Rethinking Pension Reform in China

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Abstract

In line with advice from international financial institutions, China introduced a three-pillar pension system in 1997. However, it performs badly, with high contribution levels, the 'funded' contributions being used for current expenditures, and delays in pension payments. The problems are often ascribed to the remaining elements of pay-as-you-go (PAYG) present in the system. This paper, however, argues that the advantages of a fully-funded system (FF) have been exaggerated. The higher relative return of the PAYG system in China justifies a PAYG pension system for China. It is argued that the problems of the Chinese pension system are not caused by the use of PAYG but by the need to finance transition costs and conditions particular to the pension system in China, notably incomplete contribution coverage, a low pension age, and a high replacement rate. It is these factors, and the rate of growth of output, which determine the viability of the Chinese pension system.

Key Words: pay-as-you-go   pension reform   productivity

I. Introduction

In the last decade, social insurance has been undergoing a process of reform in both developed and developing countries. Old age pensions have the broadest coverage and frequently the largest cost of any program in the entire social insurance system, and in many countries have become or threaten to become a major burden on public finances. Hence they have been the subject of much discussion. Attention has been concentrated on the question of which system should be chosen: should it be a pay-as-you-go (PAYG) or a fully-funded (FF) system? Debate on the disadvantages of the traditional PAYG system

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has concerned such matters as demographic challenges, that is the secular trend in many countries of decreased total fertility rates and increased life expectancy, which affects the dependency ratio and has negative implications for the financing of PAYG; the crowding-out effect on savings, and hence the reduction in capital accumulation and slowing down of economic growth (Feldstein, 1974,1995; Kotlikoff,1979); and distortions to the labor supply and form of compensation due to the low return implied by PAYG (Feldstein,1996). In contrast, a FF system avoids the aforementioned adverse affects on the public finances from an aging population. Moreover, the contributions will be invested in stocks and bonds and thus the capital stock will grow as a result of contractual savings. However, the potential risks implicit in FF system, such as financial risk and inadequate regulation should not be overlooked. Also, FF system has no redistributive function, unlike PAYG.

In China, a national pension scheme is available for urban employees. The most recent framework for pension reform was established in July 1997. The new pension system includes three pillars: a pooling account to redistribute to all beneficiaries, compulsory individual accounts, and supplementary pensions offered by commercial insurance on a voluntary basis. The first pillar imposes a payroll tax of 17 percent (paid by employers) to ensure that employees who have worked more than 15 years have a replacement rate (i.e., pension as a percentage of average wage) of 20 percent. The second pillar (paid jointly by employers and employees) establishes an individual account for each employee. The contribution for this is 11 percent of an individual's wage. After retirement, the employee gets a monthly benefit from this account of the accumulated value divided by 120. The target replacement rate of the first and second pillar taken together is 58.5 percent[1]. In this system, about 60 percent of contributions will go into the PAYG system, while 40 percent will be channeled into individual accounts.

There are a number of studies which simulate China's pension reform based on the rationale for a multi-pillar system (McCarthy and Zheng, 1996; World Bank, 1997; Wang *et al.*, 2000). Their results show that the costs of the transition from a PAYG to FF are quite manageable, and several ways to finance the transition are suggested. However, reality is diverging from these projections. A number of problems concerning China's pension reform have arisen. These include the heavy burden of contribution placed on those enterprises expected to finance the transition cost, which often leads to delays in the payment of pension contributions and outright evasion; the misuse of funds in the supposedly funded

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[1] This is based on the assumption that life expectancy is 70 and the rate of growth of real wages equals the real interest rate. If one contributes to the system for 35 years, then an individual account can provide a 38.5 percent replacement rate. So jointly, the two pillars have a replacement rate of 58.5 percent.

individual accounts, which remain notional, and the weak performance of financial markets, which have not generated a satisfactory return to the pension fund. It appears that the transition problems have been underestimated while the returns on private accounts have been overestimated. More research is needed to compare PAYG and FF under Chinese conditions, to consider to what extent the system should be mixed, and how to keep the system financially viable.

The following section discusses the choice of pension reform in China in a neoclassical economic framework by using the Pareto efficiency criterion, paying special attention to the dynamic efficiency of the economy and the relative return of the alternative pension systems. Section III is a continuation of the welfare analysis of pension reform focused specifically on the transition process, where the current situation in China is discussed. Section IV shows the advantages of a PAYG system under Chinese conditions. In section V, the relationship between productivity improvement and the ability of PAYG to absorb increased pension expenditures is simulated for China. The paper concludes with a brief summary of the advantages of PAYG in China.

