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Optimal asset–liability management with liquidity constraints and stochastic interest rates in the expected utility framework

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Abstract

This paper studies the optimal investment problem for an investor who wants to maximize the expected utility of the terminal asset-liability ratio under liquidity constraints and stochastic interest rates. By using the method of stochastic control and variable change techniques, we derive the closed-form solutions of optimal investment strategies and optimal terminal asset-liability ratios for the constant relative risk averse (CRRA) utility and constant absolute risk averse (CARA) utility functions. Moreover, a new verification theorem without the usual Lipschitz assumption is proved. Finally, we provide numerical examples to illustrate how liquidity constraints and stochastic interest rates affect the optimal investment strategies and optimal terminal asset-liability ratios.

Keywords: Asset-liability management, Liquidity constraint, Stochastic interest rate, Utility maximization criterion, Verification theorem, Optimal investment strategy

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