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UNIVERSAL FULLY FUNDED PENSIONS VERSUS INDIVIDUALIZED RETIREMENT SAVINGS ACCOUNTS: A COMPARISON OF FULLY-FUNDED PENSION OPTIONS

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Universal Fully Funded Pensions versus Individualized Retirement Savings Accounts: A Comparison of Fully-Funded Pension Options

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Abstract

In light of the ongoing debate over pension reform and privatization, two fully-funded mandatory pension systems are examined: the Universal Fully Funded Pension (UFFP), and the Individual Savings Account (ISA) plans. The UFFP is a plan that retains the social aspect of public pensions, in which individuals pool longevity risk. The ISA system allows individuals to maintain ownership over their contributions, but does not pool longevity risk. Simulation exercises show that the UFFP system affords retirees much higher benefits and consumption levels over their lifetimes than what would be available under an ISA plan, when longevity is uncertain.

Keywords: public pensions, lifecycle savings, longevity risk

JEL Classification Codes: D91, H55

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I. INTRODUCTION

With the aging of the baby-boomers, the subsequent decline in fertility rates, and the continual advances in medical knowledge that potentially can extend life expectancy by leaps and bounds, there is an emerging consensus that the Pay as You Go pension system, which is prevalent in most industrialized nations, needs to be reformed. The options commonly considered include variants of a fully funded system. These can be in the form of central provident funds like those in Singapore and Malaysia, mandatory provident funds like that launched in Hong Kong from 2002, and variants of individualized retirement accounts modeled after the Chilean system that was first adopted in 1981. The Bush administration is keen on introducing individual savings accounts to Social Security. In his 2005 State of the Union Address, referring to the current social security system, President Bush said:

> **The system…is headed toward bankruptcy. And so we must join together to strengthen and save Social Security…. We must pass reforms that solve the financial problems of Social Security once and for all…. As we fix Social Security, we also have the responsibility to make the system a better deal for younger workers. And the best way to reach that goal is through voluntary personal retirement accounts. Here is how the idea works. Right now, a set portion of the money you earn is taken out of your paycheck to pay for the Social Security benefits of today's retirees. If you're a younger worker, I believe you should be able to set aside part of that money in your own retirement account, so you can build a nest egg for your own future.**

Here's why the personal accounts are a better deal. Your money will grow, over time, at a greater rate than anything the current system can deliver -- and your account will provide money for retirement over and above the check you will receive from Social Security. In addition, you'll be able to pass along the money that accumulates in your personal account, if you wish, to your children and -- or grandchildren. And best of all, the money in the account is yours, and the government can never take it away.

All of the alternatives to the Pay as You Go system that are currently considered share the common feature of being a totally individualized, private fund specific to the account holder. As such, there is no question about sustainability. But all of these alternatives also do not allow for any pooling of longevity risks. Just as President Bush says, "Fixing Social Security permanently will require an open, candid review of the options." We need to look at all viable options. But this very important policy debate has completely ignored an option that is called the "universal fully funded pension" the concept of which was pioneered by Abel (1986) and a formal proposal was detailed by Ho (1997). Motivated by the logic of generational accounting (Auerbach et.al.1999), the distinguishing feature of the latter is that it proposes cohort-specific retirement savings funds and allows the pooling of longevity risks and yet it is entirely fully funded.

The purpose of this article is to offer an intelligent comparison between the individualized savings accounts (ISA) and the universal fully funded pension (UFFP) plans. The ISA option is one under which individuals make contributions into a tax-sheltered personal account, from which they may draw upon retirement. The UFFP option is one under which individuals from a given age cohort make contributions into a pooled tax-sheltered fund, from which survivors draw benefits upon retirement. The purpose of this article is not to debate the

sustainability of current pay-as-you-go pension systems, the reform options available to sustain a pay-as-you-go system, the relative merits of fully-funded schemes as compared to the pay-as-you-go option, nor to examine the issues related to a transition to a fully-funded system from a pay-as-you-go system. Such issues have been addressed by too many authors to adequately cite here and continue to generate much debate and research.[1]

In the next Section we will describe the salient features of the two prototype retirement saving plans. Section Three will outline the simulation model. Section Four will describe the results. Finally, Section Five will present concluding remarks.

