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**A UNIVERSAL FULLY-FUNDED
PENSION SCHEME**

by

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A Universal Fully-funded Pension Scheme

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1. Introduction

Economists around the world are by now quite familiar with the pitfalls of a pay-as-you-go pension system. An aging society coupled with the prospect of increasing longevity is causing financial strains in public pension schemes from Europe to America¹(See Table 1).

Calls for pension reform are heard everywhere. In the industrial world quite a few authors are talking about privatization of public pensions(Roberts, 1995; Dornbusch, 1995). A favourite model of pension reform is privatization Chile style². Yet the superiority of this model is not unquestioned. Note, for example, MIT economist Peter Diamond's conclusion in 1993:

We have come to think of privatization as a route to greater efficiency and lower costs. Thus, perhaps the most surprising aspect of the Chilean reform is the high cost of running a privatized social security system, higher than the "inefficient" system that it replaced.(NBER Working Paper, no. 4510, 1993)

It has been pointed out that the administration costs of public pension plans are likely to be under-reported(James and Palacios, 1995). However, under-reporting is unlikely to

¹ Prof. Robert Fogel in his 1993 Nobel lecture presented evidence that the mortality and disability rates for the elderly had fallen for longer than expected, with the result that the U.S. elderly population in 2050 was likely to be underestimated by the Census Bureau to the tune of 36 million.

² Actually the Chilean system is more properly represented as based on "an intermediate form of funding." The Chilean government guarantees a minimum benefit payable irrespective of the performance of the funds invested. (Mitchell, 1993, pp.27-28) Another well-known system, the Central Provident Fund (CPF), which is in operation in Malaysia and Singapore, is privately and fully funded but are publicly administered. See Asher(1994).

account for the huge gap in the administration costs of public and private plans. The U.S. Social Security Administration reported administration costs at less than 1 per cent of annual benefits while those of the life insurance industry are known to range from 12 to 14 per cent of annual benefits(Diamond, 1993, p.7). Economies of scale of management, economies of supervision, as well as economies arising from the dispensing of much of marketing costs, are likely to provide important cost savings attributable to the central administration of public pensions.

Equally important, a "private social security system" is a contradiction in terms. Under the Chile model--a variant of which is being recommended by the Hong Kong Government, each person has his own account. Each and his employer are to contribute a percentage of the monthly salary into this account, and the funds accumulated are managed privately and the total amount inclusive of investment returns is repayable upon retirement. The only aspect that is "social" about this arrangement is that it is mandatory. This Mandatory Private Provident Fund(MPPF) scheme fails to deal with such well-known problems as those arising from longevity risk(Eckstein, Eichenbaum, and Peled, 1985) and the high cost of voluntarily purchased annuity plans(Abel, 1986). It is also doubtful that workers stand to gain from employers' contributions. In a highly competitive world how much can be spent in compensation for labour is dictated by the market. Workers' pay and/or other benefit are likely to fall, thus offsetting employers' contributions. The set-up will not expand the real opportunity set open to workers.

On the contrary, employees see their opportunity set reduced because they are required to contribute the stipulated percentage of their salaries towards their retirement

plans. From this perspective, if the plan has any merit at all, the merit must be founded on the assumption that citizens do not know what is best for themselves (the assumption of *myopia*) or the assumption of *moral hazard*, namely that some citizens overconsume before their retirement, intending to take a free ride on public money to bail them out after they have retired. As we will see, even if the myopia and the moral hazard assumptions are valid, the MPPF is not necessarily the best option.

Abel(1986) has demonstrated the welfare enhancing property of "Fully Funded Social Security(FFSS)." With compulsory participation, FFSS overcomes the problem of adverse selection. As a result the rate of return is higher than that on private annuities. With a higher, *actuarially fair* rate of return based on population average mortality, and assuming exogenously given factor prices, both the steady state consumption of young consumers and the steady state level of bequests can be shown to be higher than would be the case under private, voluntary annuities.

