

# Melbourne Centre for Financial Studies Academic Research Grant

## Fund style analysis with time varying exposures

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### 1. Background and Aims of Project

This project aims to assess the returns of Australian managed funds using return-based style analysis (RBSA). Specifically, we are interested in predicting and explaining fund returns. We innovate by proposing to employ state space methods to estimate time-varying asset class weightings using strong form RBSA. State space methods are superior to the commonly used rolling window regressions. Further, the strong form of RBSA is more conceptually justified as it implies that funds cannot be short an entire asset class. Thus, we aim to better explain and predict fund returns using a superior and more conceptually justifiable methodological technique.

Return performance and prediction has been one of the most widely studied topics in the area of managed funds. It is widely agreed that asset allocation accounts for a large part of the variability in the return on a typical investor's portfolio. Once a set of asset classes and relevant benchmark indices have been defined and identified, it is important to determine the exposures of each component of an investor's overall portfolio to movements in their returns. Exposure is defined by Sharpe (1992) as a fraction of the amounts that the fund has invested in various securities and the exposures of the securities to the asset classes. The principal objective of return-based style analysis (RBSA), which is pioneered by Sharpe (1992), is to find the best mimicking strategy that is in accordance with the investment style and is thus advantageous for identifying a fund's actual investment policy (Annaert and Van Campenhout, 2007).

Although RBSA has gained wide acceptance as an analytic tool by both academics and practitioners, existing literature still has a number of drawbacks and limitations. Most studies only conduct RBSA under static and rolling window regressions, assuming the exposures are constant within the sample or sub-samples. Swinkels and Van Der Sluis (2006) pioneered the use of state space methods to introduce time-varying exposures to the analysis, however, the analysis was conducted using the semi-strong form of RBSA, which means only the portfolio constraint, i.e. the exposures of portfolio holdings must sum to one, is incorporated in the analysis. It ignores the other important constraint, that is the prohibition of short sales and therefore, that the exposures must not be negative. With strong form RBSA, both restrictions are imposed. This form of RBSA will be the focus of this proposed project.

The main goal of this proposed project is to develop a superior method for predicting and explaining fund returns, through the use of state space methods and the strong form of RBSA. This knowledge will then be applied to examine funds' ability to time their dominant benchmark index.

### 2. Significance and Innovation

The number of managed funds in Australia has increased rapidly over the last decade. A global survey of managed funds conducted by the Investment Company Institute ranked Australia as the fourth largest onshore managed funds market in the world in March 2007. The Australian funds management industry is now one of the major markets for managed funds around the globe, with total funds under management of A\$1.3 trillion in June 2007.<sup>1</sup> It has grown more than 460 percent since 1992, with a compound annual growth rate of 12.2 percent. Conservative industry estimates forecast that total funds under management

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<sup>1</sup> Australian Bureau of Statistics, cat. No. 5655.0, Managed Funds, June 2007.

will grow to around A\$2.5 trillion by 2015.<sup>2</sup> Thus, the size and growth in managed funds makes it important to develop superior techniques for explaining and predicting fund returns.

This project is innovative as we propose to model time varying exposures in fund returns using a state space framework and under strong form restrictions. To the best of our knowledge, we will be the first to do so. Most prior research has used rolling window regressions to capture time variation in the parameters. The limitation of this approach is that it introduces time variation in an ad hoc manner and unrealistically assumes that the exposures are constant over the estimation window (usually 36 months). The advantage of the state space formulation is that allows us to introduce time variation without having to choose an arbitrary window length. We also extend Swinkels and Van Der Sluis (2006) by using strong form restrictions as opposed to the semi-strong form of RBSA. The strong form of RBSA is more conceptually justified, as although fund managers are permitted to short sell certain assets, it is unreasonable to assume that funds are short an entire asset class, and hence have negative exposures.

### 3. Description of Approach

Data on Australian managed funds is obtained from the Morningstar Direct database. We follow a recent Australian paper by Holmes and Faff (2006) in selecting the benchmark indices. Following Sharpe (1992), we begin by estimating the exposures on the benchmark indices for individual funds using both static and rolling window regressions. We then estimate the model in a state space framework. The forecast performance of the three estimation techniques is compared by calculating the Mean Squared Deviation (MSD) of the one step ahead forecasts. If the state space framework is superior in predicting fund returns, the MSD should be lower for this estimation technique than for the static and rolling window regressions.

The next research question explores whether the state space approach is superior in explaining the selectivity or micro-forecasting skills of the fund manager by comparing the selectivity coefficient (alpha) obtained under the three methodologies, as alphas capture the systematic fund returns that cannot be explained by the dynamic exposures to the stock market. To compare alphas obtained from the three estimation techniques, a non-parametric (pairwise) Wilcoxon signed rank test is applied to test the equality of the alphas.

Holmes and Faff (2006) find weak evidence that funds are able time their dominant index, that is the index that the fund has the highest exposure to. They use static and rolling window regressions and employ the strong form of RBSA. The final part of our proposed analysis is to assess the robustness of their findings to the estimation technique utilised. That is, we shall examine whether their findings hold when a state space framework is employed to estimate the exposures.

In summary, we propose a new and superior methodology for estimating the exposures of the fund and by extension predicting and explaining managed fund returns. Thus, not only will this project further the scholarly debate on explaining managed funds performance, it will also be of benefit to practitioners who employ return-based style analysis in assessing managed funds.

### 4. References

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<sup>2</sup> Department of Innovation Industry, Science and Research, Managed funds in Australia, 2008.

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