II. TWO COMPETING SCHEMES: ISA VERSUS UFFP

In order to make a valid comparison of the two fully funded systems, we first compare an environment in which the two alternative schemes require participants to make exactly the same contributions. Individuals will participate in one of the two systems. Participation in the given plan is mandatory. Individuals also have the opportunity to contribute to a voluntary retirement savings program, at their discretion.

In the first scheme, we assume an ISA arrangement. Individuals will make mandatory contributions to the fund during their working years, and will withdraw funds from the account during their retirement years. The individual has a claim against the assets in the fund, and any unused balances may be claimed by the deceased's estate. The individual will have the opportunity to purchase an annuity, to spread the value of their accumulated fund over a larger or smaller number of years of retirement. As examples, the fund value may be converted into an annuity of 15, 25, 40, or even 55 years.

In the second scheme, we assume that a cohort-specific pension fund is in operation. This is the mandatory UFFP system as proposed in Ho (1997). Individuals will make equal contributions to pension funds that are earmarked for the specific cohort to which they belong, during their working years. A cohort will be defined as consisting of all individuals who were born in the same year. Survivors of each cohort will withdraw from their respective cohort fund during the retirement years. The fund ceases payment of benefits to members after their death. Under this arrangement individuals of a given cohort pool longevity risk among themselves but not across cohorts. Since the probability of survival at any age is known with little uncertainty at the aggregate level, the sustainability of the scheme is at little risk. As long as the payout is worked out with reference to the average rate of return to the investment of the fund and to the life expectancy of the cohort, the scheme can be said to be fully funded. As an entirely mandatory system, the UFFP system is not subject to the problem of adverse selection.

Compared to the ISA, the UFFP fund does not allow members of the pension plan to have a claim on the plan other than the specified entitlement. It is socialized while the former is truly private. One can argue that ISA is more in line with the "ownership society." One important advantage of the UFFP is that it provides a greater peace of mind. This peace of mind is a benefit in the same way a person enjoys a benefit from an insurance contract, be it life/death insurance, health/sickness insurance, employment/unemployment insurance, or property (damage, theft) insurance. We will not, however, make any estimate about this psychological benefit. It is the purpose of the present article, however, to demonstrate whether, in addition to the benefit of the "mental goods" in the form of a sense of security and a sense of greater autonomy (Ho, 2001: Chapter 3) than under mandatory savings, there are real consumption benefits over the course of the lifecycle for members of a UFFP.

In reality, there are many members of society who are not able to make contributions to a retirement plan, due to illness or disability. These members would not be able to accumulate an individual savings account from their own resources. Nor would these members be able to contribute to the universal fully funded pension system. Thus these individuals would need public support. There is the choice of subsidizing their contributions or using general taxation revenues to pay on their behalf in full before the retirement age, or leaving them out altogether and offering them assistance after the retirement age. Since all relevant considerations are common to both schemes, the analysis that follows abstracts from this issue by examining the situation of a representative individual who can pay the contributions.

III. COMPUTATIONAL EXERCISES

In these exercises, individuals will participate in a mandatory contribution pension system, and will make contributions to the pension system during the prime working years, in this case from 25 to 64 years of age, and receive benefits when retired, aged 65 years or older, according to the type of pension system to which the individual subscribes. The two types of systems to be examined are the UFFP and the ISA systems. Under the UFFP system members make identical contributions that accumulate in cohort-specific funds, each cohort being defined by all members of the same age (or birth year). Benefits under the UFFP plan are paid to surviving members of the cohort only. Under the ISA system individuals' identical mandatory contributions accumulate in personal funds that are owned privately. Under both schemes individuals can voluntarily save additional amounts privately to supplement their retirement savings.

