This report summarises the research we have undertaken over the past eighteen months into the implications of various pension reform strategies in Japan. Reform is essential because ageing will generate extreme pressures on the public, unfunded pension system. We consider the macroeconomic, or aggregate, and the distributional implications of reforms that, to varying degrees, would increase reliance upon funded pensions. We also estimate the welfare implications of reforms by calculating the expected gains and losses to households of various generations. We take as a point of reference a scenario where unfunded pensions provide an income to the retired worth a high proportion of salaries at the end of their working life; we take that proportion to be 50% of gross (or around 70% of net) salaries.

In earlier reports we have described results from a range of models. In some models uncertainty was absent but asset prices and wages were endogenous and responded to movements in savings and in labor supply generated by demographic shifts and changing pension arrangements. In other versions of the model there were multiple sources of uncertainty, none of which could be fully insured against, but rates of return and real wages evolved exogenously. In some versions of the model we were able to allow for uncertainty and to endogenise asset prices, but only by focusing on steady states. That precludes analysing transitional periods where demographics and pension systems are evolving. Computational difficulties made it hard to simultaneously allow for: multiple risks; changing demographics; shifting pension
arrangements and to also search for a general equilibrium where factor prices move as the capital stock used in production is influenced by domestic saving. In this final report we are able to show results for a more general calibrated model of the Japanese economy where there are all these features – there is uncertainty, endogenous factor prices and shifting demographics and pension arrangements. We no longer need to present several different models; instead we use a single calibrated model but vary key parameters (in particular discount rates and rates of risk aversion) to assess how different reform strategies are influenced by preferences and by technology.

Ageing within the Japanese economy is likely to be dramatic over the next 50 years. This has obvious implications for the sustainability of pension arrangements. By far the larger part of the resources going to the retired now in Japan are unfunded, pay-as-you-go, public pensions. With a dramatic increase in the ratio of the retired to the working population, unfunded pensions can only continue to be paid at their current level of generosity (in terms of replacement rates) if contribution rates rise sharply. That is likely to have significant and undesirable impacts on competitiveness and labor supply. Reform of the system is necessary. But what sort of reform? In this report we consider various alternatives and estimate their impact on aggregate performance and on the distribution of gains and losses both across generations and within generations.

One reform strategy is to initiate a transition toward an almost completely funded system where unfunded pensions might only be set at a very low level to act as a safety net. The desirability of that policy depends on what the long run implications of relying much more heavily on funded pensions are and on how a transition to greater funding is managed. The first question is about the macroeconomic and welfare implications of having made a transition to a funded system. The second question is about what the transition process implies for the welfare of those generations who live through it. We consider both issues by analysing the evolution of macroeconomic aggregates and the distribution of welfare within and between cohorts along the transition path towards alternative steady states. We also consider less wholesale reform of the system. So called parametric reforms involve some scaling back in the generosity of unfunded pensions, either by reducing replacement rates or increasing retirement ages. We consider a strategy of holding the Japanese
payroll contribution rate at around its current level, thereby necessitating a reduction of unfunded state pensions, but on a scale that could not be described as "phasing out". We also consider the implications of trying to preserve the current generosity of unfunded state pensions with no change in the retirement age or in typical replacement rates. That will require substantial increases in contribution rates.

It turns out that the welfare and macroeconomic implications of these alternative strategies for Japan are markedly different and they affect different generations in distinct ways.

A key feature of alternative pension arrangements – different degrees of reliance upon funded pensions - is that they distribute risks in different ways. For that reason any assessment of alternative pension arrangements needs to handle risk. Modelling how uncertainty about incomes and rates of returns influences optimal pension arrangements is difficult. A key policy issue is 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. Here we try to say something about this.

Using our models we found certain results appear to be fairly robust.

- The overall saving rate and particularly the aggregate stock of assets is likely to be highly sensitive to the generosity of unfunded state pensions.
- In the absence of prolonged bear markets it is likely that a long-run implication of a switch to much greater reliance upon funded pensions is that consumption and welfare for future generations will be very significantly higher.
- Yet it is likely to be hard to engineer a transition to much greater reliance upon funding without leaving a substantial proportion of today's adults at least slightly worse off.
- Annuity market efficiency is important - in a model with no bequests the degree of efficiency of annuity markets has a significant impact on the scale of the potential gains from relying more on private saving to finance retirement consumption. The more significant are bequests the less important is this factor likely to be.
• There is a powerful link between overall portfolio allocation and the pension system. The more generous are state, unfunded pensions—the value of which is only indirectly (and perhaps weakly) linked to rates of return on financial assets the greater is the proportion of wealth invested in risky assets. If people come to rely heavily upon funded pensions which expose their retirement resources to financial market risk then they are likely to respond by holding a large share of their financial wealth in safe assets.

• It is important to note that a significant part of the gain of a switch towards giving people discretion about the scale and timing of contributions towards their own personal pension pot is the value of the flexibility this gives—something which is absent in most unfunded social security systems where contributions are typically a given proportion of earnings. One important implication of this is that there may be substantial gains to be had by increasing the flexibility in the timing of contributions within an existing unfunded, PAYGO pension system.

• 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. In fact our stylised model is one in which the gains that go to cohorts that do benefit from reform go disproportionately to the less well off. The losses that are suffered by cohorts that do not benefit from a switch to funding also are suffered disproportionately by the better off. We find no tendency for reform to have adverse distributional consequences—quite the contrary. To an extent this is a somewhat artificial result since we model the PAYGO, unfunded pension system as one in which pensions are tied to final salaries. If pensions were completely flat rate the distributional consequences of reform would be different, and less benign. In fact the current Japanese system has a flat rate element and an earnings related element. But we doubt that the flat rate element is so large that a switch to funding of the sort analysed in this paper would have significantly adverse distributional consequences. If it did seem this was likely to be a problem one could chose to preserve the flat rate element while scaling back the earnings related element.