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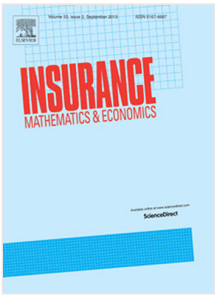

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Multi-period Defined Contribution Pension Funds Investment Management with Regime-Switching and Mortality risk☆

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Abstract

Using mean-variance criterion, we investigate a multi-period *defined contribution* pension fund investment problem in a Markovian regime-switching market. Both stochastic wage income and mortality risk are incorporated in our model. In a regime-switching market, the market mode changes among a finite number of regimes, and the market state process is modeled by a Markov chain. The key parameters, such as the bank interest rate, or expected returns and covariance matrix of stocks, will change according to the market state. By virtue of Lagrange duality technique, dynamic programming approach and matrix representation method, we derive expressions of efficient investment strategy and its efficient frontier in closed-form. Also, we study some special cases of our model. Finally, a numerical example based on real data from the American market sheds light on our theoretical results.

Keywords: Contribution pension funds; Multi-period mean-variance; Regime switching; Mortality risk; Dynamic programming

1. Introduction

There are two major types of pension schemes: *defined benefit* (DB) and *defined contribution* (DC). In a DB plan, benefits are fixed in advance by sponsors, and contributions are set and subsequently adjusted so as to ensure that the fund remains in balance, hence the risk is borne by sponsors. It is borne by members in the

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