Incentive Problems in China's New Rural Pension Program

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Abstract: China's New Rural Pension Program (NRPP) has rapidly expanded since its implementation in 2009, and by the end of 2010 had reached a coverage rate of 24 percent. Empirical evidence, however, shows that rural residents, especially those who are younger, lack incentives to participate. If they do participate, they tend to choose plans with the lowest payment standard. Through calculations and simulations under various scenarios, we demonstrate that the current design of the rural pension program is itself a disincentive. Proper return rate for individual account funds is essential, and would not only encourage participation, but also enable a high replacement rate and relieve the current system's fiscal burden.

Key words: New Rural Pension; Incentive Mechanism; Rate of Return

1. Introduction

The New Rural Pension Program (NRPP) has rapidly expanded since its implementation in September 2009, with the State Council declaring its goal of expanding the program to all counties by the end of 2012.[1] The number of national pilot counties was 320 during the first pilot group, and increased to 838 by the end of 2010.[2] More than 24 percent of eligible rural residents were participating in the program, a rapid pace even compared to what the State Council had aimed for.

The pension program's objective is to provide social security for the rural population when it ages to retirement. The program would never be a real social security program without nationwide participation among the rural population. As the program's pension benefits come mainly from the individual accounts that contain accumulated individual funds, the promised financial support relies on the premiums paid by the participants. It is therefore essential to design the program in a way that not only encourages participation, but also motivates participants to select plans with higher premiums. To this end, both central and local subsidies have been provided since the program's inception.

Despite the government's efforts, rural residents—especially youth—do not have sufficient incentive to participate, and most who do participate choose the lowest payment standard (Feng, 2010; Feng and Dong, 2010; Zhang, C., 2010; Zhang J., 2010). Feng and Dong (2010) suggest that about half of all participants have selected the lowest premium level. Zhang (2010) shows that approximately 25% of peasants are unwilling to participate in the pension program. Participation rates also decline with each premium level, with only 5% of participants choosing the highest premium level. Another study by Zhang (2010) showed that most peasants younger than 45 have a wait-and-see attitude. Those approaching 60 are also less likely to enroll, likely because they receive basic pension benefits once they turn 60, regardless of their enrollment status. This also shows that the attractiveness of the NRPP comes mainly from the basic pension paid by the central government.

In this paper, we demonstrate that the current implementation of the rural pension program is a disincentive, and that the key to improving the system is to raise the return rate of the individual account by switching its investment mechanism. While taking into account opportunity cost, an item that is easily overlooked, the net benefits under the current institutional arrangement of NRPP are shown to be negative, discouraging participation by any rational individual. Simulated net benefits under different scenarios with different parameters are improved the most with a reasonable increase in the rate of return, indicating the importance of this parameter. Our simulations also show that in addition to the positive net benefits that encourage participation, a proper rate of return can guarantee a high enough replacement rate for the elderly to make a basic living without a fiscal subsidy, largely relieving the potential fiscal burden and enabling long-term sustainability.

The study is structured as follows: In next section, we introduce and discuss the current design of the NRPP; Section 3 provides a brief conceptual framework; Section 4 empirically estimate the potential problems of the current NRPP system; and Section 5 concludes this paper with policy implications.

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[1] The original plan had been to realize nationwide coverage by the end of 2020. It was adjusted to 2012 in June 2011 in response to its rapid expansion since its inception.

2 These pilot counties do not include those in Beijing, Shanghai, Tianjin, and Chongqing, which were approved by the local governments but not by the State Council. Besides these national pilot counties, 316 counties had been approved by the provincial governments by the end of 2010.

2. Institutional Arrangement of the NRPP

The basic schemes of the NRPP are regulated by Doc. 32, according to which, all rural residents aged 16 or above (excluding students) who are not enrolled in the urban basic pension program can participate voluntarily. Undoubtedly, the NRPP was intended to be a large social security program.

The pension fund consists of two main parts: an individual premium and a government subsidy. The individual premium comprises five categories: 100, 200, 300, 400, and 500 RMB per year per person, and is supposed to be adjusted according to rural residents' increase in per capita net income. Each premium level corresponds to a certain payment schedule. The higher the premium, the higher the nominal payments received in the future.

The government subsidy comprises two sources: one from the local government, which is required to be no less than 30 RMB per year per person, and the other from the central government, also called the basic pension benefit. Doc. 32 requires the local subsidy to increase with premium levels. Basic pension benefits in the middle and rural areas are paid for in full by the central government, while only half of benefits are in eastern areas.

