Time Changing Alpha and Active Fund Performance Evaluation: Australian International Funds

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Abstract

Tests for active management are inevitably based on averages estimated with 10 years or more of mutual fund monthly returns. In general, these tests implicitly assume that the impact of active management is reflected in a stable and well-behaved increment or decrement to mutual fund returns over the study period. There is virtually no justification appearing in the literature for this assumption and little research is evident that deals with the time series behaviour of mutual fund alphas. We focus on a sample of 75 Australian international funds using data covering the period from July 1995 to January 2005. Even after controlling for predictable time variation in fund risk there is evidence of time changing alpha, with some variation apparent when the sample is split into three groups, Asian, European/USA and global/international.

JEL Code: F21, G11, G23
Key words: international equity funds, time changing alpha

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1. Introduction

The question of whether mutual funds generate abnormal returns is of considerable significance. While active funds are accused of churning they have also been described as expensive passive funds, tracking the index and thus providing some form of quasi-indexing (Wooley and Bird, 2003). The finance literature provides evidence both supporting (Wooley and Bird, 2003, Minor, 2001) and questioning (Sharpe, 1991, Bogle, 2002) active mutual fund management.

Further, much of the recent research is based on portfolios constructed specifically to avoid survivorship bias and it is possible that these portfolios may bias tests against identifying active managers. While survivorship bias is important in estimation of average returns, survivorship bias adjusted portfolios tell us very little about the performance of individual active fund managers over shorter horizons. It is possible that fund performance over shorter periods has a greater impact on whether an active manager is maintained or replaced by a large superannuation fund, or a retail investor. More precisely estimated long term average returns earned by a portfolio of funds arbitrarily grouped together to avoid survivourship bias may provide little insight into the performance of actively managed funds. For example, active managers are likely to earn rather lumpy returns. When an active manager engages in timing or selection of undervalued or overvalued securities the payoffs from these strategies will not be realised in a smooth predictable fashion.

This project focuses on measuring the performance of mutual funds that are not identified as index tracking funds, specifically modelling the time changing nature of the performance measures that these funds generate. We focus on Australian international funds because this sector is growing rapidly[1] and because these funds give investors access to international financial markets at reasonable cost. International equity fund data is collected for those Morningstar funds that report their percentage of overseas equity investment in the range 90% to 100%. These funds are clearly international equity funds, regardless of their stated fund product description. As at January 2005 there are 715 funds that fall within this definition but there are only 75 funds starting in July 1995 with data through to January 2005.

Performance evaluation of mutual funds is an important topic both in the economics and finance literature and it has an immediate impact on practitioners. The search for an appropriate adjustment for risk when ranking fund performance begins with the path breaking work of Treynor (1965), Sharpe (1966) and Jensen (1968). This is further extended with development of multifactor models. Examples include the Gruber (1996) four-factor model, the Carhart (1997) four-factor model and the Grinblatt and Titman (1989) eight-factor model. The models described so far assume that the fund managers do not actively time the market and so a further set of risk adjusted performance models have been developed to deal with timing. The work of Treynor and Mazuy (1966) and Henriksson and Merton (1981) provide a framework for assessment of both timing ability and asset selection ability and specific adjustment for time changing risk or expected returns is provided in Ferson and Schadt (1996) and Ferson and Warther (1996). The problem of survivorship bias has also been identified in the literature (Brown, Goetzmann, Ibbotson, and Ross, 1992) and while this is a critical problem in assessing whether funds earn abnormal returns on average it is not critical to the analysis of those funds that are active managers.

[1] The Australian Prudential Regulation Authority (APRA), statistics show that the proportion of total superannuation funds invested in international shares is around 18% of total assets invested with the general growth in total superannuation investment resulting in an increase in dollars invested in international assets from $38 billion in June 1996 to $110 billion in June 2004.

We extend on the work of Ferson and Schadt (1996) and Ferson and Warther (1996) who argue that it is important to adjust for predictable changes in fund beta in any test of firm performance. In this case we are interested in the time variation in excess performance that is exhibited by mutual funds, as well as time variation in fund risk. For example, it is quite possible that an active fund may achieve the average for its cohort over much of the year and then take a series of informed speculative positions that result in abnormal returns for some part of the year. Thus, we are interested in how individual fund alphas vary through time. A literature review is provided in the following section, with data described in Section 3. Analysis is described and discussed in Section 4 and conclusions follows in Section 5.

2. Model used in performance evaluation

The CAPM, or some multi-factor asset-pricing model, is generally used to estimate expected returns for mutual fund performance evaluation, with the Jensen alpha providing a simple application. The constant beta assumption that underlies the Jensen alpha is generally inappropriate for active fund performance evaluation because active managers may manage fund beta. Thus more complex models are generally applied in testing for active management. It is also possible that fund betas change predictably over time and the conditional performance evaluation model of Ferson and Schadt (1996) and Ferson and Warther (1996) is used in this study to deal with this source of variation. Finally, the model used to estimate the expected return for the fund should reflect the investment set that the portfolio manager faces and so we use the Solnik (1974 and 1977) version of the international CAPM (ICAPM).