A. The Individual's Maximization Problem

Consider a representative individual that enters the workforce at the age I_w, and is a forward-looking, rational agent that maximizes expected lifetime utility. The individual faces an uncertain lifetime, but knows the age-dependent probabilities of survival, according to the life tables. The maximum lifetime is denoted by I. The probability of surviving from age i to age i+1 is denoted by s_i. The individual will maximize expected utility over a standard composite good, with time-separable preferences and a discount factor β. The composite good may be used for consumption, c, or may be used as capital and earn a one period real rate of return denoted by r. The individual will maximize expected lifetime utility, given by:

$$\max E_{I_w}\left(U(c_{I_w}) + \sum_{j=I_w+1}^{I} \beta^j s_{j-1} U(c_j)\right), \quad \text{where } U(c) = K + \frac{c^{1-\sigma}}{1-\sigma}. \tag{1}$$

In this utility function, K is a scale parameter that is used to center the utility function so that the value of utility is set to zero when consumption is at a threshold value or low-income cutoff, is positive for consumption levels above this threshold, and is negative for consumption values below this threshold. The main objective of the shift parameter is to achieve positive expected lifetime utility values. Without the "centering parameter" adjustment, the convenient functional form specified would result in negative calculated expected lifetime utility values. It should be noted that this simple adjustment does not alter the ordinal rankings of utility over consumption.

To simplify the exercise, the individual is assumed to face an earnings profile over the lifecycle that is known in advance. Earnings at age i are denoted by e_i. The individual will also face no employment uncertainty. The individual will participate in a mandatory pension program, either the ISA or the UFFP. While of working age, the individual will pay a fixed contribution, defined at age i, denoted by p_i . During the retirement years, he will collect a pension benefit of b_i that depends on the type of the program. Income taxes, denoted by T, are

levied on all income less contributions to the mandatory pension programs, subject to a basic personal income exemption of $\overline{Y}$. The representative agent is constrained to consume non-negative levels of consumption goods. In addition, the agent is also constrained to never hold net debt. The agent is liquidity-constrained and cannot borrow without collateral greater than or equal to the amount borrowed. The agent is allowed to mortgage capital, but cannot borrow against the promise of future income to finance present consumption. This restricts the agent so that it is not possible to die with net debt.

In period *i*, the representative agent of age *i* chooses consumption, c_i, and private asset holdings, $a_i' = a_{i+1}$ that are carried into the next period, with the following constraints:

$$c_i + a_i' \leq W_i = a_i + (ra_i + e_i - p_i + b_i - T_i), \text{ with} \tag{2}$$

$$T_i = (ra_i + e_i - p_i + b_i - \overline{Y}) \times (1 - \tau), \text{ with } T_i \geq 0, \tag{3}$$

$$c_i \geq 0, \text{ and } a_i' \geq 0 \text{ for all } i, \text{ and,} \tag{4}$$

$$p_i = 0 \text{ for } i \geq 65; \; b_i = 0 \text{ for } i < 65 \tag{5}$$

In these exercises, it is assumed that the individual has no intended fixed or explicit death bequest. All savings are for retirement purposes in the face of uncertain lifetime. The individual is also assumed to receive no utility from actual death bequests of personal wealth, but receives utility from consumption only.

B. Pension Program Details

Participants in an ISA pension system will contribute premiums while of working age, and withdraw benefits while retired. Any unused personal fund value at the time of the individual's death will accrue to the deceased estate. The ISA fund will be balanced when the present value

of contributions is equal to the present value of withdrawals. If the stream is expressed in terms of present values at age 65, then the fund budget constraint is:

$$E\left[\sum_{i=I_w}^{I_r-1} p_i(1+r)^{I_r-i} - \sum_{i=I_r}^{I} b_i(1+r)^{I_r-i} - B_D\right] = 0\,, \tag{6}$$

where B_D = the present value (expressed at age 65) of the fund at time of death, that goes to the individual's estate if death occurs before the age of I, and b_i and p_i are set to zero for all ages after the individual's death. The stream of benefits can be adjusted if the ISA plan was to allow the individual to choose the length of the annuity to be received from the fund. For example, if the fund is to be paid out in a 15-year annuity, then $b_i = 0$ for $i = 80$ to I. If the agent were to die at age 45, then the value of B_D at the agent's death would be: $\sum_{i=25}^{45} p_i(1+r)^{45-i}$.

