

Optimal strategies for Pay-as-you-go pension finance: A sustainability framework

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Abstract

The aim of this paper is to design an automatic balancing mechanism to restore the sustainability of a Pay-As-You-Go pension system based on minimising changes in the main variables, such as the contribution rate, normal retirement age and indexation of pensions. This mechanism, that uses nonlinear programming, identifies and applies an optimal path of these variables into a PAYGO system and absorbs fluctuations in longevity, fertility rates, life expectancy, salary growth or any other random events in a pension system. The functional objective to determine the optimal and smooth path for the variables is defined to minimise the difference between the net present value of the income from contribution and the expenditure on pensions with a 75-year time horizon.

The main advantages of a mechanism of this type is to guide the system back onto the road to sustainability and at the same time to automate the measures to be taken, isolating them from the political arena, avoiding any delay and lack of time perspective. Furthermore, this ABM also allows some flexibility in the sense that the number of variables to be controlled can be changed to adapt the system to a specific situation. As a case study, this ABM, using optimal nonlinear programming techniques, has been applied into a generic defined benefit PAYGO pension system and the results are discussed in the paper. Some sensitivity analysis is also included in our analysis.

The model presented in this paper could be an alternative to the traditional parametric reforms of the PAYGO systems around the world.

Keywords: *Public pensions, Retirement, Risk, Sustainability.*

References

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