

# **HYBRID SOCIAL SECURITY PENSION SCHEMES BETWEEN DB and DC: risk sharing and stochastic optimal control**

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## Abstract

Traditionally, public pension schemes, organized in a social security framework and using a pay as you go technique (PAYG), are based on a Defined Benefit (DB) or a Defined Contribution (DC) approach, corresponding to two extreme philosophies of risk spreading between the stakeholders: in DB, the main risks are taken by the organizer of the plan; in DC (including the Notional accounts – NDC), the affiliates must bear all the risks. Especially applied to social security, this traditional polar view can lead to unfair intergenerational equilibrium in both cases. The purpose of this presentation is to propose, in PAYG, alternative hybrid architectures based on a mix between DB and DC, in order to achieve simultaneously financial sustainability and social adequacy. An example of this approach is the so called Musgrave rule, proposed recently in Belgium as potential reform principle. Other risk sharing approaches will be also presented and illustrated. In particular, we will develop a stochastic optimal control model in order to obtain an optimal mixed level between DB and DC.

## Keywords

***Hybrid schemes, Risk sharing, Musgrave rule, stochastic optimal control***

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