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Public pension and household saving:  
Evidence from China



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Jin Feng\*, Lixin He\*\* and Hiroshi Sato\*\*\*

## Public pension and household saving: Evidence from China

### Abstract

We relate household saving to pension reform, to explain the high household saving rates in urban China from a new perspective. We use the exogenous – policy induced - variation in pension wealth to explicitly estimate the impact of pension wealth on household saving, and obtain a significant offset effect of pension wealth on household saving. Our estimations show that pension reform boosted the household saving rate in 1999 by about 6 percentage points for cohort aged 25-29 and by about 3 percentage points for cohort aged 50-59. Our results also indicate that declining pension wealth reduces expenditure on education and health more than on other consumption items.

Keywords: pensions, pension reform, household savings rate, China

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## Public pension and household saving: Evidence from China

### Tiivistelmä

Tässä tutkimuksessa selvitetään Kiinan kaupunkialueiden korkeaa säästämistä uudesta näkökulmasta liittämällä sen eläkeuudistukseen. Poliittisesti päätetty eläkeuudistus vaikutti selvästi kotitalouksien eläkevarallisuuteen ja sitä kautta niiden säästämiseen. Eläkevarallisuuden supistuminen lisäsi kotitalouksien säästämistä. Tämän tutkimuksen tulosten mukaan eläkeuudistus nosti 25–29-vuotiaiden säästämistä 6 prosenttiyksikköä ja 50–59-vuotiaiden säästämistä 3 prosenttiyksikköä. Eläkevarallisuuden supistuminen vähentää koulutus- ja terveystuloja enemmän kuin muuta kulutusta.

Asiasanat: eläkkeet, eläkeuudistus, säästäminen, Kiina

# 1 Introduction

China's household saving rates climbed continuously during the mid-1990s. Based on official statistics, the urban household saving ratio increased from 17% in 1995 to 20% in 2000 and to 23% in 2004.<sup>1</sup> At the same time, China's public pension system for urban employees has been in the process of reform. The most important pension reform began in 1995, first in several provinces and eventually across the country. At the end of 1997, the State Council (Document 26, 1997, State Council) officially implemented the new policy and unified the parameters of the system. The reform has been aimed a multi-pillar system. Besides the Pay-as-you go (PAYG) pillar, individual accounts were established. However, the total replacement ratio declined. The combined target replacement ratio of the first and the second pillars is 58.5%, down from 75% in the pre-reform period. Transition arrangements are available to even out the losses of those workers who did not have individual accounts before the reform. Although it has often been conjectured that pension reform would affect household saving, the relationship between rising household saving rates and declining pension benefits requires further exploration.<sup>2</sup>

Numerous studies have attempted to explain household saving rates in China. One recent study is by Horioka and Wan (2007), which investigated saving rates of urban, rural, and all households in 1995-2004 using provincial data from the China household survey. They find the significant determinants to be the lagged saving rate, income growth rate, real interest rate, inflation rate, and (in one case) demographic structure. Modigliani and Cao (2004) use time series data from 1953 to 2000 and find that long-term economic growth and demographic structure are the two main factors contributing to the high household saving rate. More comprehensive explanations for China's high household saving have been given in an earlier paper by Karry (2000), focusing more on saving behavior in a period of comprehensive urban economic reform. He uses the panel of provincial saving data before 1995. According to his estimations, none of the variables future income growth, future income uncertainty and dependency ratio is significant for urban areas in 1978-83 and 1984-89. Using household level data for 1995 to 2005, Chamon and Prasad

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<sup>1</sup> This is calculated from household survey data as the difference between disposable income and consumption expenditure divided by disposable income. The data is from China's statistics yearbook.

<sup>2</sup> The other effect of pension reform on aggregate household saving is that growth of pension distribution in the 1990s would have had a negative impact on the incentive to save for old age, as inferred by Modigliani and Cao (2004). But the extension of the pension system occurred at a slow pace. Contributors as a percentage of urban employees was 44% in 1992 and 45% in 2002 (Yuan and Feng, 2005).