Individual premiums and local government subsidies are accumulated in individual accounts according to one-year deposit rate. The central government's fiscal subsidy of 55 RMB per month per person is provided in the form of basic pension benefits, and is promised to be adjusted according to economic development and commodity prices. Therefore, the pension benefits a beneficiary can ultimately achieve depend both on the accumulated total funds in the individual account, and on the basic pension benefits from the central government.

When a beneficiary turns 60, he/she starts to receive a monthly benefit (1/139 of the total accumulation) from the individual account for a maximum 139 months. At the same time, he/she receives a basic pension benefit (currently 55 RMB per month). Under the old rural pension program (ORPP), any beneficiary who lived longer could enjoy the program's benefits until death, but the new system does not include this possibility. Accumulated individual funds are inheritable, except for the local government subsidy.

In order to encourage participation, the new system has several major improvements over the old system. The first are the basic pension benefits paid by the central government; the second being the premium subsidy provided by the local government. In addition to these two subsidies, there was a substantial change in the origin of operating expenses: under the old system, operating expenses came from the pension funds, which in the end would attenuate pension benefits; under the new system, it is earmarked into local fiscal budget.

As described, the NRPP has made many efforts, especially in putting more emphasis on government responsibility. However, whether it can sustain these efforts and successfully play its role is not guaranteed. We will show that even with this governmental support and reasonable participation rate, under the current design, the system will hardly be able to reach its promised replacement rate. Even worse, as participation is not sufficiently incentivized, the promise of social security is even less reliable.

3. A Brief Conceptual Framework

In this section, we will provide a cost-benefit analysis of a potential participant of the pension system. As a rational individual, a peasant will calculate the present value of net benefit from participating in the pension program. From the return side, he can obtain the basic pension benefit

plus accumulated benefit from the individual account; while from the cost side, he pays the premium, the amount of which depends on the level he chooses. The other important cost that should be taken into account is the opportunity cost: since premiums are continuously paid into the individual account while benefits cannot be withdrawn until the beneficiary turns 60, the individual sacrifices potential returns from investing the money into other projects (Feldstein, 2002; Zhao and Xu, 2002). The opportunity cost of the accumulated funds in individual accounts until the pensioner turns 60 can be calculated as:

$$OC = \sum_{t=1}^{N} P_0 \times (1 + g)^{t-1} \times (1 + r_{-1})^{N-t-1}, \qquad (1)$$

while the accumulated benefit is:

$$IA = \sum_{t=1}^{N} P_0 \times (1 + g)^{t-1} \times (1 + r)^{N-t-1}, \qquad (2)$$

where r_{-1} is the return rate that can be obtained by investing the funds in other ways; it captures the opportunity cost of the funds in the individual account. For other parameters, P_0 is the premium for the selected level, which increases at a rate of g; r is the return rate of the accumulated fund in the individual account; N is the length of the contribution period, and IA denotes the accumulated funds at age 60. Therefore, the net benefit from the individual account when the pensioner turns 60 is：

$$NB = IA - OC = \sum_{t=1}^{N} P_0 \times (1 + g)^{t-1} \times (r - r_{-1})^{N-t-1}, \qquad (3)$$

After partial differentiation, we get:

$$\frac{\partial NB}{\partial P_0} = \sum_{t=1}^{N} (1 + g)^{t-1} \times (r - r_{-1})^{N-t-1}, \qquad (4)$$

Obviously, if $r - r_{-1} > 0$, then $\frac{\partial NB}{\partial P_0} > 0$; if $r - r_{-1} < 0$, then $\frac{\partial NB}{\partial P_0} < 0$, i.e., higher levels of premiums result in lower net enrollment benefits. Furthermore, when $r - r_{-1} < 0$, net benefits from the premiums of each period are always negative, and thus longer periods of contribution result in a lower net benefit.

Currently, the return rate of the fund is defined as the rate of the one-year deposit, which is unlikely to cover the opportunity cost of the fund, or $r - r_{-1} < 0$. As a result, the current NRPP design is a disincentive to participating, and encourages participants to choose the lowest premium standard and the shortest contribution period.

4. Empirical Estimations on the Problems of the Current System

In this section, we calculate the net benefits of the individual account under various settings, using the formula described in the previous section. To demonstrate that the incentive mechanism is critical, we also calculate income replacement rates of individual accounts under these settings and the corresponding local government subsidy required.

The net benefit of the individual account

We use equation (3) to calculate the net benefit of individual accounts. Based on Doc. 32, P_0 can be chosen from five categories: 100, 200, 300, 400, and 500 RMB. We calculate the net benefits under each category.[3]

It is not easy to choose an appropriate g. According to data from the National Bureau of Statistics (NBS), per capita net income of the rural residents in the past ten years is about 8.2%. This high growth rate is not likely to last for a long period, considering China's economy is currently in the rapid growth stage, so we assume that $g=5\%$.