Abel has, unfortunately, not addressed the problem of actual design for such a "Fully Funded Social Security." The fact is that practically all the public pension plans that we know today are either pay-as-you-go or partially funded. In this paper I will explain how a "fully funded social security" system can be designed. It will be clear that the design is consistent with the spirit of the "generational accounting" framework as advocated by Auerbach, Gokhale, and Kotlikoff(1994)³. Section 2 will present the salient features of the

³ Robert Haveman(1994) has raised some questions about the generational accounting framework, but conceded that it should serve "as a useful supplement to the annual budget." (p.110) The Office of the Management of the Budget(OMB) presented for the first time in history a tabulation of the lifetime tax rates of current and future generations in the FY 1994 budget.

new model. Section 3 will provide an analytical investigation of the microeconomic and political economy properties of the model. Section 4 will conclude with a discussion of the longer term macroeconomic implications of a universal fully funded pension system. Finally, Section 5 will provide some brief concluding comments.

2. The Fully Funded Pension Fund System

Given the demographic trends of the world's population, economists generally agree that a pay-as-you-go type of pension system will ultimately require a rise in contribution rates, a cut in benefits, a postponement of the retirement age, or a combination of these. To avoid the predicaments of uncertain benefits or uncertain contributions a fully funded system, like that practised in Singapore or Malaysia(the "Central Provident Fund" model⁴), or that introduced in Chile in 1981⁵(the "Mandatory Private Provident Fund" model), seems necessary.

The spirit of a fully funded system is that workers should save for their own retirement needs. Post-retirement payouts should be "fully funded" by accumulated contributions rather than from the general tax revenue. According to Auerbach et.al. and citing from OMB, "even assuming a discount rate of just 3 per cent and a productivity growth rate of 1.25 per cent, future generations will still have to pay 65 per cent more(taxes) than current newborns."(p.82) This presents a case of gross generational imbalance in U.S.

⁴ See Asher(1994) .

⁵ See Diamond(1993) .

fiscal policy, a problem underscored by generational accounting. In general, only a fully funded system is compatible with the avoidance of arbitrary intergeneration transfers. However, a fully funded system does not require that *each individual* fully fund *his* own retirement needs. It is conceivable and desirable that each *generation* or *cohort*, rather than individuals, fund its own retirement needs.

The Universal Fully Funded Pension(UFFP) system as I call it would have members of each age cohort contribute to and draw from the same pension fund. Rather than relying on the working population to support the retirees, each cohort finances its own retirement. The basic version of the scheme--with refinements to be introduced later--requires each member to contribute the same amount in each month during the contributing years and to draw the same amount each month during the payout years. The budget constraint is one simple equation which says that funds accumulated prior to the stipulated age for drawing benefits must equal the present value of post-retirement payout at the stipulated retirement age:

$$\sum_{t=0}^{N-1} C(1+r)^t = \sum_{j=1}^n B/(1+r)^j$$

Here N is the number of contribution instalments. C is the monthly contribution. r is the effective average real rate of return assumed, and is also used as the discount rate for the n instalments of payouts at B per month. Life expectancy is equal to the current age plus (N + n)/12.

Because there is little uncertainty over the life expectancy for a specified age cohort

we can readily calculate the size of the required contribution to support a specified payout from the stipulated age through the end of the expected life for the entire cohort. If the expected life has increased at the stipulated payout age, say because of a breakthrough in medical knowledge, the budget constraint requires either that the payout age be postponed, or a smaller payout is necessary. Each cohort being responsible for itself, it will have to make the choice just like other cohorts. In principle, however, the payout should be large enough to cover a basic standard of living agreeable to the community. Individuals have, of course, the choice to top it up as they see fit.

