



## Life-cycle asset allocation with focus on retirement savings

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“Life-cycle asset allocation with focus on retirement savings”.

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We consider optimal asset allocation of a pension saver with uncertain lifetime. The objective is to maximize the expected utility of the retirement savings. The model accounts for characteristics of a pension saver given by her mortality risk, risk attitude, type of retirement contract, trading costs, taxes, and uncertain labor income.

The problem is solved using a combination of a multi-stage stochastic linear programming (SLP) model and stochastic optimal control, such that the practical application is emphasized. Both solutions are integrated into the SLP formulation.

The decisions for the long period are based on a classical continuous-time optimization based on the closed-form solution obtained by Richard (1975). This model is first simplified by removing the insurance policy, such that the focus is on the pension savings. In particular, fully funded contribution-defined pension schemes are considered with different payout possibilities: lump sum payment at retirement and payment in installments. Richard’s model is extended by introducing deferred labor income linear taxation of contributions to the pension savings.

The first year decisions account moreover for aspects such as the trading costs and uncertain labor income. The market returns uncertainties are modeled by discrete scenario trees, where a joint distribution is consistent with the specified values of the first four marginal moments and correlations, and the arbitrage opportunities are excluded.

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