

Research Highlight: Portfolio Diversification and Model Uncertainty: A Robust Dynamic Mean-Variance Approach**Work of Huy  n Pham (Universit   de Paris), Xiaoli Wei (TBSI) and Chao Zhou (NUS)**

This paper focuses on a dynamic multi-asset mean-variance portfolio selection problem under model uncertainty. We develop a continuous time framework for taking into account ambiguity aversion about both expected return rates and correlation matrix of the assets, and for studying the joint effects on portfolio diversification. The dynamic setting allows us to consider time varying ambiguity sets, which include the cases where the drift and correlation are estimated on a rolling window of historical data or when the investor takes into account learning on the ambiguity. In this context, we prove a general separation principle for the associated robust control problem, which allows us to reduce the determination of the optimal dynamic strategy to the parametric computation of the minimal risk premium function. Our results provide a justification for under-diversification, as documented in empirical studies and in the static models. Furthermore, we explicitly quantify the degree of under-diversification in terms of correlation bounds and Sharpe ratios proximities, and emphasize the different features induced by drift and correlation ambiguity. In particular, we show that an investor with a poor confidence in the expected return estimation does not hold any risky asset, and on the other hand, trades only one risky asset when the level of ambiguity on correlation matrix is large. We also provide a complete picture of the diversification for the optimal robust portfolio in the three-asset case. This paper was published at the Mathematical Finance.

1. Portfolio diversification and model uncertainty: a robust dynamic mean-variance approach, with H. Pham and X. Wei, Mathematical Finance, 2022, 32(1):349-404.