Risk, Return and Portfolio Allocation under Alternative Pension Systems with Incomplete and Imperfect Financial Markets

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David Miles and Ales Cerny[1]

Imperial College

53 Exhibition Road
University of London
London SW7 2PG
e-mail d.miles@ic.ac.uk
telephone (44) 207 594 9112
fax (44) 207 823 7685

Executive Summary:

The old age dependency ratio in nearly all developed economies (the ratio of those of pensionable age to those of working age) will be substantially higher in the future; in many cases (Germany, Italy, France, Japan) the ratio is likely to double. If unfunded (pay-as-you-go), state pensions are to continue to provide a large part of retirement incomes, then contribution rates in most countries will have to be substantially higher to balance the system. The desirability of providing a significant proportion of retirement income from unfunded pensions is therefore a key policy issue and it is the one that is addressed in this research.

The central policy issue we address in this paper are ones which are relevant in all economies: what is the desirable split between funded and unfunded systems when there are sources of uninsurable risk that affect risk averse agents and where those risks are allocated in different ways by different types of pension system? How does reform re-allocate resources between generations on a transition where pension

arrangements and demographics are changing? How does the distribution of welfare evolve both within and between different generations?

We use a calibrated model to assess the issues. In our model we allow for the impact of changing demographics and focus not just on steady states[2]. We also allow for less than perfect risk sharing opportunities: idiosyncratic risk is significant and cannot be fully insured against; longevity risk exists in an environment where although annuities markets exist, they are less than perfect. Returns on some financial assets are risky.

Any model that wants to say something useful about risk and uncertainty must take account of the many types of risk that face individuals: risk about their future earnings; risk that assets will fall in value; risk that individuals will live much longer than they expect.

It is the existence of multiple sources of uncertainty that makes these models hard to work with. But uncertainty in asset returns and in labour income are so central to the issues about the nature of optimal pension regimes that to omit them is to risk generating seriously misleading results. One of the issues we are keen to explore is the link between optimal portfolio allocation and the structure of pension arrangements. With no uncertainty about asset returns there is no portfolio allocation decision since arbitrage will ensure that returns on al assets are equal. So it is essential to allow for stochastic returns on at least some financial assets.

The central policy issue we address is what is the optimal degree of reliance upon personal, funded pensions. Personal funded pensions may allow people to insure perfectly against some risks – if annuities are available at actuarially fair rates then length of life risk can be avoided. But personal pensions mean that labor income risk from working years, which will have an impact on the contributions to a personal pension fund, have lasting effects upon pension income; such pensions obviously also generate rate of return risk. Given this we consider what role might be played by unfunded, state pensions that give varying degrees of insurance against labor income

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[2] In the simulations we will illustrate with demographic data for Japan. Japan is interesting because it has unusually high life expectancy and low fertility. But Japan is not atypical of many Continental

risk and are not dependent on rate of return risk. We take into account shifting demographics that alter the contribution rate needed to balance an unfunded, state run system. Shifting demographics also alter asset prices and changes in returns on financial assets affect the relative advantages of unfunded and funded pension systems.

Our results indicate several things.

* The capital stock, the level of national income and portfolio allocation are extremely sensitive to differences in the generosity of unfunded pensions. In the long run the aggregate stock of wealth might be twice as high if unfunded pensions were, on average, worth only 25 percent of average earnings, as opposed to 50 percent. Long-run benefits to future generations of a move towards greater reliance upon funded pensions are likely to be substantial; losses to the current generation of workers are smaller but not insignificant.

* How much of financial wealth is invested in risky assets is very sensitive to both the level of state pensions and the efficiency of financial markets. Even with quite low risk aversion (a coefficient of relative aversion of 3) we can explain substantial holdings of safe assets (often over 50% of portfolios) if state pensions are low. We do not need to assume extreme risk aversion or fixed costs of investing in risky assets to generate substantial investment in safe assets. This is so even though we use common assumptions about risk premia and the volatility of risky assets.

* The effects of reducing the generosity of unfunded pensions upon welfare, savings, portfolio allocation and national income depends on the efficiency of annuities contracts. They are also sensitive to the size of the equity risk premium. Credit restrictions affect the answers substantially. Individuals find it difficult to borrow against future labor income (that is their human capital) and therefore any model with uncertainty over income and over length of life is one in which individuals naturally face borrowing constraints. We find that these constraints are likely to matter significantly. We also find that how serious borrowing constraints are, particularly amongst the elderly, depends very much on the pension environment.

European countries where life expectancy is projected to rise steadily and where population may

*   A key finding is that longer run gains from a switch towards greater reliance upon funding, and away from an unfunded system where pensions are linked to salaries, do not go disproportionately to the better off.

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actually fall.