

Commercial Pension Insurance Program Design and Estimated of Tax Incentives---- Based on Analysis of Enterprise Annuity Tax Incentives

Huang Xue¹, Lu Yating

School of Management
Shanghai University of Engineering Science

Abstract

Taxes as the primary means of state intervention and regulation of social and economic development, while encouraging the development of commercial pension insurance also plays an important role. Under encouraging of the government's tax incentives, individuals from their own interests, will increase the initiative of participating in the commercial pension insurance. This paper analyzes and estimates pension replacement rate and loss of national revenue, under the annuity tax incentives, constructs the commercial pension of tax incentive insurance replacement rate model. We find that the commercial pension insurance of tax incentives has little impact on revenue, but can actively promote the development of commercial pension insurance.

Keyword: Commercial pension insurance; tax incentives; enterprise annuity

Form "China Aging Development Report (2013)" by the end of 2012, we found out the number of elderly population in China has reached 194 million, an increase of 8.91 million over the previous year, 14.3% of the total population. Due to the large number of elderly population, the government bears heavy finances. To alleviate the financial expenditure on old-age insurance, the government must consider reducing the replacement rate of the basic pension insurance in order to maintain the sustainable development of basic social pension insurance. Enterprise annuity and commercial pension insurance play an important role in alleviating pressure on government pensions, while also improving the level of individual pension treatment. So how to arrange the three-pillar pension premium replacement rate is an important consideration for policy adjustments. As the enterprise annuity and pension insurance business is restricted in all aspects, there has not been widely developed. Coverage is limited, they do not achieve the desired level of pension replacement rate. Combined with annuity income tax preferential policies of the 2014 China's implementation, we will measure changes in the pension replacement rate before and after the policy, expecting that these calculations can provide a reference for the choice of commercial pension insurance tax incentives mode.

1. The Enterprise Annuity Preferential Effect Analysis

Enterprise annuity as the second pillar of pension insurance, is a supplementary pension insurance, while established by government in order to better protect the enterprise employees after retirement and improve the social security system. Enterprise annuity is established in accordance with the national policy of voluntary, not mandatory. On the other hand coverage of enterprise annuity is relatively small. Only a few large companies, while have good efficiency, establish the enterprise annuity.

According to the news of the Ministry of Human Resources and Social Security, in 2013 China, it had 66,120 enterprises established enterprise annuity. The number of participated the enterprise annuity is 20,560,000. However, the total number of enterprises is about 14.7 million. Company, while built the enterprise annuity, is less than 0.5% of the total number. At the end of 2013, the number of people while participated in basic pension insurance was 322,120,000 across the country, but the number of workers participating in the enterprise annuity is less than 7% of the total insured. To change this situation, promoting the development of multi-level old-age insurance system, Since January 1, 2014, government promulgated and implemented personal income tax deferred annuity policies.

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Policy allowed payment that units and individuals do not exceed the prescribed standards of corporate pension or occupational pension, can be deducted before the personal income tax; Investment income from the business for personal pension or occupational pension fund exempt from personal income tax; The actual collection of personal or occupational pension annuity required personal income tax. It can be seen that China's enterprise annuity tax model paradigm shift from the traditional TEE became EET mode.

1.1 Establishment of Enterprise Annuity Actuarial Models under TEE and EET Mode

1.1.1. Select the Model Assumptions and Variables

China's Enterprise Annuity is paid by businesses and individuals together to build enterprise annuity personal accounts, and personal Account implement market-oriented investment operations. Therefore, the final accumulated value of corporate pension personal accounts equal to the amount of personal accounts actuarial present value of future payments. In the enterprise annuity actuarial model, we assume that the individual account pension annuity payment is a beginning of a lifetime payment of \$ A life annuity, without considering early retirement, unemployment, etc., without considering all transaction costs and management fees, as well as the case of fixed premiums.

Table 1: Variable Names and Symbols Explained

w	Average wage levels
g	Average wage growth rate
c	Contribution rate
q	The total number of workers to participate in the enterprise annuity
a	Age workers begin to pay
b	Age of stopping payment (retirement)
n	Payment period
r	Investment yield
t0	Personal income tax rate
t1	Personal income tax rate of collection
k	Survival after retirement age
i	Interest rate
β	Pension replacement rate

1.1.2. Enterprise Annuity Actuarial Models of TEE Model

a. The total amount of personal account: M

The accumulated amount of the first year: $cw(1 - t_0)$

The accumulated amount of the second year: $cw(1 - t_0)(1 + r) + cw(1 - t_0)(1 + g)$

N-year cumulative amount of funds:

$$cw \left[(1 + g)^n + (1 + g)^{n-1}(1 + r) + (1 + g)^{n-2}(1 + r)^2 + \dots + (1 + g)(1 + r)^{n-1} \right] (1 - t_0)$$

Or: $M = cw \sum_{j=1}^n (1 + g)^{n+1-j} (1 + r)^{j-1} (1 - t_0)$

b. Present value of future actuarial individual account payment amount: N

Actuarial formulas for life annuities survival that pay \$ 1 at beginning: $PV = \sum_{k=0}^{\infty} v^k P_k$, (v^k is discount factor,

P_k : the probability of survival that policyholders live to b + k period). Thus, the actuarial present value of pension benefits upon retirement for each year the amount of the termination payment after N years:

$$N = A \cdot P_k \cdot \sum_{k=0}^{\infty} \left(\frac{1}{1 + i} \right)^k \quad (A \text{ is a personal account to receive standard.})$$

In which, A satisfies: $A = \beta w(1 + g)^n$.