Let r be a weighted average of the return rates of one-year deposits between 2000 and 2010, which is about 2.5%.[4] Let r_{-1}, the potential rate of return through other investments, equal the five-year time deposit rate, 5%.[5] According to Doc. 32, the upper bound of N is 44, while the lower bound is 15.[6]

The results are displayed in Table 1. It shows that net benefits are all negative regardless of the length of contribution and premium level, and the magnitude of negative benefits increases with these two parameters. For example, given the highest premium level, contributing 15 to 44 years corresponds to a net benefit of -26,600 to -73,590. There is no doubt that for a rational participant, the best option is to choose the lowest premium level and start contributing as late as possible.[7]

Table 1 insert here

Theoretically, incentives can be provided through high enough local government subsidies. In other words, a higher subsidy can be provided for those who choose higher premiums and longer contribution periods. We calculate the necessary subsidies, i.e., the amount that can guarantee a nonnegative net benefit of the individual account. The results are displayed in Table 2. In correspondence to Table 1, higher levels of premiums and longer periods of contribution require higher local government subsidies. Given a local subsidy of 30 RMB per person per year, only the option of contributing less than 21 years at the lowest premium level obtains positive net benefits. With the highest premiums and longest periods of contribution, the required local subsidy is as high as 321 RMB per person per year.

Table 2 insert here

It is widely acknowledged that China's local public finance is suffering from an increasing deficit. Fiscal decentralization, rural tax-fee reform and exemption of the agricultural tax all more or less deteriorate local public finances (Yin, 2002; Wang and Zhao, 2006). Figure 1 displays the

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[3] According to Doc. 32, local governments can add other premium levels in accordance with local socioeconomic situations. We ignore this case for simplicity.

[4] Data on deposit rates comes from the website of the People's Bank of China. Please see http://www.pbc.gov.cn/publish/zhengcehuobisi/631/2011/20110406165642557972308/2011040616564255797230 8_.html.

[5] The least peasants can do is to save money in commercial banks. As an example, instead of paying premiums and waiting at least 15 years receive pension benefits, peasants can save money in a five-year time deposit.

[6] People aged 45 or above at the NRPP's inception are allowed to make a supplementary payment to 15 years. It is probable that they contribute for less than 15 years. For simplicity, however, we ignore this case and assume N ranges from 15 to 44. This does not affect our results or conclusions.

[7] Whether peasants will finally enroll depends on the basic pension benefits provided by the central government. However, since all elderly aged 60 and above are automatically eligible for basic pension benefits according to Doc. 32, and given the fact that the basic pension can only be received when they turn 60, the decision to enroll is dependent only on the net benefit of the individual account. The basic pension can be seen as a lump-sum transfer from the central government.

fiscal revenue-expenditure ratio (i.e., revenue/expenditure) of the local government. It is shown that most counties have a fiscal deficit. Therefore, it is doubtful whether local governments are capable of providing premium subsidies in accordance with different premium levels.

In order to provide incentives for peasants to participate, the return rate of the fund in individual accounts must be larger than the opportunity cost. In other words, it is necessary to guarantee $r - r_{-1} > 0$. In this case, the net benefit of the annual premium is always positive, and higher premiums (or longer contributions) will result in higher net benefits. A higher return rate not only has the potential to provide incentives to peasants to participate and make payments, but also promotes the income replacement rate of the individual account, and thus the NRPP. In the next subsection, we calculate the income replacement rate of the individual account.

<u>Figure 1 insert here</u>

Replacement rates of the NRPP under different scenarios

As a social insurance program, the success of the NRPP will be based on how much support it can ultimately provide to its beneficiaries. One important indicator of final support is the income replacement rate. By definition, the income replacement rate is the ratio of the pension benefit to earning income right before retirement. For those who do not have formal employment, net income is used as a proxy for earning income in calculating the income replacement rate. As a funded account, the replacement rate that can be obtained through the individual account mainly depends on the return rate of the fund (Feldstein, 2002; Zhao and Xu, 2002). To show this, we calculate the replacement rate of NRPP under various scenarios with different return rates.