The standard contribution, in general, may be borne by the employee or shared between the employer and the employee. Over the long run assuming that the market functions efficiently one way or the other will not make any difference. A self-employed person, a housewife, and the unemployed has to be responsible for their own contributions unless he/she satisfies certain criteria for public subsidization, in which case the contribution is either in part or wholly paid by the government. The scheme also allows the government to subsidize an employee's contributions on grounds of lack of means. This set-up, with a standard contribution and a standard payout, and providing a means-tested subsidy for contributions, will work to reduce the regressivity of existing pay-as-you-go plans that has been noted by some authors.⁶

The UFFP needs to be phased in slowly. Clearly, for cohorts which have now

⁶ James (1995, p.6) for instance noted: "High-income people enter the labour force later and so contribute for fewer years; they live longer and so receive benefits for more years; and they have steep age-earnings profiles; consequently they end up with high lifetime pension incomes relative to their life-time contributions."

reached, say, the age of 50, they have only 15 years to pay before reaching 65 (assumed to be the payout age). Accumulated funds by 65 would be small. The budget constraint would dictate that this cohort draw a smaller pension than cohorts that are younger when the scheme starts operation. In principle we can assume that the older people have accumulated more savings than the younger ones at the time the scheme takes effect. In addition, the government will have to provide assistance to the needy aged.

3. Microeconomic/Political Economy Properties of the Universal Fully Funded Pension Scheme(UFFP)

First, the UFFP is a universal, mandatory plan. The fact that it is universal means that it is free from the problem of adverse selection. Private, voluntary annuity plans tend to attract those with a long expected life to join, thus raising the cost for those with an average expected life. The UFFP covers everybody, including employees, the self-employed, employers, housewives, and the unemployed. Everyone within the age group has to contribute unless a means test shows one eligible for financial assistance.

Second, the stipulated contribution is a flat amount, which makes it simple to administer. This contrasts with most public pension schemes in practice. Most public pension plans provide for benefits that rise with contributions and incomes. Such plans may have distributionally undesirable consequences because they accentuate the regressivity of many public pension plans earlier noted. Similarly, the contributions on a mandatory private

provident fund scheme are income related and are akin to a payroll tax⁷. To the extent that low income people have to struggle to survive the MPPF may push the poor people to earlier death. In contrast, the UFFP provides a means-tested subsidy to people who need it.

The provision for possible redistribution *during the contributing years* is unique to the UFFP. All individuals are entitled to the pension in proportion to the number of years of contribution--regardless of whether they have been assisted. A recent immigrant starting to contribute, say, at the age of 50 will be entitled to $(65-50)/(65-20)$ of the standard stipend when he reaches the age of retirement, which is assumed to be 65. But no elderly person will have to go through a means test in order to receive the pension. This arrangement is desirable because some old people may not know how to apply for assistance and because it may be derogating for them to depend on handouts in order to survive.

Third, the benefit is also a flat amount, with the full amount payable on reaching the stipulated age but discounted if early withdrawal of benefits is deemed necessary because of health reasons. It is also a basic amount, thus allowing individuals to top it up as they please without impairing their choice to opt for a combination of a richer pre-retirement life and a less glamorous post-retirement life.

Fourth, the UFFP economizes on supervisory effort. Unlike the Mandatory Private Provident Fund, the UFFP at any time would not have more than 45 Contributing Funds (one Fund for each age cohort from 20 to 64) to be supervised. Apart from the Contributing

⁷ If the capital market was perfect individuals could trade future payouts for current income. But if this were the case the very concept of mandatory provident fund would fall apart as no individual could be forced to save more than he would like.

Funds there are up to 26 Outpaying Funds(one for each age cohort post retirement, from age 65 to 89)⁸. This is much simpler than the Mandatory Private Provident Fund which would require supervision of thousands of plans.

Unlike the *laissez faire* regime or the MPPF, the Universal Fully Funded Pension pools longevity risks and minimizes cost. Upon reaching the stipulated age members of the UFFP draws a monthly stipend as long as they live. Like the MPPF it takes care of the *myopia* and the *moral hazard* problem by mandating participation and extends participation to every citizen within the eligible age range.