Then we obtain, $N = \beta_0 w(1 + g)^n \cdot \sum_{k=0}^{\infty} P_k \cdot \left(\frac{1}{1+i}\right)^k$.

According to the actuarial balance principle, $M=N$. So, we can get a pension replacement rate:

$$\beta_0 = \frac{c \cdot (1-t_0) \sum_{j=1}^n (1+g)^{n+1-j} (1+r)^{j-1}}{(1+g)^n \cdot \sum_{k=0}^{\infty} P_k \cdot \left(\frac{1}{1+i}\right)^k}$$

The total government financial loss: $T_0 = qcw \sum_{j=1}^n (1+g)^{n+1-j} (1+r)^{j-1} \cdot t_0$

1.1.3. Enterprise Annuity Actuarial Models of EET Model

According to the principles of corporate pension actuarial of TEE mode, we can speculate that annuity actuarial

models under the EET mode: $M = cw \sum_{j=1}^n (1+g)^{n+1-j} (1+r)^{j-1}$

Under EET mode, the amount of funds accumulated after-tax accounts: $M_1 = cw \sum_{j=1}^n (1+g)^{n+1-j} (1+r)^{j-1} (1-t_1)$

Present value of future actuarial individual account payment amount: $N = \beta_1 w(1 + g)^n \cdot P_k \cdot \sum_{k=0}^{\infty} \left(\frac{1}{1+i}\right)^k$

The enterprise annuity pension replacement rate of EET can be obtained by M and N:

$$\beta_1 = \frac{c \cdot (1-t_1) \sum_{j=1}^n (1+g)^{n+1-j} (1+r)^{j-1}}{(1+g)^n \cdot P_k \cdot \sum_{k=0}^{\infty} \left(\frac{1}{1+i}\right)^k}$$

1.2Parameter Assumptions and Actuarial Conclusion

1.2.1. The Basic Parameter Assumptions

In the calculation process, suppose a person from the age of 25 to work on enterprise annuity payment. When he or she retired, male (60 years old retired) pay 35 years and women (55 years of retirement) contributions for 30 years. And insured workers base pay for each year is equal to the average wage in the previous year, Corporate pension contribution rate should not exceed 1/6 of wages (including corporate contributions and individual contributions). In the view of the company’s payment, we assume the contribution rate is 8%, which is more in line with the actual situation. And assuming the payment annuity payment based on a yearly basis. In 2012, national urban average wage of workers in the post is 47,593. Assuming 2014-2050 nominal average wage growth rate is 5%.In 2013 the number of participating enterprise annuity is 20,560,000. In recent years, investment yield of enterprise annuity is maintained at around 6%, annual interest rate of 3%. Survival probability distribution is based on China Life Insurance Mortality Table (2000-2003) in pension business table section (men and women), and the highest age at death is 105 years old. China's personal income tax rate and the average wage calculated under TEE mode annuity payment at the rate of 3%.

Table 2: The Basic Parameter Assumptions

Parameter	a	b	n	c	g	r	i	q	t ₀	t ₁
Value	25	(60,55)	(35,30)	8%	5%	6%	3%	2056万	3%	3%

1.2.2. Actuarial Results

According to Table 2 and said model parameters can be calculated:

	Women (Retire at the age of 55)		Men (Retire at the age of 60)	
	TEE mode	EET mode	TEE mode	EET mode
The total accumulated amount of personal accounts	480,136	494,985	718,256	740,470
Pension replacement rate	12.47%	12.86%	16.57%	17.08%
The annual amount of receipt	19,253	19,848	31,116	32,078
The government extended tax of the first year	275,981,000			

In TEE mode, male 60-year-old retirement pension replacement rate is 16.57%, but female at 55-year-old of 12.47%. After the tax deferred annuity incentives, under EET model, male 60-year-old retired pension replacement rate is 17.08%, female (55-year-old) of 12.86%. Extension of the tax in the first year is 270 million.

The extension of the tax will grow according to an annual average growth rate of wage each year.

From the results of the actuarial point of view, the individual pension replacement rate has not significantly improved, but can reduce the current personal income tax burden and improve the living standards of retirement. The impact on government revenue is not great.

