on the Basic Old-age Insurance of China, People's Press, 2013, p. 95

5.2 Negative Impact of High Contribution Rate

High contribution rate has led to some employers and employees' inability to participate in the BOAI, affecting the upgrade coverage of the system. Reform in 2005 allowed the self-employed and flexible employment pay at lower rates, and the coverage has improved significantly as evidenced. Even in the formal sector it is a common problem for some employers to identify their employees as flexible employees, so that they can enjoy lower contribution rate. Higher contribution rate resulted in the common problem of choosing lower contribution base and shorter contribution period. These will deteriorate the system dependency ratio, thus reducing the system's revenue and also directly reducing retirees' pensions.

5.3 Very low contribution base reduces both the system's revenue and retiree's pension

System with a minimum salary base is 60% of the social average wage, which is a relatively low condition that helps to improve coverage rate. The lower contribution base means less current premiums as well as lower pensions for one's retirement.

One more problem is that lower contribution base provides some participants with the "free ride" opportunity. It means some participants are not low income earners but pay the contributions with lower base. As mentioned, wages in China are not very transparent, and moral hazard in contribution base is prevailing. This problem is harming the fairness and current revenues and long term balance of the system. In the formula for calculating pensions, those who contribute on a smaller contribution base benefit more from the system. The truth is that not only those with low wages paid contributions at a lower base, but also some people working in formal sector with higher wages did so. In July 2013, the social security auditing department in Zhengzhou City of Henan Province released a set of statistics showing that over 90% of Zhengzhou employers paid social security illegally, in which the main problem is employers did not pay the BOAI contributions for their employees at all or contributed at a lower contribution base[13].

5.4 Short minimum payment period policy worsens support ratio, reducing the system's revenue and the individual's pension

Policymakers took into account the large number of China's non-regular employment, and in which large numbers are migrant workers with unstable employment. In order to improve

[13] People's Daily, " Nearly nine out of ten employers in Zhengzhou social security payment illegal", People's Daily, March 27, 2013

accessibility to the BOAI for this part of the population, the system requires only 15 years of contribution comparing with 30 years of work under the traditional retirement system.

This low threshold conditions are conducive for expanding coverage rate, however, part of the population stops contributing after meeting the minimum 15 years requirement. This leads to a number of problems:

The first problem is exacerbated by the system actual dependency ratio, thereby reducing the system's revenue. In early 2000s the actual average working period of all staff at retirement was 32.5 years. Last year some provincial data showed that this indicator has dropped to 29 years. It is believed as the system matures, more and more people with contribution of only 15 years will enter retirement, this indicator will decline further. Changes in this data show that although the current generation of retirees live longer than the previous generation, this generation contributes 3.5 years less than the previous generation. Not only the informal employees will choose the shortest payment period, even in the formal sector, where circumstances are possible, employers and employees have a choice of 15 years payment period. This choice may save 20% of wages cost for employers. For employees, stopping individual contributions obtains 8% of his salary which present value of the utility is much larger than the value of future pension effectiveness. Data shows that in 2007 only 90% of people insured pay contributions, in 2011 it further declined to 85%[14], down one percentage per year, and is expected to decline further.

The second problem is the short payment period directly reduces the individual's pension, because the individual payment period is an important parameter for calculating pensions. According to our calculations, in order to fulfill the expected replacement rate of 59 percent of the social average wage, it requires continued contribution for 35 years for the social pooling part, and the individual accounts requires 40 years of continuous contribution in the current interest rate system. Fifteen years of contribution can offer only 15% of the average wage from the social pooling part, personal accounts part is even less.