The formula used to calculate the income replacement rate is as follows:

$$RR = \frac{IA}{L \times I_{N-1}} = \frac{\sum_{t=1}^{N}(P_0 + S_0) \times (1+g)^{t-1} \times (1+r)^{N-t+1}}{L \times I_0 \times (1+a)^{N-1}}, \quad (5)$$

IA, as we defined in the previous section, denotes the accumulated fund in the individual account, but with the new element S_0 here, which denotes the initial level of subsidy paid by the local government. L represents years of receiving benefits, which should be 139/12 years according to Doc. 32.[8] I_{N-1} is the earning income in the year before retirement. We assume $I_{N-1} = I_0 \times (1+a)^{N-1}$, i.e., the net income of the representative peasant grows at a rate of a during the period of contribution. I_0 is the initial net income. Since the NRPP benefit includes a basic pension payout, the replacement rate of the NRPP is RR+12.8% where 12.8% is the replacement rate that can be obtained through the basic pension with an assumption that basic pension payments will be adjusted according to an increase in per capita net income of rural residents. In 2009, the basic pension benefit is 660 RMB per person per year, while the per capita net income of rural residents is 5,153, and thus the replacement rate is 12.8% (660/5133*100%). To proceed, we make three assumptions regarding the parameters in Equation (5) based on the current design of NRPP:

1)   A representative rural resident enrolls in NRPP in 2009 and pays premiums annually until age 60.
2)   The initial local government subsidy is the lowest standard required by Doc. 32, i.e. 30 RMB per person per year.

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[8] Actually, the current rule on years of benefit is unreasonable. The current design of 139 months is calculated according to the life expectancy of Chinese people at birth. Since the funds in individual accounts would be inherited and would not be paid as another pensioners' benefit, a reasonable design on the period of benefits should be calculated based on the conditional life expectancy at age 60. According to the life table from WHO, the remaining life expectancy for the age cohort from 60 to 64 is 19.2 years, which is much larger than 139 months.

3)   Both the premium and subsidy increase at a growth rate of per capita net income of rural residents. Thus we have $g = a$ now.

To set a benchmark, we first calculate income replacement rates under the current system design, i.e., with a return rate of 2.5% on the individual account fund. The replacement rates with different premium levels and different contribution lengths are displayed in Table 3.

Table 3 insert here

Generally, Table 3 shows that higher premiums and/or longer period of contribution bring out higher replacement rates. However, with a low return rate of funds, the highest potential replacement rate is only 37.8%, still not very high. This means the replacement rate of the individual account is only 25% (37.8%-12.8%). It is worth noting that we cannot obtain a replacement rate of 37.8% under the current system design due to the fact that the current system is a disincentive for peasants' participation and contribution. As we have demonstrated in previous sections, with a low return rate, the participants will choose the lowest premium level and the shortest contribution period. In other words, participants choose the lowest initial level of premiums, 100 RMB, and pay premiums for 15 years. Consequently, the income replacement rate for the NRPP will be less than 15.6%, with less than one-fifth provided by the individual account.

We now calculate income replacement rates with more rational rates of return. Bai, Hsieh, and Qian (2006) calculated the return of capital in China from 1985 to 2005 and concluded that the return rate under the basic specification was around 20%, and remained high at 10% even after considering inventory investment, housing investment, and subtracting taxes from the return on capital. According to another study done by a research team at the China Center for Economic Research (CCER China Economic Observer Research Group, 2007), the return on fixed assets and return on equity capital in China during 1993 to 2005 were 8.2% and 8.4%, respectively, and reached as high as 16.5% and 20.3% in 2006. If the pension funds are operated in a commercial manner, it should reap a return rate as high as the average return on capital. Conservatively, we calculate the income replacement rates in two cases when the return rate is assumed to be 8% to 10%.

We assume that S_0 equals zero now. The intuition is as follows: The subsidies provided by local governments are used to attract peasants' participation. However, as we have shown, when the return rate is higher than its opportunity cost, peasants will choose to participate even without subsidy. In this case the subsidy from local governments becomes unnecessary.

We also ignore basic pension benefits. In other words, we only calculate the replacement rate that can be obtained through individual accounts. The basic pension benefit paid by the central government is aimed to attract peasants to participate and guarantee a high enough replacement rate, both of which can be achieved with a high rate of return. Calculated replacement rates are displayed in Table 4, with the left and right panels assuming a return rate of 8% and 10% respectively.

Table 4 insert here.

Compared to those in Table 3, the potential income replacement rates shown in Table 4 are much higher now. With a return rate of 8%, choosing the highest premium level standard and contributing 44 years can yield a replacement rate of 77.7%, more than double that of the highest potential replacement rate under the system's current design. Note that we assume no basic pension benefits here, and the replacement rate of 77.7% is obtained only through the individual account. Normally, assuming a peasant enrolls in NRPP at age 20 and chooses the highest level of premiums to contribute for 40 years until age 60, he could reap a replacement rate of 66.1%, a little higher than the replacement rate of an urban worker's pension benefit (i.e. 59.5%).

