Lin, Xiang; Qian, Yiping; Shu, Yingbin

Summary: In this paper we investigate a continuous-time optimal portfolio selection problem for a risk-averse investor based on a relative log-return. Investor can invest her wealth in a risk-free asset and a risky stock. The objective of the investor is to exceed the performance of a stochastic benchmark that is not perfectly correlated with the risky stock. Investor chooses a dynamic portfolio strategy in order to maximize her expected terminal utility of the weight sum of absolute log-return and relative log-return. By using the dynamic programming principle, the corresponding Hamilton-Jacobi-Bellman equation of the optimal portfolio strategy and the value function is established. Furthermore, closed-form expressions of the optimal portfolio strategy and the value function under the investor with a exponential utility function are derived. The effect of the relative return on the optimal portfolio strategy is also analyzed. The result shows that the relative return works against a investor’s intrinsic risk-taking tendency. Finally, numerical examples are provided to illustrate how the optimal portfolio strategy and the value function change when some model parameters vary.

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91G10 Portfolio theory

Keywords:
optimal portfolio selection; stochastic benchmark; absolute return; relative return; Hamilton-Jacobi-Bellman equation

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