In a UFFP system, individuals of any given age-cohort contribute into a pension system while of working age, and survivors of this cohort withdraw benefits while retired. Let each cohort be defined by birth year. For example, the year 1980 cohort consists of all those individuals born in the year 1980; this cohort will begin working in the year 2005, retire in the year 2045, and no members of this cohort will survive past the year 2100 (based on the assumptions of the 2000 Period Life Tables). For any one cohort, let μ_0 denote the number of newborns, or the original size of this cohort. The number of this cohort that survives to age 1 is $\mu_1 = s_0\mu_0$. The number of survivors from this cohort from age i to age i+1 is $\mu_{i+1} = s_i\mu_i$. The cohort-specific fund will be balanced when the present value of total contributions is equal to the present value of benefits paid out to cohort members during retirement. If the present value calculation is centered around the age of retirement, then the budget constraint is as follows:

$$E\left[\sum_{i=I_w}^{I_r-1} p_i\mu_i(1+r)^{I_r-i} - \sum_{i=I_r}^{I} b_i\mu_i(1+r)^{I_r-i}\right] = 0\,. \tag{7}$$

The budget constraint may be adjusted to include a death benefit paid to members of the cohort at death:

$$E\left[\sum_{i=I_w}^{I_r-1} p_i \mu_i (1+r)^{I_r-i} - \sum_{i=I_r}^{I} b_i \mu_i (1+r)^{I_r-i} - \sum_{i=I_w}^{I} B_D (1-s_i)\mu_i (1+r)^{I_r-i}\right] = 0 \qquad (8)$$

C. Calibration

In the simulation exercises, each period corresponds to one year. Individuals begin working at age $I_w = 25$, retire at age $I_r = 65$, and have a maximum lifetime 120 years, so that $I = 119$ (i.e. the last possible full year of their lives is when they are 119 years of age. The 2000 Period Life Tables for males define the age-specific survival rates.[2] These survival rates are assumed to be known by the individual. While life expectancy rates have tended to increase over time, especially in the twentieth century, the effect of increased longevity will affect both the UFFP and ISA plans in a similar fashion, and so, these rates are fixed to the 2000 Period Life Table rates to avoid the unnecessary complexity of predicting future rates for this analysis. All income streams and wealth are expressed in real terms.

The age-specific earnings profile used in the simulations is given in Figure 1. This is an estimated profile constructed using the 2003 cross-sectional median earnings for males. Median earnings for males working full-time for 50 or more weeks are available from the US Census Bureau, from the Current Population Survey, 2004 Annual Social and Economic Supplement, for the age groupings, 15-24, 25-44, 45-64, and 65 years and over. The median earnings for these age categories was assigned to the middle age of the group (while that of the 65+ group was assigned to age 70), and then linearly interpolated between that age and the preceding age group midpoint. For example, the median earnings for males aged 45 to 64 in 2003 were $47,978. This figure was assigned to the age of 55. The median earnings for males aged 25 to 44 in 2003 was

$39,595. This figure was assigned to the age of 35. Earnings for males between the ages of 35 and 55 were linearly interpolated using these two earnings figures. Labor productivity in the US over 1921-2001 was 2.1% per year, while it was 1.8% per year over the 1991-2001 period.[3] The estimated cross-sectional profile was adjusted by a growth factor over time of 2% per year. This procedure is used to simulate the upward trend in real wages by age generally experienced by workers, with a falling off of wage increases in the latter stages of an individual's career. Earnings were then expressed in thousands for the simulations.

The discount factor, β, and the constant relative risk aversion parameter, σ, are set to 1.011, and 1.12, following estimates established by Hurd (1989), and used in similar exercises by Huggett (1996), and Wilson (2003). The real interest rate is set at 2% per year. This rate will be fixed for the exercises, and is a risk-free rate of return, applicable to both private wealth holdings, and pension funds. There is no uncertainty or variance for this rate over time in order to simplify the simulation exercises. This assumption is made for both the ISA and UFFP environments. In actuality, the real rate of return is influenced by many factors, and is variable over time. However, the effect of interest rate uncertainty and variability will have a similar impact on both the ISA and UFFP fund. For the purpose of these exercises, we will make the assumption of a fixed risk-free rate, set at 2%.

For the year 2004, the standard deduction for a single US income tax filer was $4,850, while it was $9,700 for a married tax filer completing a joint return, and $7,150 for a household head.[4] The poverty threshold for 2004 for a single individual less than 65 years of age was $9,827.[5] For the computational exercises, the value of $\overline{Y}$ is set to 7.150 equal to the standard deduction for a household head, expressed in thousands, and K is set to $\frac{-\overline{Y}^{1-\sigma}}{1-\sigma}$, which is equal to 6.5812 when σ is 1.12. Thus the utility function is centered so that $u(c)$ is equal to 0 when c is

equal to $\overline{Y}$. The income tax rate, τ, is set to a flat rate of 30% on all earnings less a personal deduction equivalent to $7,150.