II. Efficiency Analysis of China's Pension Reform

Pension reform is normally discussed in a neoclassical economic framework, where maximization of utility and improvements in efficiency are the main justifications for reform. The main argument of neoclassical theory for pension reform is based on the different impacts on savings under PAYG and FF. Theoretically, there is no long run effect on capital accumulation with a moderately funded system, but if the funded system is expanded to a higher level, then there is an increase of capital supply due to forced savings, while a PAYG system has a negative effect on savings and thus the capital supply is reduced. In China, the capital accumulation has not been restricted by the amount of savings. On the contrary, an abundance of savings have not been efficiently transformed into investment. Evidence for this is provided by comparing the annual balance of domestic savings and the loans of financial institutions since the currency is non-convertible on capital accounts. Before 1994, the annual balance of loans exceeded savings, while after that, savings have been increasing rapidly over time, reaching 3,963 billion yuan in 2002 (Table 1). The situation is a result of lack of demand for consumption and investment.

Attention has been paid to the relative returns of the two systems. In a model with two overlapping generations, the return on a PAYG system is the sum of the population growth rate and wage growth rate of each generation. Aaron (1966) showed that PAYG improves the welfare of each individual if the growth rate of the economy is higher than the interest rate, which is assumed to be exogenously given. Obviously, the return on individual

Table 1. Deposits and Loans in Financial Institutions of China

(billion yuan)

	Deposits	Loans	Balance
1990	1401	1768	-367
1992	2347	2632	-285
1994	4047	4081	-34
1995	5386	5054	332
1996	6857	6115	742
1998	9570	8652	918
2000	12380	9937	2443
2002	17092	13129	3963

Source: National Bureau of Statistics (NBS), China Statistical Yearbook, 1991-2003, China Statistics

Press.

accounts in a FF system is determined by the return on investment. Consequently, the

relative return of the PAYG system is: $\frac{(1+g)(1+n)}{1+r}$, where r is the return on investment, n the

rate of growth of population, and g is the wage growth rate. In the framework of the OLG model (Samuelson, 1958), it is clear that to get the same level of benefit, the relationship of the contribution rates of PAYG (τ_P) and FF(τ_F) must meet the following equation:

$$\frac{\tau_F}{\tau_P} = \frac{(1+g)(1+n)}{1+r}$$

where g, n and r are rates in terms of a generation rather than yearly[2]. If the product of the rate of population growth (which determines the number of contributors) and the rate of growth of wages exceeds the return on capital, then a PAYG system will improve welfare. This justifies the redistributive function of PAYG between generations. Conversely, when the product of the rate of growth of population and the rate of growth of wages is less than the rate of return on capital, the savings deposits required to provide the same level of benefit under FF are less than the contribution rate required under PAYG.

The optimistic results estimated by some authors for China after introducing an FF scheme derive from a simplistic application of this methodology. For example, Feldstein (1999) calculates the gain of transition to a FF system for China based on the assumption that the real aggregate wage growth rate will be 7 percent p.a. in the future and the future real marginal return on capital will be 12 percent, which he thinks quite conservative.

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[2] For example, if the annual population growth rate is 1.4 percent and a generation is 30 years, 1+n= $(1.014)^{30}$=1.52

Under these assumptions, 1 dollar in a PAYG scheme will be worth 7.6 dollars after 30 years, while in an FF scheme the same dollar will be worth 30 dollars. To get the same level of benefit, the contribution rate required under FF is only 1/4 of that under PAYG, therefore a 20 percent contribution rate in PAYG, for example, will be reduced to 5 percent in FF. The derivation is correct, given the assumptions. However, if we take an aggregate wage growth rate of 4 percent, which is conservative according to data from recent years, and an investment return of 3 percent, which was the case in 2000 and 2001, the outcome will be reversed. The benefit which is likely to be received from a contribution rate of 20 percent under PAYG, will require a savings rate of 26.7 percent under FF. In fact, the result is determined by the relative return of PAYG as shown above. If the relative return of PAYG is higher than 1, then PAYG is better than FF, and the higher the relative return, the better PAYG is.