What if the return rate is higher? Results in the right panel of Table 4 show that with a return rate of 10%, two percentage points higher, the potential highest replacement rate is a startling 130.5%. Even with a moderate premium level, contributing 44 years can obtain a 78.3% replacement rate.

Sustainability of a central subsidy without reforms

As we have mentioned above, achieving a reasonable market return on the individual account fund can make the central subsidy unnecessary. If, on the other hand, returns do not improve, the central subsidy needed would not be sustainable in the long run. We look at the dynamics of the fiscal subsidy paid by the central government under the current design.

One key factor that influences the dynamics of the central subsidy is the number of potential pensioners, which depends on both the coverage rate of the NRPP and the demographic structure. As the pilot program of NRPP has experienced rapid expansion since its beginning, and is planned to cover 40% of counties by the end of 2011, there is no doubt that the program will soon expand nationwide. Meanwhile, with population aging, the number of potential pensioners is expected to increase rapidly, and thus the required amount of central subsidies. To proceed, we make several assumptions based on Doc. 32 as follows:

1) The standard of the basic pension benefit is adjusted according to the growth of per capita GDP.
2) All pensioners begin to receive pension benefit at age 60, until death.
3) The urbanization rate stays constant at 50% from year 2010 to 2050.
4) Assume NRPP covers all the eligible rural residents.
5) Basic pension benefit of the pensioners in eastern China is also entirely paid for by the central government.[9]

The projected ratio of central subsidies to GDP is depicted in Figure 2. It will increase by over 2.5x in 2050 as compared to 2010. In 2008, social security related central financial expenditures accounted for a mere 0.11% of GDP, and was less than one third of the NRPP central subsidy needed in 2050. Without significant change in the composition of central financial expenditure, the required central subsidy for NRPP is definitely unaffordable.

Figure 2 insert here

5. Conclusions

In order to promote the development of its rural population, and to avoid the social instability that may result from relative deprivation of peasants, the Chinese government launched the ambitious NRPP to cover all rural residents in old-age social insurance. It is aimed to provide sufficient old age support to more than eight hundred million peasants, almost none of whom have had any previous social security.

It has been officially reported that the program has been welcomed and implemented in an increasing number of counties. Problems, however, do exist. As a social insurance program, it is better for the NRPP to cover as many as eligible peasants as possible, and to attract people to enroll in high-premium plans, which will in turn provide high level of old-age support. However,

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[9] Data on population projections come from the UN database. We do not treat eastern China differently as regulated in Doc. 32, since there is no population data by region. Furthermore, although half of pension benefits are paid for by local governments rather than central governments in eastern China, there are no differences in discussing the fiscal burden on the government.

empirical and anecdotal evidence shows that young peasants are reluctant to participate, and those participants prefer the lowest premium standard. The program is welcome only among the older peasants, and its rapid expansion is mainly motivated by the local governments.

Young peasants' lack of enthusiasm in participating, and lack of incentives to choose higher premium plans have been partly attributed to the distrust that peasants have of governmental projects according to several studies (Feng, 2010; Zhang, J., 2010). Rather than disputing this argument, this paper demonstrates that the lack of incentives is rooted in the system's design.

Under the current design, funds in individual accounts accumulate at low (or even negative) return rates for one-year deposits. As individuals may invest the money in other ways that can yield higher return rates, the opportunity cost of participating in the NRPP is high, and increases with each standard premium level. This not only results in fewer incentives to participate in the program, but also discourages enrolling in higher standard plans. Consequently, both the coverage rate and income replacement rate will be too low to guarantee efficient protection for the rural elderly, which eventually go against the objectives of the NRPP.

Therefore, the key is to raise the return rate of the individual account. One possible way is to operate the pension fund in a commercial manner, and thus reap a market return. This not only provides participation incentives and payments of higher premiums, it can also guarantee a high income replacement rate for the NRPP. With higher return from individual accounts, government subsidies will eventually become unnecessary, relieving the huge fiscal burden on both the central and local governments. Of course, a reasonable return rate depends on efficient operation and efficient capital markets. These may require the government to relax or remove regulations on the operation of the pension fund and make capital markets function through the market mechanism.

