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Markowitz's Mean-Variance Asset–Liability Management with Regime Switching: A Multi-Period Model

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Abstract

This paper considers an optimal portfolio selection problem under Markowitz's mean-variance portfolio selection problem in a multi-period regime-switching model. We assume that there are n + 1 securities in the market. Given an economic state which is modelled by a finite state Markov chain, the return of each security at a fixed time point is a random variable. The return random variables may be different if the economic state is changed even for the same security at the same time point. We start our analysis from the no-liability case, in the spirit of Li and Ng (2000), both the optimal investment strategy and the efficient frontier are derived. Then we add uncontrollable liability into the model. By direct comparison with the no-liability case, the optimal strategy can be derived explicitly.

Key Words:

discrete time multi-period regime switching markov chain asset-liability management portfolio selection efficient frontier

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