In China, the real interest rate has fluctuated sharply in recent years and the real return on government bonds has also changed sharply. In the year 2000, the real interest rate on 5-year government bonds was 4.7 percent, which was approximately the average level of the 1990s. However, real wages have grown at a higher rate. The real average growth rate of the average wage from 1986-2002 was 6.6 percent annually and the real aggregate wage growth was 8.2 percent annually. Meanwhile, the rate of population growth is still positive. During the reform period, the real wage growth rate has usually been higher than the real interest rate or real rate of return on bonds. Hence, it is quite possible that the relative return

of a PAYG system − $\frac{(1+g)(1+n)}{(1+r)}$ − will stay at a level of more than 1 in China. Obviously,

when considering possible pension reforms, we have to look to the future and not the past. According to the World Bank, during 2011-2030, the real wage growth rate in China will be 4 percent p.a. and after 2030 will be 3 percent p.a. As far as the rate of growth of population is concerned, the general expectation is that China will maintain a positive population growth rate until 2030. Furthermore, with continuous migration from rural to urban areas, the working force covered by the pension system will increase at a rate higher than the total population.

It is difficult to find a clear indicator to show the marginal return of investment. However, in view of the high savings rate of China over a long period of time, there is unlikely to be a high risk-free interest rate. As for the capital market, it has been well recognized that China's stock market is too premature to be an effective market. The anticipated return on FF, based on the assumption of greater returns in the capital market, is highly uncertain. Basing the retirement income of the urban population on it is very risky. In fact, the financial sectors are still insufficiently developed to provide the minimum conditions for starting a

fully-funded system[3]. So in the long run, the relative return of PAYG could be higher than 1 in China.

III. The Transition Costs of China's Pension Reform

When considering pension reform, the welfare aspect of the transition should not be neglected – that is, the impact on the welfare levels of different cohorts during the period of transition from one system to another. Under PAYG, the first generation receives the pension as a gift, which creates a cost inherent in the system. But it is an implicit debt in that each generation benefits from the subsequent one. When changing from unfunded PAYG to individual accounts, this implicit debt becomes explicit and it has to be decided who should pay for the liability existing throughout the history of the system. During the transitional period, funds need to be accumulated for the current generation while pensions must still be paid to the previous generations who have accumulated rights to receive pensions under the PAYG system.

In the case of China under the reform framework adopted, the original PAYG framework was retained for those who had already retired before 1997, while those who entered the labor market in or after 1997 will be covered by the new three-pillar pension system. For those who started work before 1997 and retired or will retire after 1997, a transitional plan is to be applied[4]. So in practice, the transitional costs in China consist of two parts: one is the pension commitment to those who retired before 1997 which is to be subtracted from the amount that could be received by others from the new pooling account; the other part is equivalent to the amount needed to establish the individual accounts for those to whom the transition plan is applied.

Initially, the government counted on the multiple-pillar system, with its higher contribution rate and extension of coverage[5], to absorb the transitional costs. According to documents of the State Council (Document 26, 1997, State Council), 4 percent out of the 17 percent contribution rate to the first pillar is for transitional purposes. The benefits for the pre-1997 retirees were not to be downsized and a plan to extend the pension scheme to cover more

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[3] According to Holzmann (1993), as a prerequisite to introduce funded pensions, some kinds of financial market must already exist to which the introduction of funded pensions should contribute.

[4] In practice, the transitional arrangements differ regionally, but in most cases, the replacement rates for these retirees are similar to those for retirees who retired before 1997 – on average, 75 percent-80 percent.

[5] China's pension system was established in 1951 for employees in urban state sectors and one of the objectives of reform was to extend the system to non-state sectors.

employees was supposed to increase the inflow into the system and keep the system in financial balance. In fact, the current workers and employers bear the cost, which means a double burden for present workers: simultaneously contributing to individual accounts and paying for the current generation of retirees. On the other hand, higher investment returns were expected to offset the cost, because as long as the rate of return on investment is significantly higher than the growth rate of wages, then the required contribution will be far less than to double the contributions under the pay-as-you-go system.

However, a deficit in the first pillar soon emerged and the funds in the individual accounts were used to pay for the benefits to current retirees. This transformed what had been intended as an actually funded system into a (partially) notionally funded system. Furthermore, these empty accounts with an uncertain interest rate undermined confidence in the system and individuals and enterprises lack incentives to participate in it. Furthermore, the investment return of the social security fund measured by the return on government bonds was much less than the growth of money wages which makes it difficult to accumulate the financial assets required to pay a pension which has a reasonable relationship to average earnings[6]. Under these conditions, contributions to the second pillar pension scheme are more in the nature of taxes than of saving for old age. As a result, the new system expanded its coverage only slowly (Table 2).