The annual pension premium or contribution is fixed at $3,000 per year, so that $p = 3$. This lump-sum contribution is set to reduce the distortionary effects of taxation rates.[6] The types of pension plans examined are:

1. No tax-sheltered pension plan
2. A tax-sheltered ISA plan where the individual receives the value of the fund as a 15-year annuity from age 65 to age 79.
3. A tax-sheltered ISA plan where the individual receives a 25-year annuity from age 65 to age 89.
4. A tax-sheltered ISA plan where the individual receives a 40-year annuity from age 65 to age 104.
5. A tax-sheltered ISA plan where the individual receives a 55-year annuity from age 65 to age 119.
6. A pooled and tax-sheltered UFFP plan where the individual receives a 55-year annuity from age 65 to age 119, with no death benefit (this death benefit assumption will be altered later in the analysis).

For the purpose of the UFFP program calculations, it is assumed that the population of the cohort at age 25 is 100,000. The exercises will also be constrained in that the individual will not receive an inheritance from a deceased family member.

D. Computational Procedure

In the simulations, the individual has perfect foresight regarding the earnings profile over the lifecycle, and the real rate of return is fixed and constant over time. There is no employment uncertainty, so there is no precautionary savings motive, nor is there an unemployment insurance program. The computational procedure is as follows:

1. Specify the pension premium contribution level, and determine the stream of pension benefit annuity payments, given Eq. (6) for the ISA scheme, or Eq. (7) for the UFFP scheme.
2. Calculate the optimal decision rules for consumption, c, and private asset holdings, a', for the individual over the lifecycle, from age I_w (25) to I (119) recursively, with the values of a'_{I_w-1}, and a'_I set to zero (the individual has no private wealth upon entering the workforce, nor will the agent maintain wealth past the terminal age of I). Therefore, the individual's dynamic programming problem must be solved: Eq. (1), subject to the constraints in Eqs. (2-5). The decision rules are calculated by maximizing the value function on grid points defined over the state space. 5000 evenly spaced grid points were used for each of the variables a, and a'. The grid space for assets effectively ranges from \$0 to \$1 million, with asset choices given in denominations of \$200. For each year of the individual's life, the value function was calculated over 25 million grid points. The optimal value of a' was then selected which maximized the value function for any given value of a, leading to a one-to-one mapping of a to the optimal a'.
3. Once the decision rules are calculated, the consumption and asset profiles over the lifecycle can be generated by ascending age, given that a_{25} is zero.

This procedure was carried out using the Ox computer language by Jurgen Doornik. For details of the programming language, see Doornik (1998).

IV. RESULTS

The results of the computational exercises are separated into the following key components: expected lifetime utility values for the representative individual upon entering the workforce at age 25, then the profiles of consumption, private wealth, and total inheritable wealth (private wealth plus inheritable pension fund wealth), for the representative individual over the lifecycle, by the type of pension plan. The computational exercises assume that the representative individual will have (i) no pension plan, (ii) an ISA type plan of a specific annuity term (15-, 25-, 40-, or 55-year terms), or (iii) a UFFP plan, to the exclusion of other options. Please note that, given the 2000 Period Life Tables, the representative individual has a maximum lifespan of 120 years, so that, even though the UFFP plan provides a perpetuity until death, no one survives past their 120^{th} birthday, and the fund is closed with no remaining assets. The 55-year ISA annuity plan has the same annuity term as the UFFP plan.

Given the pension fund types examined, each one will imply a different annuity value, corresponding to its term, as calculated given the $3,000 annual contribution from the age of 25 to the age of 64, and an annual fixed real interest rate of 2% per year. These annuity values are presented in Table 2. The results show that the fund value per individual at age 65 is higher under the UFFP plan than the ISA plans. This occurs since some members of the cohort die before they reach the age of 65, and their contributions remain in the cohort fund for surviving retirees. Non-surviving members of the cohort lose their contributions to the fund to survivors due to the longevity risk pooling aspect of the fund. As a result of longevity risk pooling, the

UFFP annual fund benefit is large for survivors. The annual benefit from the UFFP plan is $16,192, while those of the ISA plans presented are all lower, with the annual benefit declining as the annuity term rises.[7] The annual benefit for the UFFP plan is almost three times higher than that of the 55-year ISA annuity.