5.5 Low statutory retirement age worsens the financial status as well as also reduces the pension level significantly

Retirement age for old-age insurance finance is an important factor in the Balance of Payments. Its impact is in twofold: it affects the working population as well as the retired

[14] Zheng BingWen, editor, "China Development Report 2012 pension", Beijing: Economic Management Press, 2012,2.

population. When the retirement age is lower, we have small working population and a large retired population. Aging dependency ratio of the BOAI was mainly due of China's very low retirement age. In the 1950s China set retirement age for men at 60, female worker at 50, female cadre at 55. At that time population life expectancy in China was only 50 years which reached 74 years in 2010, but we are still using a retirement age policy that was introduced 60 years ago. Relative to life expectancy, China's retirement age is low.

Retirement age has an influence on the individual accounts pension level. All things being the same, the higher retirement age, the longer payment period and the higher basic pension of Social pooling part is calculated and paid. The personal accounts are impacted by retirement age in twofold, the higher retirement age, the more amount accumulated in individual account , and the less pension payment period after retirement, making the monthly pension more. On the contrary, the lower retirement age, the shorter contribution period, the lower the amount of accumulation in individual accounts, while the monthly divisor is larger, the average monthly pension is lower[15]. The divisor of individual account accumulation for male is 139, for female retiring at age 55 is 175, and for female retiring at age 50 is 190. So women's individual accounts pension will be substantially less than men's.

According to the experience life table for insurance industry, in the years of 2000-2003, the life expectancy of female at 50-year old was more 32 years; 27.5 years for female at age 55; 20.2years for male at age 60. This means most retirees will live many years after their accumulation of the accounts are used up. The social pooling system will subsidize them; it will further harm the finance system of the BOAI.

5.6 System Parameters Conflict with System Goals: An Example with Pension Level

According to our calculations[16], in order to achieve the expected replacement rate policy, namely public pension replacement rate of 35%, individual accounts replacement rate of 24%, basic pension requires 100% of the average wage contribution base for 35 continuous years. Individual accounts portion can offer the target 24% replacement rate only when the following conditions are met:

1) Contributing 8% of one's wage with social average for 40 years
2) Interest rate of assets on Individual accounts is equal to wage growth rate

[15] Li Zhen. "Empirical Analysis on China's retirement age", China Social Insurance, 1998 (4) :21-22

[16] Zhen Li, An analysis on the Basic Old-age Insurance of China, People's Press, 2013, p. 124

3) The retirement age is 60 years, setting individual accounts minimum divisor at 139 months

But as we saw earlier, given individual account interest rate policy, the minimum contribution base, the minimum payment period and the statutory retirement age, we cannot meet these requirements.

Between 1997 and 2009, we combined the system parameters empirical data related to the pension replacement rate calculations. The underlying assumptions are as follows:

First, employees begin a continuous payment before retiring for n years up to retirement (As 15 years contribution shall be 15 years prior to retirement or pre-retirement lump-sum payment of premium for 15 years)

Second, employers contribute 20 per cent of total wage payment and employees contribute 8 per cent of individual wage payment. The former goes into the social pooling; the latter enters the individual accounts.

Third, personal accounts yield 2.9%. From 1997-2009, the average one-year bank deposit interest simple is 2.9%. That is r = 2.9%, which is our empirical data.

Fourth, the individual account system requires months divisor 195 (50-year-old retired), 170 (retirement age of 55) and 139 (retirement age of 60) respectively. The three ***m****s are 195,170 and 139 respectively.*

Fifth, the wage growth rate is 8%, that is g = 8%. (This is a more modest assumption, and economic development is expected to adapt). From 1997-2009, among insured workers, the average wage growth rate was 16.1%).

Fifteen years is the minimum contribution period. Table 5 shows the replacement rate when a person enters the first year of retirement at a choice of 60% and 100% of contribution base with 15 years of continuous payment (mainly female workers and male whose retirement age is 50 and 60 years respectively).