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Table 1 The Net Benefit of the Individual Account at Age 60 (*in hundreds*)

Years of Contribution	Initial Premium (Unit: RMB/Per Year)				
	500	400	300	200	100
15	-26.6	-21.3	-16	-10.7	-5.3
16	-31.5	-25.2	-18.9	-12.6	-6.3
17	-36.9	-29.5	-22.1	-14.8	-7.4
18	-43	-34.4	-25.8	-17.2	-8.6
19	-49.8	-39.8	-29.9	-19.9	-10
20	-57.3	-45.9	-34.4	-22.9	-11.5
21	-65.7	-52.6	-39.4	-26.3	-13.1
22	-75	-60	-45	-30	-15
23	-85.3	-68.2	-51.2	-34.1	-17.1
24	-96.7	-77.3	-58	-38.7	-19.3
25	-109.2	-87.3	-65.5	-43.7	-21.8
26	-122.9	-98.3	-73.7	-49.2	-24.6
27	-138	-110.4	-82.8	-55.2	-27.6
28	-154.5	-123.6	-92.7	-61.8	-30.9
29	-172.5	-138	-103.5	-69	-34.5
30	-192.3	-153.8	-115.4	-76.9	-38.5
31	-213.8	-171.1	-128.3	-85.5	-42.8
32	-237.3	-189.9	-142.4	-94.9	-47.5
33	-262.9	-210.3	-157.8	-105.2	-52.6
34	-290.8	-232.6	-174.5	-116.3	-58.2
35	-321	-256.8	-192.6	-128.4	-64.2
36	-353.9	-283.1	-212.3	-141.5	-70.8
37	-389.5	-311.6	-233.7	-155.8	-77.9
38	-428.1	-342.5	-256.9	-171.3	-85.6
39	-470	-376	-282	-188	-94
40	-515.2	-412.2	-309.1	-206.1	-103
41	-564.2	-451.4	-338.5	-225.7	-112.8
42	-617.1	-493.7	-370.3	-246.8	-123.4
43	-674.3	-539.4	-404.6	-269.7	-134.9
44	-735.9	-588.8	-441.6	-294.4	-147.2

Table 2 Required Levels of Local Government Subsidies

Years of Contribution	Initial Premium (Unit: RMB/Per Year)				
	500	400	300	200	100
15	103.0	82.4	61.8	41.2	20.6
16	109.9	87.9	65.9	44.0	22.0
17	116.8	93.4	70.1	46.7	23.4
18	123.7	99.0	74.2	49.5	24.7
19	130.7	104.6	78.4	52.3	26.1
20	137.8	110.2	82.7	55.1	27.6
21	144.9	115.9	86.9	58.0	29.0
22	152.0	121.6	91.2	60.8	30.4
23	159.2	127.4	95.5	63.7	31.8
24	166.4	133.2	99.9	66.6	33.3
25	173.7	139.0	104.2	69.5	34.7
26	181.1	144.8	108.6	72.4	36.2
27	188.4	150.7	113.1	75.4	37.7
28	195.9	156.7	117.5	78.3	39.2
29	203.3	162.7	122.0	81.3	40.7
30	210.9	168.7	126.5	84.3	42.2
31	218.4	174.7	131.0	87.4	43.7
32	226.0	180.8	135.6	90.4	45.2
33	233.7	186.9	140.2	93.5	46.7
34	241.4	193.1	144.8	96.6	48.3
35	249.1	199.3	149.5	99.7	49.8
36	256.9	205.5	154.2	102.8	51.4
37	264.8	211.8	158.9	105.9	53.0
38	272.7	218.1	163.6	109.1	54.5
39	280.6	224.5	168.4	112.2	56.1
40	288.6	230.9	173.1	115.4	57.7
41	296.6	237.3	178.0	118.6	59.3
42	304.7	243.7	182.8	121.9	60.9
43	312.8	250.2	187.7	125.1	62.6
44	320.9	256.7	192.5	128.4	64.2

