



Essays on Collective Funded Pension Schemes.

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Summary (English)

Many pension systems worldwide have welfare enhancing properties, but seem unsustainable due to ageing problems, low interest rates and the recent financial crisis. Revisions of pension systems are required to improve sustainability, even in some cases this might reduce the generosity of pension arrangements. This dissertation covers several topics in collective funded pension arrangements, inspired by the revisions of pension arrangements worldwide and, in particular, the Dutch pension scheme.

Chapter 2 explains in detail different types of pension systems and highlights institutional aspects of second pillar pension funds. The focus of this chapter is on mandatory participation in funded second pillar plans in the Netherlands in particular, as well as in a number of other countries. The chapter highlights the economic arguments for mandatory participation. However, it also explains that the justification for mandatory participation from a legal perspective may become weaker as the number of solidarity features in collective pension schemes are reduced, a trend that we observe nowadays in the Netherlands and Europe.

Chapter 3 uses contingent claim analysis to evaluate the option of participants in a collective pension scheme to convert their defined benefit (DB) pension entitlements into an individual defined contribution (DC) plan. This way we can evaluate under what conditions individuals would be prepared to voluntarily join a collective pension scheme. When more decision dates are included, cohorts become more willing to participate in the collective pension scheme. If the funding ratio falls below a critical value, some young cohorts will exercise the option to quit the scheme. As a result, other generations might prefer to quit as well, causing a collapse of the collective pension scheme. In the absence of mandatory participation, it is only a matter of time before such a break down occurs.

Chapter 4 investigates mandatory participation for a broader class of collective funded pension schemes. We explore under what circumstances individual participants exercise the option to exit such a scheme if participation is voluntary. We demonstrate how the pension fund's set of policy instruments can be designed to minimise the likelihood that any cohort exits the pension scheme. The instruments consist of contribution and indexation policies. Recovery of the funding ratio to its regulatory target level may be based on uniform contributions or age-dependent contributions which are actuarially fair in equilibrium. Specifically, while the value of the exit option deters younger workers from exiting the pension fund, a uniform contribution policy encourages older workers to stay in the pension scheme. The setup in Chapter 4 is more general than in Chapter 3. However, the more complicated setup in Chapter 4 forces us to consider only the full participation setting. The simplified setup in Chapter 3 allows us to analyse the effect of cohorts leaving the pension fund on the remaining and future cohorts.

Chapter 5 explores the benefits of intergenerational risk-sharing through both private funded pensions and via the public debt. We use a multi-period overlapping generations model with a pay-as-you-go pension pillar, a funded pension pillar and a government. Shocks are smoothed via the public debt and variations in the indexation of pension entitlements and pension contributions. The intensity of these adjustments increases when the pension funding ratio or public debt gets closer to their regulatory boundaries. The two main results are the following. First, we find that the best-performing pension arrangement is a hybrid funded scheme in which both contributions and entitlement indexation are simultaneously deployed

as stabilisation instruments. The contribution and indexation adjustment policies are substitutes and the same is the case for contribution and tax adjustment policies. By contrast, indexation and tax adjustment policies are complements. Second, we find that welfare is higher in a system where pension contributions are paid before taxes while pension benefits are taxed (EET) than in a system where contributions are paid after taxes while benefits are untaxed (TEE). EET and TEE are globally the two most common taxation regimes for pension savings.

Chapter 6 proposes a non-linear method to model the behaviour of pension funds. This method is based on dividing the burden of recovery required by the regulator over the policy instruments. These instruments consist of a contribution and an indexation policy, so shocks are smoothed via variations in the indexation of pension entitlements and/or pension contributions. We derive and compare stability conditions of the traditional linear policy pension system and our proposed non-linear policy pension system. Under the linear policy system the indexation rate and the contribution rate linearly depend on the funding ratio. We use a continuum of multiple overlapping generations with a general demographic process. We show that our non-linear policy model is stable, while we derive stability conditions for the linear policy model. Even when stability conditions are satisfied under the linear policy model, there is still a non-zero probability that regulation under linear policy is violated. Since this typically holds in bad economic states, the non-linear policy pension system provides a more realistic representation when policy instruments are key for recovery.

Chapter 7 provides an empirical assessment of herding behaviour in investment policies by Dutch pension funds. We use a unique set with detailed transaction data on 39 large pension funds in the Netherlands over the period January 2009 – January 2015. We distinguish between weak, semi strong and strong herding behaviour. Weak herding occurs if pension funds have similar rebalancing strategies. Semi strong herding arises when pension funds react in a similar way to other external shocks, such as changes in regulation and exceptional monetary policy operations. Finally, strong herding means that pension funds intentionally replicate changes in the strategic asset allocation of other pension funds. We find empirical evidence supporting all three types of herding behaviour in the asset allocation of large Dutch pension funds. These findings have potentially important implications for policy makers who are concerned in financial stability.