Table 5 Different pensions at different contribution base levels with15 years of contribution

	Retirement Age	Basic pension (%)	Individual Account (%)	Total
60% of Contribution base	60	11.11	4.308	15.42
	50	11.11	3.072	14.18
100% of Contribution base	60	13.89	7.18	21.07
	50	13.89	5.12	19.01

6. Countermeasures for improving the system of old-age income security

The above study shows that: first of all, in a unified system with a coverage rate of 60%, we cannot achieve both basic protection and sustainability and we must make choices between these conflicting goals; second, the individual account system is ineffective; third, the system parameter threshold is very low for basic protection and sustainability; fourth, there is a large number of labors uncovered for their lower and unstable jobs; and fifth, even through parametric reforms suggested in this paper we cannot expect the BOAI to provide more generous benefits, therefore we need to strengthen the corporate pension system when we reform the first pillar, especially the establishment of the third pillar – personal retirement savings account.

Based on these findings, this paper suggests some things that should be done to enhance the BOAI and old-age income system.

6.1 Extensive discussion on one system covering all labors or different systems covering different income groups

It is popular idea related to fairness that old age pension should be a unified system covering all employment. As we analyzed above that the goals of "broad coverage" "basic protection, and sustainable development" are in conflict. In order to extend coverage rate, policies were designed with lower threshold requirements, and many workers participated in the BOAI with these requirements. Their pensions must be extremely low which cannot reach the "basic protection" goal, if the BOAI redistributes to them, the finance of the BOAI will be unsustainable, because economy structure in China is dual, there are massive labors working in the informal sector. At the point of pension benefits, the threshold requirements of the BOAI are very low, but they are not accessible for many of them who are working in the informal sector.

So I would like to pose some open questions: should we choose between "broad coverage" and "basic protection, sustainable development"? Is one system for all more suitable for China's status quo, or is dual system for labors with different incomes better for China?

If the answer is that the goals of "the system's sustainable development" and "basic protection" have priority, I argue that the dual system might be better for China, and we should reform the BOAI.

6.2 Separation of the social pooling system and the individual account system, improving the efficiency of the Individual accounts system

In addition to the previous analysis, the individual account system increases the financial burden on the BOAI and it is ineffective. Not only does it not play a coordinating role of incentives, but it confuses boundaries of government's responsibility. We propose the separation of the individual account system and the basic old-age insurance, and establish a voluntary individual retirement savings account system which will relieve stress of the first pillar.

"Separating the individual account system from the BOAI " is not intended to improve retirement income level, it also cannot guarantee that all account holders can get a higher return on investment in order to achieve a better pension level, however, the principle of voluntary individual account can make use of 8 percent of wage for a more flexible and efficient system. Meanwhile, the government is only responsible for the social pooling; we can make the government's responsibility borders clearer.

6.3 Parametric reforms to improve the system's financial conditions and the level of retirement benefits

Institutional reform of the parameters is necessary regardless of whether the individual account will be stripped:

6.3.1 Proposal to increase the minimum contribution base

From Table 5 we see that if the contribution base is 60% of the social average wage, even if payment is made for 15 years, during retirement from the basic old age pension one can only obtain 11% of the social average wage. Only when contribution wages achieve social average wage, the retirees can get pensions of 1% of the average wage for each year of contribution. As to what extent the contribution wage lower limit can be raised, further research needs to be done. Of course, we can simultaneously raise contribution base and lower the contribution rate.

6.3.2 Proposal to raise the minimum contribution years to 30 years

If the contribution base is 100% of the average wage, the payment period increased to 30 years, then the basic pension can solely reach 30% of the average wage. Raising the minimum payment period will raise retirement income, and it is also crucial for the system support ratio and the system's financial balance.

6.3.3 Proposal to gradually raise the retirement age

Raising the retirement age is a sensitive topic, but we must face this problem now, gradually raising the retirement age, and consider the link between the retirement age and life expectancy. In fact, raising the retirement age is also an important benefit distribution policy. Different groups have different interest demands, policymakers need to stand on the side of the financial aspect of the system and retirement benefits level, fully taking into account the fast speed of population aging in China, and take actions immediately on retirement age policy.