Notes: All subsidies refer to the initial subsidy level. Keep in mind that we have assumed that the subsidies provided by the local government also grow at a rate of the growth of the per capita income of the rural residents.
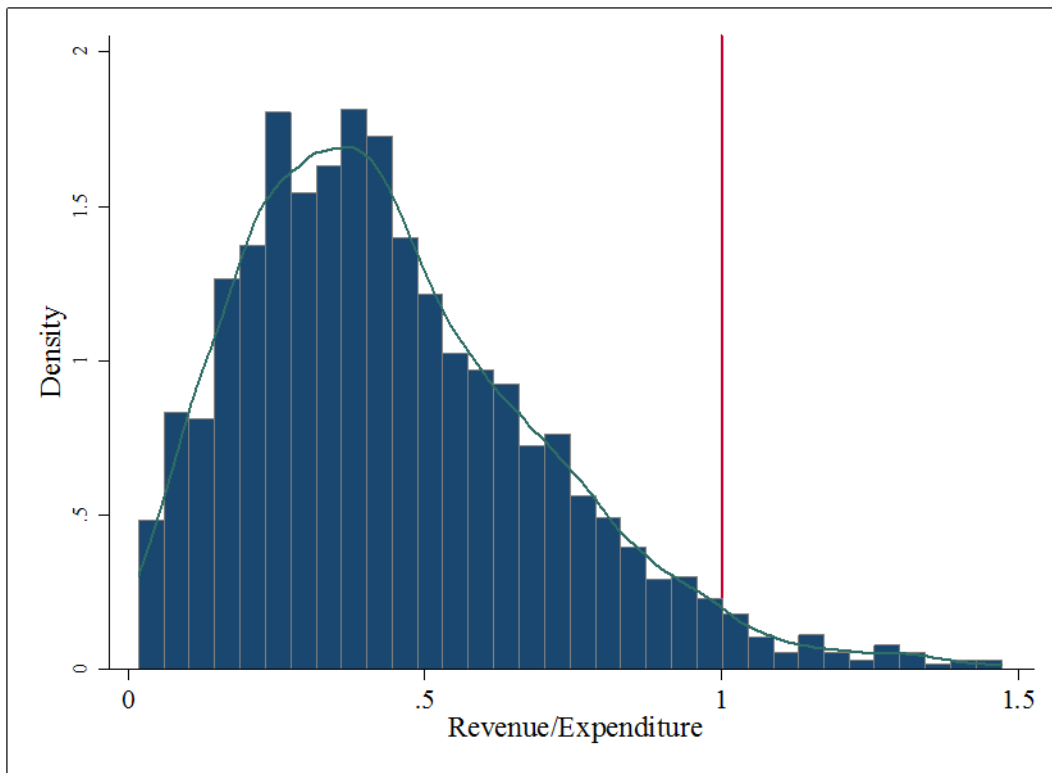
Table 3 Income Replacement Rates of NRPP under Various Settings (%)

Years of Contribution	Initial Premium (Unit: RMB/Per Year)				
	500	400	300	200	100
15	24.4	22.2	20	17.8	15.6
16	25	22.7	20.4	18.1	15.8
17	25.7	23.2	20.8	18.4	16
18	26.3	23.7	21.2	18.6	16.1
19	26.8	24.2	21.5	18.9	16.2
20	27.4	24.7	21.9	19.1	16.4
21	28	25.1	22.3	19.4	16.5
22	28.5	25.6	22.6	19.6	16.7
23	29.1	26	22.9	19.9	16.8
24	29.6	26.4	23.3	20.1	16.9
25	30.1	26.8	23.6	20.3	17
26	30.6	27.2	23.9	20.5	17.2
27	31.1	27.6	24.2	20.7	17.3
28	31.6	28	24.5	20.9	17.4
29	32	28.4	24.8	21.1	17.5
30	32.5	28.8	25.1	21.3	17.6
31	32.9	29.1	25.3	21.5	17.7
32	33.4	29.5	25.6	21.7	17.8
33	33.8	29.8	25.9	21.9	17.9
34	34.2	30.1	26.1	22.1	18
35	34.6	30.5	26.4	22.3	18.1
36	35	30.8	26.6	22.4	18.2
37	35.4	31.1	26.8	22.6	18.3
38	35.7	31.4	27.1	22.8	18.4
39	36.1	31.7	27.3	22.9	18.5
40	36.5	32	27.5	23.1	18.6
41	36.8	32.3	27.7	23.2	18.7
42	37.1	32.5	28	23.4	18.8
43	37.5	32.8	28.2	23.5	18.9
44	37.8	33.1	28.4	23.6	18.9

Table 4 Income Replacement Rates of NRPP under Various Settings (%)