2. Commercial Pension Insurance Tax Incentives Design and Revenue Forecast

We can see from the above, the personal income tax deferred of annuity incentives has reduced the burden on individuals and businesses. Compared with the second pillar of the annuity, the third pillar of the commercial pension insurance will not consider companies' effectiveness. So it has greater coverage. Therefore, if we can improve the initiative of individuals to participate in the commercial pension insurance, to a certain extent, it will increase the replacement rate of pensions. The rapid development of commercial pension insurance can provide better pension protection for individuals, but also to improve the sustainability of the first pillar, and promote the development of the commercial insurance market. As a tax incentives, tax deferred policies have brought some benefits in individuals and businesses. Therefore, we may wish to consider the personal income tax deferred annuity preferential reference to commercial pension insurance in the past.

In this paper, we put traditional commercial pension insurance as an example. In traditional commercial pension insurance, the insured person and the insurance company signed a contract, the parties agreed time and determined pensioners receive credits. Generally speaking, the entire payment rates unchanged during the period, the interest rate per annum and expected frequencies are also determined. This is a mandatory deposit insurance. According to the relevant corporate pension actuarial model, we can describe the commercial pension insurance actuarial models after taking the tax deferred policy.

Commercial pension insurance plans that insurance company launched generally pay an annual units. Assuming personal expenditures for the purchase of commercial pension insurance accounted for the proportion of fixed salary. Its annual income is w , and the wage growth rate is g . Expenditures for commercial pension insurance is cw , and pension fund earnings rate is r . Prior to the tax incentives of commercial pension insurance rate is t_0 , but after the policy rate is t_1 .

Accumulated value of the premium in the payment period is $M = qcw \sum_{j=1}^n (1+g)^{n+1-j} (1+r)^{j-1}$. Accumulated

amount of the premium after tax is $M_1 = qcw \sum_{j=1}^n (1+g)^{n+1-j} (1+r)^{j-1} (1-t_1)$.

The amount received: $N = \beta_1 w (1+g)^n \cdot q \cdot P_k \cdot \sum_{k=0}^{\infty} (\frac{1}{1+i})^k$.

The amount of tax concessions: $T_0 = qcw \sum_{j=1}^n (1+g)^{n+1-j} (1+r)^{j-1} \cdot t_0$.

2.1. Parameter Assumptions and Results

Unlike social endowment insurance, commercial pension insurance can be insured at any time. From the insured person's age, the age of the insured were selected 30,35,40,45. We assume that the annual start receiving pension funds is tantamount to retirement age(men aged 60, 55-year-old woman). Assuming that 2014-2050 nominal average wage growth rate is 5%, and investment yield of commercial pension insurance remained at about 6%, and Interest rate is 3%. Survival probability distribution is based on China Life Insurance Mortality Table (2000-2003) in pension business table section (men and women), and the highest age at death is 105 years old.

Table 3: The Basic Parameter Assumptions

Parameter	c	g	r	i	t ₁
Value	10%	5%	6%	3%	3%

We assume that a middle-income wage level is approximately equal to the average level of society (the average wage in 2012 was 47,593). Commercial pension insurance premium is 10% of the wage rates, and around 4,800 per year.

4800 in annual premium for example

	Men (Retire at the age of 60)				Women (Retire at the age of 55)			
	30	35	40	45	30	35	40	45
The total accumulated amount	694966	442688	270760	155282	442688	270760	155282	75892
The amount of receipt	28865	19178	11729	6727	17751	10857	6226	3043
Pension replacement rate	13.9%	11.8%	9.2%	6.7%	10.9%	8.5%	6.2%	3.9%

2.2 Conclusion Analysis

- Tax deferred pension insurance policy is an effective way to reasonable tax, and it have greater appeal for the middle-income.
- The lower the amount of tax deferred pension insurance business can achieve a higher replacement rate.
- Commercial pension insurance premium tax deferred has less impact on the financial result.

3. Advice and Inspiration

With the increasing aging population in China, as well as common international practice, a tax-deferred pension insurance tax incentives potential to become inevitable. For individuals to speak, commercial pension insurance tax incentives can reduce the personal tax burden, empower individuals to participate in the commercial pension insurance enthusiasm. This can raise pension income replacement rate and the level of retirement stage, so that the elderly can share the fruits of economic development. For businesses, commercial pension insurance companies tax incentives can cut spending, improve the enterprises to establish enterprise annuity enthusiasm. Such a policy is not only for the development of enterprises in the capital of concessions, but also the implicit in the promotion of human resources. For insurance companies, to increase the number of insurance companies has brought greater efficiency, promoting the development of commercial insurance in this supplemental insurance. Finally, as a national, long-term point of view, the commercial pension insurance will help improve national welfare, reduce the pension burden on the first pillar of sustainable development of social endowment insurance, and promoting sustainable economic and social stability and harmonious development.

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