6.4 Establish voluntary individual savings pension accounts through tax benefits

Regardless the status quo of the first pillar is maintained or it is reformed, for many, the first pillar cannot provide sufficient protection. China needs to develop other old-age income systems. In the 1990s, the Chinese government conceived that the old-age income security system in China must be "three-levels", including the BOAI, annuity and individual pension savings systems. But so far only 7.3% [17]of the urban employed population owns enterprise annuity, and the funds on their DC plan are very small. The individual pension savings system is just a concept.

China should develop the second and third pillars. Some scholars have advocated for *separating the individual account System from the BOAI, then combining it with existing enterprise pension, making the enterprise pension plans a mandatory second pillar*[18]. But we think enterprise pension is a tool for the enterprise managing human resources. Under the condition of total supply of labor being greater than the total demand in China, the development of a mandatory annuity is difficult.

I think that Chinese people have a culture and habit of savings, the use of EET tax incentives to encourage the development of China's voluntary pension saving accounts would be more effective. The figure 6 shows that as income rises, Chinese household savings rate gets higher and higher; high savings is a universal phenomenon, this is not unique to high income earners. In 1995 only 10% of the highest income group of household's savings rate was 20% and 90% of the household savings rate was below 20%. But after 15 years, in 2010, 90% of

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[17] China Statistical Yearbook 2011, Data Abstract of China's Enterprise Pension Fund(2012).

[18] Dong Keyong, Sunbo. From Multi-Tiered to Multi-Pillar：Rethinking of Old-Age Security System Reformation[J]. Journal of Public Management, Vol.8, No.1, 2011,p.6.

households had 20% savings rate, only 10% of household with lowest incomes, at the position with savings rate lower than 20%. This finding is exciting.

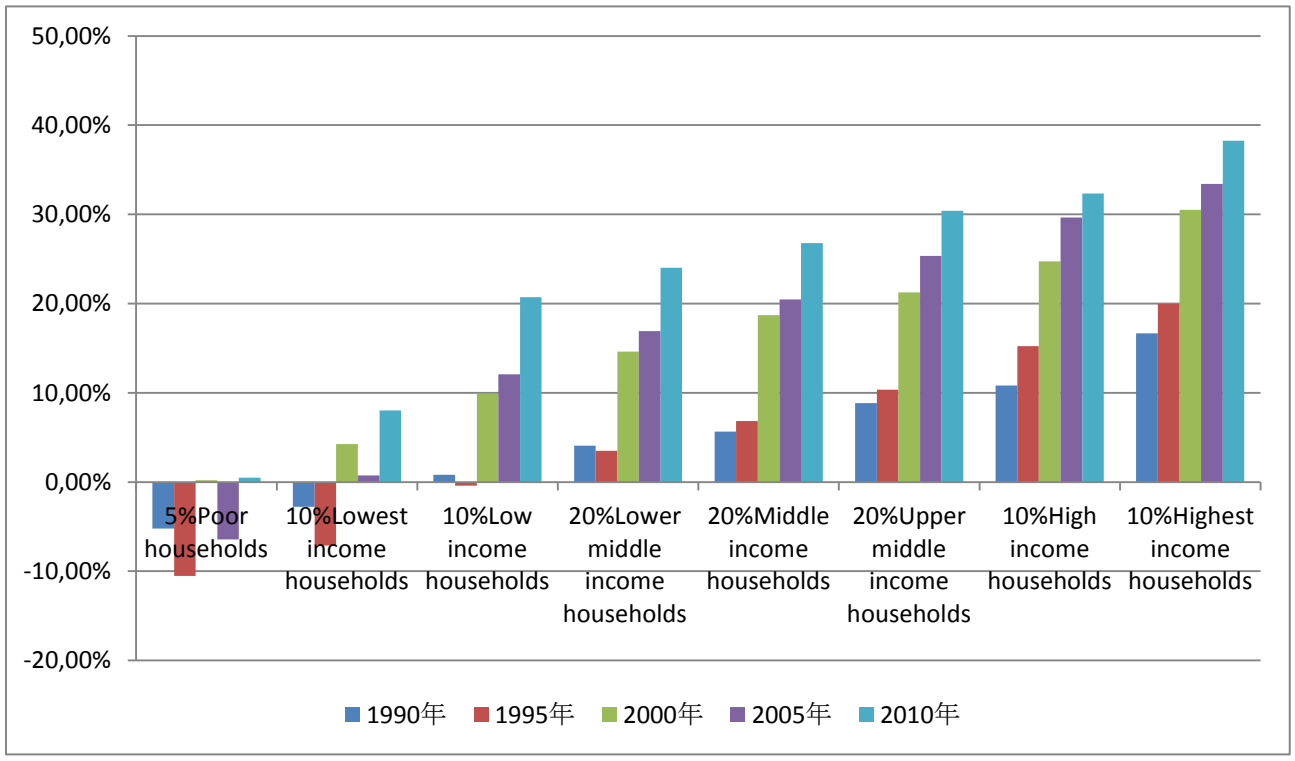
This means that voluntary pension savings system is feasible. According to a June 2013 survey report jointly conducted by Tsinghua University and China Hai Kang Life Insurance and Risk Management Research Center in a release, the "Chinese Residents Retirement Index Research Report", there was a total of 1,060 respondents from Beijing, Shanghai, Guangzhou, Nanjing and Wuxi. Of this number, 900 respondents said they were preparing for retirement.