The expected lifetime utility values for the representative individual upon entering the workforce at age 25 are also presented in Table 2. These results show that the expected lifetime utility at age 25 is the highest when the agent will participate in the UFFP plan. Of the four ISA annuity plans examined, the 40-year annuity plan yields the highest expected lifetime utility. This indicates that if individuals are given a choice of annuity terms, they will be better off choosing a 40-year term than choosing the 15-year term which would correspond closely with the individual's life expectancy upon retirement. This utility difference will be influenced by the fact that the 40-year annuity benefit is below the income tax threshold of $7,150, below which no income tax is paid. Thus, a portion of the annual 15-year benefit will be subject to tax, while that of the 40-year annuity will not (provided little private investment income). The individual will also be better off choosing the 40-year annuity than the 55-year annuity. This result reflects the low probability of survival in the latter stages of life, so that consumption and income received in the latter stages of life are highly discounted. The individual would prefer to receive a higher benefit over 40 years than the lower benefit over 55 years because of the low probability of survival.

The consumption profiles of the individual, by pension plan, are depicted in Figure 2a. Figure 2b shows the consumption gap for the individual participating in the ISA plans versus the UFFP plan. The consumption profile of agents under the UFFP plan is the highest over the entire lifecycle, of all options considered. Figure 2a also shows that agents who live past the term of the

specific annuity plan will suffer consumption below the threshold of $7,150. If this value is considered a poverty level, the individual with any of the ISA plans will consume less than that threshold level of goods and services after the age of 93. This suggests that individuals who live past the age of 93 will either experience the hardship associated with these low levels of consumption, or be forced to rely on family, friends, charity, or other anti-poverty government programs (which defeats the underlying purpose of Social Security).

Figure 3 shows the private wealth profiles of the representative individual over the lifecycle. Private wealth is defined to exclude pension wealth. This figure indicates the individual chooses to save more under the ISA plans than under the UFFP plan, since there is no opportunity to pool longevity risk. The total personal wealth (both private and claimable ISA fund wealth) profiles are presented in Figure 4. This figure shows that agents under the ISA options have much higher claimable wealth, and can provide a much higher death bequest, than agents in the UFFP option. Figure 5 shows total death bequests by age for a single cohort starting with a population of 100,000 at the age of 25 years. A much higher amount of wealth will be transferred from agents to their inheritors in the ISA plans.

The tradeoff between the ISA and UFFP plans is evident from the figures. The advantage of the UFFP system is that by pooling longevity risk, participants in a UFFP plan gain the security of an adequate income stream for the entire period of retirement until death. The disadvantage is that they will pass on fewer assets to family and friends on death. In contrast, the ISA system allows individuals to have personal accounts, with assets that can be passed on to family and friends upon their death from their pension fund, if they die before consuming all of their wealth. The disadvantage of the ISA plans is that the individual risks living in poverty if he lives too long, because he cannot pool longevity risk. An “ownership society” may be much

more willing to trade off the possibility of future poverty in favor of personal ownership of pension funds. But it will have to put up with the hardship faced by underprovided elderly living in poverty or will have to come up with extra revenues to alleviate the plight of these individuals. The latter would be tantamount to reviving to some degree the Pay as You Go system.

Since individuals in the ISA system cannot pool longevity risk, they must make higher contributions than under the UFFP system to ensure a minimum income stream when retired. With this in mind, what then would be the required annual contribution in order to generate a 55-year annuity income stream at the threshold of $7,150 in the ISA system? With the parameters specified for the exercises above, an annual contribution of $3,927 would be required. In comparison, the annual contribution required for the UFFP plan to offer an annuity of $7,150 for the retirement years is only $1,325, just slightly more than a third of the contribution required in the ISA system with a 55-year annuity.