Logically, privatization of China's large state assets could be an attractive method to

Table 2. Contributors and Retirees (1991-2002)

	Contributors (million)	Contributors/ Population（percent）	Contributors/Urban Employment（percent）	Retirees (million)	Dependency Ratio（percent)
1991	57	4.9	33	11	19.3
1992	78	6.7	44	17	21.8
1993	80	6.7	44	18	22.5
1994	85	7.1	46	21	24.7
1995	87	7.2	46	22	25.3
1996	88	7.2	44	23	26.1
1997	87	7.0	42	25	28.7
1998	85	6.8	39	27	31.8
1999	95	7.5	42	30	31.6
2000	104	8.2	45	32	30.8
2001	108	8.5	45	34	31.5
2002	111	8.6	45	36	32.4
1991-2002 increase	95 percent	3.7 percentage points	12 percentage points	227 percent	13.1percentage points

Source: NBS, China Statistical Yearbook , 2001. Beijing: China Statistics Press.
Note: Dependency ratio: number of workers contributing to the system to number of retirees collecting from the system.

[6] According to Chinese regulations, not less than 50 percent of social security funds must be invested in risk-free assets (bank deposits, government bonds).

finance the transitional cost, since both the pension commitments and the assets originate from the same set of organizations. According to the World Bank (World Bank, 1997), preliminary assessments in 1995 suggested that the state-owned enterprises had productive assets of more than 2 trillion yuan and unproductive assets (e.g. land and buildings) of 5 trillion yuan while the explicit debt of SOEs to banks was less than 2 trillion yuan. So there was room to sell part of these assets to finance the transition. In September 2000, the National Social Security Fund (NSSF) was established to receive revenue from the government, SOE sales and other sources. In June, 2001, the State Council decided to execute the plan for "Selling state-owned shares to raise funds for the social security system". From July to the end of September, 2001, 15 enterprises raised money from IPO's. These included selling a portion of the state-owned shares equal to 10 percent of the proceeds of the total share sale. The market responded to the plan with a sharp fall and the stock market index declined by 30 percent within four months. In June, 2002, the State Council stopped the plan, which had proved a failure in the market.

It is also possible for the Chinese government to follow the Latin American model of issuing bonds (for example, recognition bonds in Chile) to take over all the liabilities caused by the transition and exchange this new explicit debt for the old implicit debt. However, this will not reduce the pressure on the public budget. The bonds have to be serviced out of taxes and future generations will have to pay higher taxes to repay them (or service their successors). Transition of this kind only translates the social security tax into other kinds of taxes. Using other taxes to finance the transition conflicts with the purpose of pension reform, which is to alleviate the burden on future generations. Moreover, if both general taxation and PAYG contribution are distortionary, then a PAYG-FF reform raises Pareto-efficiency by eliminating the pure-tax component of PAYG contributions but reduces Pareto-efficiency by increasing general taxation to pay for a tax-financed transition or for the interest payments on the higher explicit government debt. Hence the net effect of pension reform on Pareto-efficiency is ambiguous. Furthermore, from a policy point of view, there is an important distinction between those people who will pay the debt and those who own the bonds and will receive the interest. In other words, the winners are the rich people who will subscribe to the bonds and receive the interest and the (poor) losers are those who will pay the taxes needed to service the bonds.

IV. The Sustainability of PAYG

1. The demographic transition in China

A common question addressed to a PAYG system is how it handles the redistribution function under conditions of an adverse change of demographic structure, which increases

the dependency ratio. Due to economic development and population policy, China's demographic structure has changed greatly in recent decades. The downward trend of fertility since the 1970s both in urban and rural areas caused a deceleration in the population growth rate from 1970 (Hussain, 2002). The decline of the growth rate of the young population caused a change of the age structure of the total population (Table 3). In 1964-2000 the percentage share of the age group 0-14 dropped by 17 points, while the percentage of the population older than 65 rose by 2.5 points. Hence, the demographic old age dependency ratio (the ratio of the numbers of those aged 65 and older to the numbers aged 15-64) keeps rising, from 8.1 percent in 1982 to 8.3 percent in 1990 and 9.9 percent in 2000 (Table 3). This demographic transition is an important reason for the increasing burden on the pension system. The dependency ratio of the pension system (number of workers contributing to the system to retirees collecting from the system) was 30:1 in 1978, i.e. 30 workers supported 1 retiree. But 5 years later, the ratio had become 10: 1, was 6:1 in 1990, and 3.2:1 in 2002 (Table 2).

