A new approach to the evaluation of Australian mutual fund performance

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A. Background and aims of project

The Australian mutual funds sector, with more than US $430 billion dollars of assets, is the fourth largest mutual funds sector in the world. However, research on the performance of Australian mutual funds is relatively sparse. One of the crucial factors ensuring efficient functioning of mutual funds is proper evaluation of their performance. The objective of such analysis is to examine whether mutual funds have professional management adding value for their investors. Although the mutual funds have become an important part of modern financial sector, evaluation of their performance have not been accompanied by examination of the investment horizon, which is recently considered as an important factor for investments. In this project, we aim to investigate the performance of the Australian mutual funds covering three types of mutual funds (index, institutional and active funds) using multihorizon performance measures: the Sharpe ratio, the Jensen's alpha, and the Treynor index, based on wavelet analysis. Wavelet analysis has the advantage of being able to decompose the time series over the various time scales. This advantage allows us to investigate the behavior of our data over multiple horizons. This multiscaling evaluation using wavelet analysis will improve future investment decisions and thus deliver considerable long-term economic benefits.

B. Significance and innovation

The *novelty* and innovation of this project is to contribute to the literature on the study of the performance measures of mutual fund returns through a multiscaling approach. To the best of our knowledge, no previous study has investigated the multihorizon performance measure using wavelet analysis. Adopting wavelet analysis does not require any assumption on the distribution of returns, because wavelet analysis is a nonparametric estimation and decomposes the unconditional variance into different time scales.

C. Description of approach

The main advantage of wavelet analysis is the ability to decompose the data into several time scales. Economists and financial analysts have long recognized the idea of several time periods in decision making, while economic and financial analyses have been restricted to at most two time scales (the short-run and the long-run), due to the lack of analytical tools to decompose data into more than two time scales (In and Kim, 2006).

The multihorizon Sharpe ratio can be constructed using the wavelet variance and local average at scale λ_j as follows:

$$ASR_i^w(\lambda_j) = SR_B^w(\lambda_j) + \frac{(1+\overline{R}_f(\lambda_j))(1-P(\lambda_j))}{\sqrt{\sigma_B^2(\lambda_j)}} \quad (1)$$

where $$SR_B^w(\lambda_j) = \frac{\overline{R}_B(\lambda_j) - \overline{R}_f(\lambda_j)}{\sqrt{\sigma_B^2(\lambda_j)}} \quad (2)$$

where $\overline{R}_B(\lambda_j)$ and $\overline{R}_f(\lambda_j)$ are the mean values of the benchmark portfolio return and the risk-free rate at scale λ_j. These mean values are calculated using the scaling coefficients, following Gençay et al. (2003). In this specification, SR_B^w and ASR_i^w indicate the wavelet multiscale Sharpe ratio of the benchmark portfolio and the adjusted wavelet multiscale Sharpe ratio of a portfolio, which can be varying depending on the wavelet scales (i.e., investment horizons).

To derive the multihorizon Jensen's alpha and Treynor's index, the systematic risk (beta) at scale λ_j is required. To derive the systematic risk, we follow Gencay et al. (2003). Given the wavelet variance and covariance between two series, the systematic risk (beta) at scale λ_j can be calculated as:

$$\beta_p^w = \frac{Cov_{p,m}(\lambda_j)}{\tilde{v}_m^2(\lambda_j)} \quad (3)$$

In this specification, β_p^w indicates the wavelet multiscale systematic risk of the portfolio, which can be varying depending on the wavelet scales (i.e., investment horizons). Using this portfolio beta, the multihorizon Jensen's alpha can be defined as follows:

$$\alpha_p(\lambda_j) = \left(\overline{R}_p(\lambda_j) - \overline{R}_{f\,p}(\lambda_j)\right) - \beta_p\left(\overline{R}_{m\,p}(\lambda_j) - \overline{R}_{f\,p}(\lambda_j)\right) \quad (4)$$

Analogous to two multihorizon performance measurements, the multihorizon Treynor's index can be defined as:

$$TI(\lambda_j) = \frac{\overline{R}_p(\lambda_j) - \overline{R}_f(\lambda_j)}{\beta_p^w} \quad (5)$$

In this specification, $TI(\lambda_j)$ indicates the Treynor's index at scale λ_j, which will be varying depending on the wavelet scales (i.e., investment horizons).

References

Gençay, R., F. Selçuk, and B. Whitcher. (2003) "Systematic risk and time scales." *Quantitative Finance*, 3, 108–116.

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