Years of Contribution	r=8%					r=10%				
	500	400	300	200	100	500	400	300	200	100
15	16.7	13.3	10	6.7	3.3	19.5	15.6	11.7	7.8	3.9
16	18	14.4	10.8	7.2	3.6	21.4	17.1	12.8	8.6	4.3
17	19.5	15.6	11.7	7.8	3.9	23.3	18.7	14	9.3	4.7
18	20.9	16.7	12.6	8.4	4.2	25.4	20.3	15.2	10.1	5.1
19	22.4	17.9	13.5	9	4.5	27.5	22	16.5	11	5.5
20	24	19.2	14.4	9.6	4.8	29.7	23.8	17.8	11.9	5.9
21	25.6	20.4	15.3	10.2	5.1	32.1	25.6	19.2	12.8	6.4
22	27.2	21.8	16.3	10.9	5.4	34.5	27.6	20.7	13.8	6.9
23	28.9	23.1	17.3	11.6	5.8	37.1	29.7	22.2	14.8	7.4
24	30.6	24.5	18.4	12.2	6.1	39.8	31.8	23.9	15.9	8
25	32.4	25.9	19.4	13	6.5	42.6	34.1	25.5	17	8.5
26	34.2	27.4	20.5	13.7	6.8	45.5	36.4	27.3	18.2	9.1
27	36.1	28.9	21.7	14.4	7.2	48.6	38.9	29.2	19.4	9.7
28	38	30.4	22.8	15.2	7.6	51.8	41.5	31.1	20.7	10.4
29	40	32	24	16	8	55.2	44.2	33.1	22.1	11
30	42.1	33.7	25.2	16.8	8.4	58.8	47	35.3	23.5	11.8
31	44.2	35.3	26.5	17.7	8.8	62.5	50	37.5	25	12.5
32	46.3	37.1	27.8	18.5	9.3	66.4	53.1	39.8	26.6	13.3
33	48.6	38.9	29.1	19.4	9.7	70.5	56.4	42.3	28.2	14.1
34	50.9	40.7	30.5	20.3	10.2	74.8	59.8	44.9	29.9	15
35	53.2	42.6	31.9	21.3	10.6	79.2	63.4	47.5	31.7	15.9
36	55.6	44.5	33.4	22.3	11.1	83.9	67.1	50.4	33.6	16.8
37	58.1	46.5	34.9	23.3	11.6	88.9	71.1	53.3	35.5	17.8
38	60.7	48.6	36.4	24.3	12.1	94	75.2	56.4	37.6	18.8
39	63.3	50.7	38	25.3	12.7	99.4	79.5	59.6	39.8	19.9
40	66.1	52.8	39.6	26.4	13.2	105.1	84	63	42	21
41	68.8	55.1	41.3	27.5	13.8	111	88.8	66.6	44.4	22.2
42	71.7	57.4	43	28.7	14.3	117.2	93.7	70.3	46.9	23.4
43	74.7	59.7	44.8	29.9	14.9	123.7	99	74.2	49.5	24.7
44	77.7	62.2	46.6	31.1	15.5	130.5	104.4	78.3	52.2	26.1

Figure 1 Revenue-Expenditure Ratio of the Local Government 2000-2005

Notes: The local governments include both counties and county-level cities. The revenue expenditure ratio is calculated as weighted average of the ratio during 2000-2005.

Figure 2 Projections on the Central Fiscal Subsidy
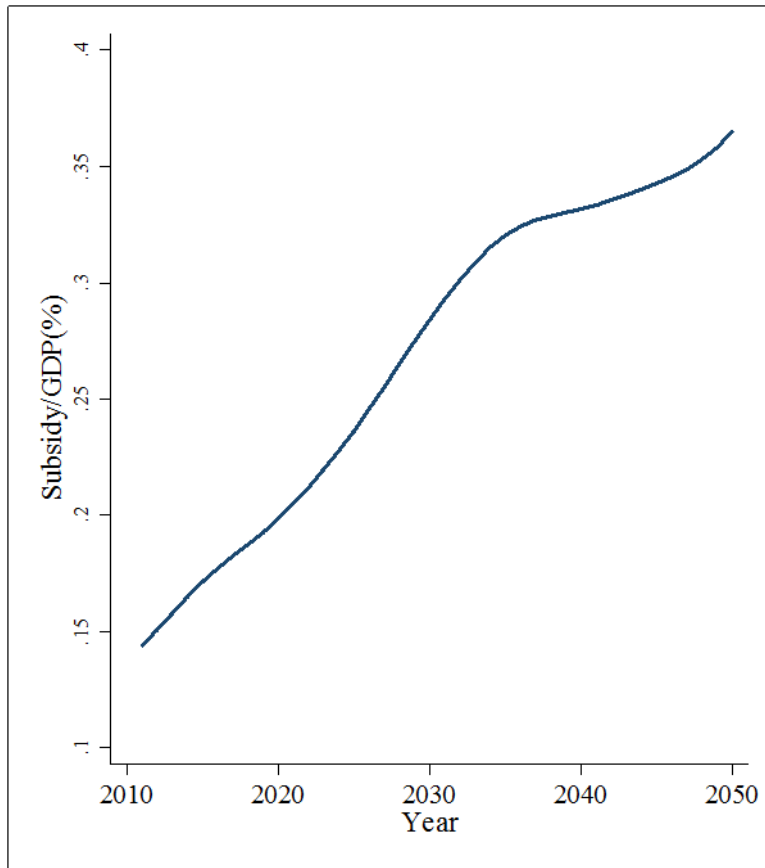
Source: Population data from UN *database*.