In view of the fact that the current total fertility rate (TFR) in China is rather low, currently 1.2, even lower than some high income countries[7], and life expectancy is quite high, population aging in the future is inevitable. Based on the demographic structure of 1998 and assuming that fertility and mortality rates remain stable, we can simulate the demographic structure of China in 2030 (Table 3). Even if we assume a recovery in the TFR, to a level of 2, which almost equals the level necessary for a constant population, within 15 years, the population aging will still be rapid and the old age dependency ratio will reach almost 27 percent in 2030.

Table 3. Demographic Structure in China（percent）

Age Group	1964	1982	1990	1995	2000	2030 (projected)
0-14	40.4	33.5	27.69	26.73	22.98	17.88
15-64	55.1	61.5	66.74	66.57	70.15	64.54
65+	4.5	5	5.57	6.70	6.96	17.58
Old age dependency ratio （percent）[a]	8.17	8.13	8.35	10.06	9.92	27.23

Source: data for 1964 and 1982 are from Hussain (2002); other years are from NBS, *China Population Statistical Yearbook*, Beijing: China Statistics Press. The projection is based on the assumption of a total fertility rate (TFR) of 2.

Note: a = the number of those older than 64 as a percentage of those aged 15-64.

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[7] TFR is a summary index of child-bearing experience in particular years expressed as the expected number of births per woman over her life. The TFR of the U.S. in 1998 was 2.06, of Germany in 1994 was 1.31, and of France in 1993 was 1.65.

2. Rural-urban migration in China

For some developed countries it has been argued that migration will help society pay the benefits promised to the elderly. In China, however, what is relevant is not international migration but internal migration. The ongoing migration from rural areas to urban ones has important implications for the financial soundness of the pension system. Although the labor market in China is a segmented one, which hampers rural-urban labor mobility, rural-urban migration has become an important factor during the reform period. Urbanization in China has lagged behind industrialization and also behind the level of other developing countries in the same income group. So there is going to be a process of urbanization in the near future. According to a research by the Development Research Center of China, it is possible that the urbanization rate will be 70 percent after 30-40 years, that is, the annual increase of urbanization rate will be 1.0-1.2 percentage points, which is approximately twice that in 1978-1998.

There is a distinction between the age structure in rural areas and urban areas. We take those who are in the age range 15-64 as the labor force. The percentage of the age group of 15-34 to the total labor force in rural areas are 50.23 percent and 50.76 percent for male and female respectively, and in urban areas the corresponding indicators are 46.75 percent and 47.65 percent. Furthermore, those who migrate to urban areas are younger than the average labor force in rural areas. Because of their better educational background, greater willingness to take risks, better personal qualities and other individual factors, young people have more incentives and are more likely to be successful in finding jobs in cities. A study of the migrants to Shanghai (The Fifth Census of Shanghai, 2000) shows that the percentage of the age group 15-59 to total migrants was 89.9 percent and 89.4 percent for male and female respectively. From 1996 to 2000 about 2 million people of working age migrated into Shanghai, mostly belonging to the younger age groups, while 200 thousand children and only 30 thousand elderly migrated to Shanghai during the same period.

The migration from agricultural sectors to non-agricultural sectors and urban areas has important implications for the social security system in that coverage of the pension system will continue to expand for a long time. It may nevertheless be reasonable to argue that these migrants will ultimately be net beneficiaries of the welfare system in general and the future burden of the system might become heavier as a result. But for China, the expansion is necessary on grounds of equity. For the PAYG system this means that for many years there will be an influx of young workers from the countryside which will help maintain the financial balance of the PAYG system.

3. Parameters of PAYG in China

Under a PAYG system, pension financing is determined by the following relationship:

Contribution rate = Replacement rate × Dependency ratio. Dependency ratio specifically refers to that of the pension system, and is usually different from that of the demographic structure due to the coverage of the system and varying labor participation rates and unemployment rates of each cohort. Other things being equal, as the demographic dependency ratio rises, the dependency ratio of the pension system rises as well. Taking account of the increasing dependency ratio, several methods may be used to maintain the financial balance of PAYG.