(2008) find evidence suggesting that precautionary motives and the rising private burden of social expenditures eg on health, education and housing, have driven the increase in household saving rates. Meng (2003) uses micro data to test the permanent income and precautionary saving hypotheses for urban China. The results indicate that urban households in China have strong precautionary saving motives. However, not all of the previous studies were able to explicitly consider factors such as the social insurance program and old-age pensions.

On the other hand, the relationship between pension wealth and household saving is inconclusive in the literature. The life-cycle model predicts that an increase in future pension wealth will be offset by a decline in individuals' saving. But in a general set-up more applicable to developing countries like China, both the sign and size of the incentive from future pension entitlements to savings requires more careful investigation. First, if current generations feel altruistic towards their offspring, who will be financing the current payouts, the expansion of the social security system may lead to increased private saving to compensate for larger future contributions (Barro, 1978). Secondly, credit market imperfections reduce the importance of the life cycle motive for saving, as borrowing constraints limit the extent to which social security crowds out private savings (Diamond-Hausman, 1984; Dicks Mireaux-King, 1984). Thirdly, limited economic and financial literacy may hinder an individual's assessment of pension wealth, which may limit the extent of the offset between pension and non-pension wealth (Bernheim, 1994). Therefore, predicting the impact of changes in pension wealth on private saving comes down to empirical analysis

There are only a few empirical studies on this topic as regards developing countries. Empirical results from developed countries have shown great variability over time and across countries. One reason for the inconclusive results is that the variation in pension benefits has not been exogenous. Several studies have treated pension reform as an exogenous variation of pension wealth and have found a substantial offset effect in certain periods of the life cycle. For example, Attansio and Brugiavini (2003) and Bottai, et al.(2006) study the variation in pension wealth induced by a substantial legislative change in Italy in 1992, and Attanasio and Rohwedder (2003) treat major UK pension reforms as natural experiments.

In this paper we attempt to explain household saving behavior in China from a new perspective, treating the pension reform of 1995-1997 as the source of exogenous variation in pension wealth. Our data are from CHIP (China Household Income Projects)

and include enough information to allow us to compute pension wealth at the individual level. Using micro data, it is possible to take account of the effects of pension reform on household saving of various cohorts. For a younger cohort, a decline in future pension benefits has less effect on saving, because they have more time to absorb the change before retirement. We consider this life-cycle effect explicitly by allocating the present discounted value of pension benefits to each period of life and estimating the effects on saving. Using micro data, it is also possible to obtain more measurements of household saving. We measure household savings, including and excluding investment on human capital (expenditure on education and health), in order to examine the effects of pension wealth on human capital investment.

This paper is organized as follows. In section 2 we present a brief introduction to Chinese pension reform and its impact on the pension wealth of different cohorts. In section 3 we discuss the theoretical model and deal with econometric issues. Section 4 describes the data set and how the valid sample of households is obtained. In the appendix, we explain the method of computing pension wealth and report on and compare pension wealth among the sample households. Section 5 presents the main results and compares them with results of other studies. Section 6 concludes the paper.

## 2 China's pension reform and its impacts on pension wealth

In China, the public pension scheme is available for urban employees. Before the mid-1990s the arrangement was the same for employees in the public sector and in enterprises.<sup>3</sup> The first formal public pension system was established in 1951 and covered only public sector employees and SOE workers. It was a PAYG system on the enterprise basis and covered about 75%-90% of a worker's wage. In addition, enterprises provided housing, medical care and social security to their workers. In the 1980s the unfunded employer-sponsored pension became unsustainable during the move toward a market economy. Many of the old industries lacked the resources to finance pensions. Older enterprises burdened with large social security obligations could not compete with new enterprises with

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<sup>3</sup> Public sector here refers to institutions and state organs that are mainly financed by fiscal spending, such as government sector, education sector, health sector etc.

young workers. Moreover, an enterprise-based pension system deters worker mobility. In 1986 the state council encouraged pension pooling at the municipal level on the pay-as-you-go basis. During the 1980s and the first half of the 1990s, there was a series of reforms in pension system, including enlarging the pooling base from county to municipal level and extending coverage from state-owned enterprises to other enterprises. However, the system that was characterized by PAYG with generous retirement benefits remained unchanged until 1995. During 1995-1997, the pension reform was directed at a multi-pillar system with a declining replacement ratio.