As a fully-funded scheme, the UFFP, like the MPPF, is free from the risks associated with changes in the dependency ratio, and from the political risks of pressures to extract a larger payout, which may affect the Old Age Pension Plan especially if the government is made a contributor, for example, under the "Three-pronged Contribution Approach" as recommended by the Hong Kong Social Security Association. Any plan with the ultimate bearer of the financial burden hidden away is subject to the risk caused by the "free lunch" mentality. Under UFFP, the requirement that each age cohort obeys its own budget constraint eliminates the risk that members of a cohort may attempt to extract larger payouts at the expense of other cohorts. By setting up individual accounts and making the benefit-drawer responsible for his own contributions, the MPPF enjoys freedom from political pressures. Professor Diamond finds this a key attraction of the Chilean system:

⁸ While in principle there should be one outpaying fund for each cohort post-retirement, it is conceivable to unify the funds for people aged, say, 90 or above for easier administration because the number of surviving members for each cohort is small.

There is real appeal in individual accounts as insulation of the pension system from political actions to increase benefits without direct financing. (ibid., p.19)

This advantage of the Chilean system, however, will diminish as the distribution of income gets more unequal. The more unequal is the distribution of income, the greater pressure there will be for the government to exempt low income employees from the plan, and for the government to provide assistance for the poor old whose accumulated savings may be inadequate. In Hong Kong under the current proposal of the government, employees with monthly income below HK\$4000 are exempted. There will be political pressure on the government to raise this exemption level and on the government to support the poor old. The problem of moral hazard and politicization cannot be dismissed. Thus, the inability of the MPPF to provide universal, basic support for the elderly means that there will be demand for an extra tax-financed "pillar" for the needy. This pillar brings back to life the idea of free lunch which MPPF is intended to discredit.

4. Long Term Implications for Social Security and for the Macroeconomy

Given the budget constraint listed above, to the extent that the realized rate of return turns out deviating from the expected rate, solvency of the UFFP could become a problem. However, while the realized rate of return may fall short of the expected rate for some cohorts it may exceed the expected rate for some other cohorts. While no one can insure such systematic deviations from the expected rate of return for an entire cohort momentarily, the government has a long time horizon and is in the position to guarantee the real rate of

return for all cohorts by using surpluses for one cohort to tide over deficits for another cohort. This approach to deal with "correlated risks" will achieve *Pareto gains* for all generations which are exposed to such risks, which lack commercial insurers to protect them from such risks, and which are risk averse⁹.

Compared to a provident fund scheme which is in essence simply a form of forced savings, the Universal Fully Funded Pension is likely to result in smaller savings. This is by virtue of the fact that our capital markets are incomplete and imperfect. If our capital markets were complete and perfect the very idea of forced savings would be inconceivable, because those who prefer to save less can always borrow on the security of his future claims on his personal "forced" savings. In general, if the provident fund mode of "old age security" is adopted more savings than are necessary to support one through the expected life have to be in place if the provident fund mode of "old age security" is adopted. This may mean that investment is lower under the UFFP scheme than under the provident fund scheme.

Because a provident fund scheme alone cannot guarantee a minimum standard of living for the elderly many of those who subscribe to a Chile-type provident fund scheme also believe that there should be a "mandatory publicly managed pillar" as well (James, 1995). The larger this tax-financed pillar is, the greater will be the distortionary effects associated with the related tax burden. To the extent that the UFFP dispenses with the need

⁹ Ho (1981) introduced the concept of Pareto risk improvement and suggested that an arrangement that led to an *ex post* redistribution may be Pareto improving if all parties concerned are *ex ante* risk-averse and if the arrangement reduces everyone's risk exposure.

for such a pillar, economic efficiency and economic growth will be enhanced.

Over the long term, if the MPPF and the UFFP stood alone by themselves, neither would entail inter-generational redistribution. To the extent that MPPF has to be supplemented by a means-tested minimum pension pillar as suggested by James(1995), however, a tax-financed or pay-as-you-go element is brought into the picture¹⁰. In Chile the government does provide a small guaranteed pension. Such provisions will necessarily entail a degree of inter-generational redistribution. In general, the larger the scale of MPPF, the smaller will be the guaranteed pension pillar, but as the scale of MPPF increases, so will the degree of choice distortion. On the other hand, the UFFP is supplemented only by private sector voluntary savings or provident funds. The UFFP is then truly non-redistributive across generations. Table 2 presents a comparison of the properties of the MPPF and the UFFP.