It is obvious that a high replacement rate means a high contribution rate and when the dependency ratio is increasing, either the replacement rate should decline or the contribution rate should increase in order to maintain equilibrium. We now consider the average replacement ratio in China, which is currently usually 70 percent of average wages in the region concerned (Table 4). Compared with other transitional countries (Cangiano, et.al, 1998), such as Central Eastern Europe (53.9 percent, 1993-96), the Baltic states (34 percent, 1993-96), Slavic states & Moldova (38.4 percent, 1993-96), Central Asia (34.6 percent, 1993-96), the replacement ratio is extremely high in China. In the past, wages were low and basically just provided for fundamental needs such as food and clothing, so it is understandable that the pension had a higher replacement rate than in more developed countries. But after more than two decades of reform, wages have sharply increased. The increased monetization of employment benefits has not been matched by a decline in the replacement ratio. Keeping the replacement ratio unchanged inevitably led to excessive government commitments and hence the heavy burden on current workers. However, if the PAYG pensions are considered primarily as a means of poverty relief, it might have been appropriate to reduce the replacement ratio. Other forms of saving such as commercial life insurance, bank deposits, stocks, or house purchases should be used if retirees want to maintain a high standard of living.

On the other hand, the dependency ratio is a function of the retirement age, life expectancy and mortality rate of each cohort. Life expectancy and mobility rates are treated as uncontrollable variables, but in an aging society, if we adjust the retirement age according to the change in life expectancy, the re-distributive function of a PAYG system can persist without a financial crisis caused by the change of demographic structure. Unfortunately, China's pension scheme hasn't complied with this rule. In Chinese legislation, the male retirement age is 60 (the average actual retirement age is lower), for female officials, it is 55 and for female workers, it is 50. These retirement ages were fixed in 1951, when life expectancy was only about 40. Since then, life expectancy has greatly increased and is continuing to increase. Between 1990 and 2000 male life expectancy increased from 66.84 in 1990 to 69.63, and female life expectancy from 70.47 to 73.33. Moreover, like other transitional countries the use of the pension system to cushion unemployment was quite common in China.

Table 4. Expenditures and Revenues
of Pension System (1991-2002)

	Expenditures (billion yuan)	Expenditures / GDP (percent)	Revenues[a] (billion yuan)	Contributions / GDP (percent)	Average benefit/ Average wage (percent)	Average contribution/ Average wage (percent)
1991	17.3	0.8	21.5	1.0	67	16
1992	32.2	1.2	36.5	1.4	70	17
1993	47.1	1.4	50.4	1.5	78	19
1994	66.1	1.4	70.7	1.5	69	18
1995	84.8	1.5	95.0	1.7	70	20
1996	103.2	1.5	117.2	1.8	72	21
1997	125.1	1.7	133.8	1.8	77	24
1998	151.2	2.0	145.9	1.9	75	23
1999	192.5	2.4	196.5	2.4	77	25
2000	211.5	2.4	227.8	2.6	71	23
2001	232.1	2.4	248.9	2.6	63	21
2002	284.3	2.7	317.2	3.1	64	23

Source: NBS and MOLSS, *China Labor Statistical Yearbook*, 2001, Beijing: China Statistics Press.

Note: a. "Revenues" comprises contributions, both to the PAYG scheme and to the (notionally) funded accounts as well as fiscal subsidies and revenue from selling state-owned assets.

Earlier retirement and longer life expectancy means there should be more employees or additional contributions to support a retiree. Compared with some developed countries such as the UK and US, the legal retirement age in China is 5 to 15 years lower. The average annual growth rate of the number of pensioners has been much higher than growth rate of contributors. In 1991-2002, the contributors increased by 95 percent while the retirees increased by 227 percent (Table 2).

However, an increase in retirement age is only possible with a favorable development in unemployment conditions. In the 1990s, the official unemployment rate in China kept rising, and in 2002 the number of officially-measured unemployed was 6.02 million. Actually, due to the structural reform of state-owned enterprises, there have been large numbers of laid-off employees. The actual number of unemployed is much greater than the official figure. Under these conditions an increase in the retirement age is currently not a practical policy.