The most recent framework for pension reform was established in July 1997. The new system has three pillars: a pooling account to redistribute to all beneficiaries, compulsory individual accounts, and voluntary supplementary pensions provided via commercial insurance. The first pillar imposes a payroll tax of 17% (paid by employers) to ensure that employees who have worked more than 15 years have a replacement rate of 20%. The second pillar (paid jointly by employers and employees) establishes an individual account for each employee. The contribution rate for this is 11% of an individual's wage, of which the employer contributes 3%. After retirement, the employee gets a monthly benefit from this account amounting to the accumulated value divided by 120. The combined target replacement ratio of the first and second pillars is 58.5%.<sup>4</sup> The mandatory retirement age is 60 for males and 55 for females.

The reform of the late-1990s reduced the replacement ratio of pensions for enterprise workers, especially for younger workers. According to the reform framework, those who had retired before 1997 (old workers) remained in the original PAYG system, those who entered the labor market in or after 1997 (new workers) came under the new three-pillar pension system, and those who started work before 1997 and retired or will retire after 1997 (middle workers) were covered by a transitional plan.<sup>5</sup> During that period, the public pension for employees in the public sector remains unchanged. Table 1 summarizes the key features of the pension system for enterprise workers before and after reform.

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<sup>4</sup> 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, the individual account could provide a 38.5% replacement rate. The two pillars have a combined replacement rate of 58.5%.

<sup>5</sup> The transitional arrangements vary across provinces, but there is a basic rule for the transition benefit: benefit in transition = indexed avg monthly income \* adjustment coefficient \* number of years without individual account.

Table 1 Contributions and benefits before and after reform (for enterprise workers)

	Pre-reform	Post-reform		
		new worker	middle worker	old worker
Benefits	75%-90% of wage before retirement	basic benefit (20% of regional avg wage last year) + individual account benefit (accumulated value of individual acct divided by 120)	basic benefit (same as for new worker) + individual account benefit (same as for new worker) + transitional benefit	same as in pre-reform
Contribution rate	employers contributed a certain percentage of total wage, varying across regions, up to 3% no contribution from employees	contribution of employers: 20% of total wage contribution of employees: 4% payroll tax in 1997, increased gradually to 8% contribution to individual acct: 11%		no contribution from employees
Indexation of pension	real wage growth rate	real wage growth rate		

Though there was a reduction in the replacement ratio in the 1997 reform, the transitional arrangement was adopted to compensate for the losses of workers who did not have individual accounts and hence had no accumulation in the account before the reform. So the transitional arrangement left pension entitlements affected less for workers who were on the verge of retirement while greatly affecting younger workers. However, the reform affects pensions of so-called middle man. For those very young, i.e., those who entered labor market in 1997, there is no effect.

Pension wealth is defined as the present discounted value of future benefits, and net pension wealth is the net value after deducting the present discounted value of future contributions. The reform rules implied that workers of different age groups were affected in different ways in terms of pension wealth. We compute pension wealth for the samples of the 1999 survey according to the policy before and after the reform. Details of the computation of pension wealth are given in the appendix. Figure 1 compares average pension wealth at each age before and after reform for males aged 25-59 and for females aged 25-54. It shows that pension wealth declined in every age after reform, the younger the worker, the greater the reduction in pension wealth. For example, for an average male of 25, net pension wealth declined 53.59%, for an average male of 55, net pension wealth de-

















