5. Conclusions

According to James(1992) "the most general recommendation" and one that is "relatively clear-cut and non-controversial" is that old age security should be based on a multi-pillar system that comprises:

a broad based privately managed mandatory savings-annuity pillar to avert the

¹⁰ A motion to establish a pay-as-you-go pension along with the mandatory private provident fund scheme as proposed by the Hong Kong government was passed in March 1995. A similar motion raised by legislator Lee Cheuk-yan was passed 31 to 13 on 13 December, 1995. See Mingpao, 14 December, 1995.

results of myopia and incomplete insurance markets

a carefully designed public pillar for redistribution to those in long term poverty, and "possibly for insuring against correlated risks,"

tax-advantaged private pensions, and

a purely voluntary savings pillar.(p.50)

The fully funded pension system as we proposed both provided a mandatory pension that dealt with myopia and incomplete insurance markets and provided government subsidization of contributions for the poor. It therefore accomplishes by and large the objectives to be achieved by the first two pillars. The fully funded pension system is by design small scale allowing for "top-up" by individuals as they see fit. This recognizes the imperfection and incompleteness of capital markets, which make it difficult for individuals to transform excessively large future pensions into current consumption.

A recent article in a recent edition of World Bank Development Brief(August 1995) aptly remarks that "The future course of mortality is a major social risk that must be borne by some group no matter how retirement incomes are organized." The UFFP system discussed is predicated on the assumption that each cohort should be responsible for itself, so that no generation is burdened with the uncertainty of supporting another when mortality and demographics change. This is consistent with a concept of justice linked to Rawls(1972). If we all faced a "veil of ignorance" and were randomly assigned to different cohorts, we

would probably have preferred a system like what was suggested, namely that each cohort saved for its own retirement.

Many countries have different pensions plans for different occupations, and some countries have different pension plans for employees and the self-employed(International Social Security Association, 1987; Noguchi, 1983). The proposed UFFP is based on the assumption that a mandatory plan should be universal, simple, and basic, and free from the vagaries of uncertain demographics, without inhibiting each occupation and each company from developing its own private schemes.

Table 1: Public Pension Expenditure as a Percentage of GDP in
OECD Countries

Country	1960	1975	1980	1985
Austria	9.6	12.5	13.5	14.5
Canada	2.8	3.7	4.4	5.4
France	6.0	10.1	11.5	12.7
Germany	9.7	12.6	12.1	11.8
Italy	5.5	10.4	12.0	15.6
Japan	1.3	2.6	4.4	5.3
Sweden	4.4	7.7	10.9	11.2
U.K.	4.0	6.0	6.3	6.7
U.S.A	4.1	6.7	6.9	7.2

Source: Table 1 in Mitchell(1993).

**Table 2: Comparison of Mandatory Provident Funds System and
the Fully Funded Pension System**

Criteria	Mandatory Private Provident Fund System	Universal Fully Funded Pension
Financial Stability	Independent of changes in the dependency ratio	Independent of changes in the dependency ratio
Administration	Privately administered but publicly supervised; supervision potentially difficult if schemes are too numerous	Publicly administered, funds can be "farmed out" to private fund managers
Insurance Benefits	No insurance benefits because there is no risk pooling	Insurance benefits because there is risk pooling for people with unknown lifespan
Freedom from Political Risk	Yes, but potentially a problem if supplemented by a tax-funded pillar	Yes
Distortion of Individual Choice and Sacrifice of Individual Freedom	Can be serious if scale is large	No
Public Confidence	Low	High
Redistribution	Requires a separate "pillar"	Possible; degree open to discretion
Coverage	Limited to employed people	Universal
Adequacy	As a defined contribution plan it does not guarantee adequate post-retirement incomes	Any level of payout can be set so as to meet socially determined adequacy standards
Portability	Portable with transaction costs	Question does not arise as there is just one central plan

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