V. Productivity and PAYG

The key to financing a pension system is adequate growth of output, which is a stable foundation for whatever pension system is adopted. What is different between PAYG and FF is the way in which claims on current output to satisfy the consumption of pensioners

are met. Under FF, the retiree's claim on the goods they consume is met by spending the money accumulated in their own accounts, while under PAYG, the retiree gains the goods by way of government taxes. As long as there is enough output for workers and retirees, from a macroeconomic point of view, it is unimportant which system is adopted. If output remains constant or declines, even FF cannot avoid problems. Under such a situation, the FF system cannot escape from inflation in the goods market or deflation of asset prices, both of which reduce the real value of the pension. So for pension systems, the crucial issue is always the level and rate of growth of output.

When productivity is growing, the economy can absorb an increased expenditure of dependents. Currently, pension expenditure as a percentage of GDP in China is quite low, less than 3 percent (Table 4). Suppose we allow no increase in the share of GDP devoted to pensioners, which means that the burden on workers is fixed (the contribution rate stays constant) during the period of time concerned .We also assume various real economic growth rates, and then we calculate the multiple of average benefit the economy could afford at the end of the period relative to the initial year under various assumptions on dependency ratios and real economic growth rates. We consider the period from 2000 to 2030. We assume several real economic growth rates: 2 percent, 3 percent, 4 percent and 5 percent with the real average wage growing at the same rate. The dependency ratio of the pension system in 2002 is about 0.32 (Table 2). As for the dependency ratio in 2030, several factors will be taken into consideration in China, including the demographic structure, migration rate and the extension of coverage. So it is appropriate to simulate a range of dependency ratios.

Table 5 lists the level of pensions in 2030 relative to that in 2000 without increasing the burden on workers, given a particular rate of real economic growth and under various dependency ratios. Higher economic growth rates can guarantee greater pension benefits (relative to current pensions) even if the dependency ratio rises to a higher level. For example, when economic growth rate is 5 percent annually from 2000 to 2030, even if the dependency ratio rises to 0.6, the average benefit could be 2.16 times as much as that in 2000, thus allowing a substantial increase in retirees' standard of living (although it will fall relative to future average earnings).

VI. Conclusion

In 1997 China adopted a three-pillar pension system for the urban population, with the first and second pillars implemented according to advice from the international economic organizations. Nevertheless, the pension system is currently in crisis. The level of

Table 5. Increased Pension Benefit and Economic Growth Rate

Dependency Ratio	Average Annual Economic Growth Rate (2000-2030)			
	2 percent	3 percent	4 percent	5 percent
0.3	1.81	2.43	3.24	4.32
0.4	1.36	1.82	2.43	3.24
0.5	1.09	1.46	1.95	2.59
0.6	0.91	1.21	1.62	2.16
Increased Income of workers	1.81	2.43	3.24	4.32

Source: Author's calculation.

Note: The numbers represent the amount by which real pension benefit per dependent in 2030 could rise relative to 2000 without increasing the share of GDP devoted to pension expenditures, given a particular rate of real growth.

contributions is high, the PAYG system has insufficient income to pay pensions currently due, and individual savings accounts have been used to finance current expenditures. The second pillar has become a (partially) nominally funded system, which undermines confidence in it and also undermines fiscal discipline.

The problems are not caused by PAYG as such, which has the advantages of universal coverage (for the group considered), poverty relief, redistribution, avoidance of capital market volatility, and low administrative costs. The problems are caused mainly by the financing of transitional costs and particular parameters of the system, namely a high replacement rate, poor coverage of contributors (particularly in the private sector), a high rate of growth of money wages, and increasing life expectancy not matched by an increasing retirement age.

Advocates of the Fully Funded system, based on the argument that since the 1930s the economies of the main industrialized countries have been dynamically efficient, argue that the introduction of a FF pension system is helpful to economic growth. The debate about pension reform has moved from its redistributive function to economic growth. However, in China the economy is in a state of dynamic inefficiency and the real interest rate is lower than the rate of growth of wages. Accordingly, a FF system is neither an efficient one now nor is it likely to be so in the foreseeable future. A mandatory PAYG system with wide coverage, low replacement rate and a redistributive function would benefit most of China's urban population. The aim of such a mandatory pension system would be poverty relief and income redistribution, subject to keeping government commitments within its budget constraint. Financing pensions at a decent level for a growing population of retirees is basically a matter of ensuring that there is sufficient income for this purpose.

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