

## Optimal additional voluntary contribution in DC pension schemes to manage inadequacy risk

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In defined contribution pension schemes the member bears the investment risk and her main concern is to obtain an adequate fund at retirement. To address inadequacy risk, flexibility is often given to the member to pay additional voluntary contributions (AVCs) into the fund. In many countries the AVC schemes allow members of the workplace pension plan to increase the amount of retirement benefits by paying extra contributions. In this paper, we define a target-based optimization problem where the member of an AVC scheme can choose at any time the investment strategy and the additional voluntary contributions to the fund. In setting the problem, the member faces a trade-off between the importance given to the stability of payments during the accumulation phase and the achievement of the desired annuity at retirement. We derive closed-form solutions via dynamic programming and prove that (i) the optimal fund never reaches the target final fund, (ii) the optimal amount invested in the risky asset is positive, and (iii) the optimal AVC is higher than the target one. We run numerical simulations to allow for different member's preferences, and perform sensitivity analyses to assess the controls' robustness.