Managing Contribution and Capital Market Risk in a Funded Public Defined Benefit Plan: Impact of CVaR Cost Constraints

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Abstract

Using a Monte Carlo framework, we analyze the risks and rewards of moving from an unfunded defined benefit pension system to a funded plan for German civil servants, allowing for alternative strategic contribution and investment patterns. In the process we integrate a Conditional Value at Risk (CVaR) restriction on overall plan costs into the pension manager's objective of controlling contribution rate volatility. After estimating the contribution rate that would fully fund future benefit promises for current and prospective employees, we identify the optimal contribution and investment strategy that minimizes contribution rate volatility while restricting worst-case plan costs. Finally, we analyze the time path of expected and worst-case contribution rates to assess the chances of reduced contribution rates for current and future generations. Our results show that moving toward a funded public pension system can be beneficial for both civil servants and taxpayers.

Keywords: Public pensions, Defined benefit, Funding, Investing, Contribution rate risk, Conditional Value at Risk

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