A disadvantage of the UFFP system is that individuals do not have a claim to the pension fund to pass onto their estate when they die. However, the UFFP fund can be adjusted so that the estates of the deceased can receive a death benefit from the fund. If individuals pay a $3,927 annual contribution to the UFFP fund while working, and receive a retirement annuity of $7,150 until death, then there are excess contributions to provide for a death benefit. These excess funds would allow for a death benefit of $178,820 to any member of the cohort that dies after the age of 25. If individuals pay a $3,000 contribution to the UFFP fund while working, and receive a retirement annuity of $7,150 until death, there are enough excess contributions to the UFFP fund to provide a $115,120 death benefit to all members of the cohort when they die, after the age of 25 years.

These calculations indicate that there are clear distinctions between the two types of plans. The UFFP plan provides the opportunity to pool longevity risk with the retirement insurance plan, in exchange for less ownership over personal contributions to the fund. The ISA affords personal ownership over the retirement plan, but requires higher contributions or lower benefits than the UFFP plan to maintain a threshold income over the maximum lifespan.

V. CONCLUSION

The aging of the post-World War II baby-boom generation, followed by the decline in fertility rates, and combined with improvements in life expectancy, have led to calls for the reform of the pay-as-you-go pension system. Nations like Chile, Malaysia and Singapore have fully-funded personalized pension systems. The Bush administration is bent on introducing individual savings accounts, in some form, to the Social Security system. However, the pension reform debate has missed the social, fully-funded option, the Universal Fully Funded Pension system, which has the advantage of pooling longevity risk.

Edward P. Lazear (2005) argued that private accounts have an edge over a government run pension system on three accounts: they are more in consonance with the principle of consumer sovereignty; they enhance the likelihood of receiving what is expected; and they reduce government moral hazard as officials may be tempted to spend the pension funds. Since the UFFP can be fully vested with the respective cohorts all these advantages that pertain to private accounts also pertain to the UFFP. In addition, we have demonstrated that longevity risk pooling has substantial benefits. When individuals participate in a mandatory UFFP system, they can enjoy higher levels of consumption over the lifecycle, compared to the case where individuals participate in an Individual Savings Account pension system. Benefits are higher

and/or contributions are lower for individuals in the UFFP system when compared to the ISA system. The disadvantage to the UFFP system, however, is that the estates of deceased plan members do not have the same rights as those of ISA plan members. UFFP plan members cannot pass on the value of their contributions less their benefits to their estates. However, the UFFP system is adjustable to provide a basic death benefit. A cohort-based uniform pension plan allows more consumption and provides more security through the entire life of the individual, even though the ISA may entail higher "wealth" and may appear to be more consistent with the tenets of "the ownership society."

The results presented in this article provide insight for nations considering the introduction or reform of a pension system. The introduction of forced individualized savings plans, designed to maintain an adequate standard of income over the maximum possible lifespan, may reduce the burden on the public purse arising from caring for the poor old. However, this will be at the expense of pre-retirement consumption, which potentially could damage the health and the life expectancy of the poor. For a society trying to replace an existing pay-as-you-go pension with a forced savings ISA, the "sustainability" question may be "solved," but the UFFP system offers the additional benefits of longevity risk pooling.

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FOOTNOTES

[1] Readers of Contemporary Economic Policy may choose to refer to recent articles by Harris, Sabelhaus and Simpson (2005), Emery and Rongve (1999), Hagemann and John (1997), Song and Chu (1997), Demsetz et al (1996).

[2] Period Life Table, 2000, Social Security Online, http://www.ssa.gov/OACT/STATS/table4c6.html.

[3] Gordon (2003: Table A1).

[4] IRS (2004: p.152).

[5] US Census Bureau, http://www.census.gov/hhes/poverty/threshld/thres04.html.

[6] Under the fixed annual contribution, young workers pay a higher percentage of their earnings towards the pension contribution. The contribution could be altered to follow a lump-sum tax that closely mirrors the median earnings profile, so that the percentage of earnings paid to the pension is more equal over the lifecycle. This scenario is not examined, but changing the contribution profile would have a similar impact on both the ISA and UFFP plans.

[7] Please note that the annual benefit from a 10-year ISA annuity would be $20,173, higher than the UFFP annual benefit, so ISA annuity terms of less than 15 years will have higher annual benefit payments (but of course for many fewer years than the UFFP plan).