Chinese residents' retirement reserve index is 5.37, second only to Germany's which is 5.48. We have reason to believe that, if the basic old-age insurance personal accounts is canceled, through encouraging the EET personal pension accounts, 90% or even 95% of workers in this part will saved up to 8% of wages. Meanwhile, we assume that the purpose of household savings is diverse, and retirement savings is just one of them. If there is EET tax incentives, we can reasonably expect families with savings rate of 20-40% to save a quarter of their income to prepare for retirement, there is an extra 5-10 % of household saving added to voluntary personal pension accounts.

If this assumption is valid, the third pillar will benefit more people, and be more equitable, because the mandatory pension will not have such a high coverage rate.

Another advantage of voluntary personal pension savings system is that if the insured persons happen to be in the lowest income group, the abolition of the basic pension insurance in the individual accounts will increase their current income, if they do not establish a voluntary personal pension accounts, then this part of the revenue will increase the effectiveness of the current utility.

Figure 6 Distribution different years of the income level of urban household savings rate



Source: "China Statistical Yearbook" (1991-2012)

As for the establishment of voluntary retirement savings accounts, how to manage the pension funds, I think Chile's and New Zealand's pension fund risk classification and guidance of participants' policy are worth studying.

References:

Aaron, Herry J., "The Social Insurance Paradox", *Canadian Journal of Economics*, vol.32, August 1966,

Barr， Nicholas,2006,"Non-Financial Defined Contribution Pensions: Mapping the Terrain" in Robert Holzmann, Edward Palmer, eds., *Pension Reform: Issues and Prospects*

for Non-Financial Defined Contribution (NDC) Schemes, Washington D.C.:the World Bank.

Barr，Nicholas，2000，"Reforming pensions: Myths, Truths, and Policy Choices" IMF/WP/00/139

James, Estelle, 1995, "Policy Views from the World Bank Policy Research Complex", Washington D.C.，the World Bank working paper

Gillion, Colin. Turner, John. Baily, Clive and latulippe, Denis. 2000. Social Security Pension: Development and Reform. International labor Office, Geneva.

Holzmann , Robert. and Stiglitz , Joseph E. 2001. New Ideas about Old Age security: Toward Sustainable Pension System in the 21st Century, the World Bank.

Li, Zhen. 2013. An analysis on the Basic Old-age Insurance of China, People's Press

Orsag, Peter R．, Stiglitz, Joseph E．"Rethinking Pension Reform: Ten Myths About Social Security Systems", 1999, www.world-bank.org/pensions

The World Bank. 1994. Averting the Old age Crisis, Oxford Press.