Solnik (1974 and 1977) shows that an asset’s risk premium can be modelled as a linear function of the world market portfolio risk premium. The investment risk premium $\left(RP_t = R_{pt} - R_{ilt}\right)$ is the difference between the return on the international investment portfolio expressed in local currency and the risk free interest rate also expressed in terms of local currency. The world market risk premium $\left(RM_t = R_{mt} - R_{iwt}\right)$ is the difference between the return on the world market portfolio of risky assets, where each security return is expressed in local currency, and a weighted average interest rate for the world where interest rate weighting is the same as for the world market portfolio.

$$RP_t = \alpha_p + \beta_p RM_t + \varepsilon_{pt} \tag{1}$$

The term, β_p, is a measure of the fund's risk relative to world risk and the focus of the model is on the relationship between excess return on an investment portfolio and excess return on a world portfolio of risky assets. The term α_p is the Jensen alpha for international mutual funds.

Active portfolio manager behaviour is generally explained in terms of asset selection and market timing. Asset selection involves the identification of under-valued or over-valued shares irrespective of the market conditions. For an international equity fund this may involve the choice of foreign shares, units in international equity funds or similar investments, taking into account the variation in market conditions arising from differences in tax law, securities regulation, investor protection and accounting standards, for example. Market timing is generally modelled in terms of changing portfolio risk over time according to expectations about future returns in the particular markets and much of the research into market timing has focused on the choice between equity and bonds (Sharpe, 1975). If a fund manager is timing the market then they would hold shares when the share market is predicted to perform strongly and bonds where bond returns are expected to outperform the share market.[2] While market-timing benefits can be considerable (Sharpe, 1975, Chua, Woodward and To, 1987, Shilling, 1992 and Sy, 1990) the theoretical benefits from market timing noted in the literature depend on market forecasting accuracy.

The Treynor and Mazuy (1966) test is perhaps the most widely used test for selectivity and market timing for domestic equity funds and we apply an adjusted form of this test. It is based on the assumption that fund managers who time the market change the fund portfolio beta over time, with high beta portfolios more likely during periods when equities are performing strongly. This behaviour generates a non-linear relationship between realised portfolio returns and share market returns, which can be approximated by including the square of the share market return in the ICAPM, equation (1). The Treynor and Mazuy (1966) test amounts to a t-test on the estimated squared market return parameter. The selectivity test in this model is based on the intercept term in the model, which gives an estimate of the excess returns remaining after adjustment for general market effects and timing effects.

$$RP_t = \alpha_p + \beta_p RM_t + \gamma_p RM_t^2 + \varepsilon_{pt} \quad (2)$$

The parameter, β_p, is a measure of the risk of the portfolio relative to the market for the fund or portfolio of funds and ε_{pt} is a residual term. The investment selection parameter (α_p) and a market timing parameter (γ_p) are generally estimated using ordinary least squares regression and if the selection parameter is positive ($\alpha_p > 0$) then the fund is said to exhibit superior investment selection ability. If the

[2] Changes to equity exposures may take place either by buying or selling the international shares or through the use of derivatives. For example the combination of a well diversified share portfolio and short share price index futures contracts can create a hedged portfolio that earns the risk free rate of return. Later reversal of the futures contract removes the hedge, leaving the underlying share portfolio (Do, 2002). These changes in exposure could also be attained through buying and selling units in international portfolios that specialise in particular international markets and particular asset categories.

market timing parameter is positive ($\gamma_p > 0$) then the fund is said to exhibit superior investment timing ability. [3]

Ferson and Schadt (1996) and Ferson and Warther (1996) show that the unconditional estimates, provided by the original Treynor and Mazuy (1966) approach, are not valid where portfolio risk changes over time in some predictable way. They show that proper conditioning of the portfolio beta estimate is critical to identification of selection and timing skills. As a result, we focus on the approach put proposed by Ferson and Schadt (1996) and Ferson and Warther (1996) and our application draws directly upon the work of Sawicki and Ong (2000) and Ferson and Schadt (1996). The model for predictable changes in beta takes the form:

$$\beta_{pt} = b_{1p} + b_{2p} JAN_{t-1} + b_{3p} D/P_{t-1} + b_{4p} STI_{t-1} + b_{5p} YC_{t-1} + \varepsilon_{pt} \qquad (3)$$

Where β_{pt} is the portfolio beta conditioned on a constant, a January dummy variable (JAN_{t-1}) observed at time t-1, the dividend yield at time t-1 (D/P_{t-1}), the short-term interest rate at time t-1 (STI_{t-1}) and the yield curve slope at time t-1 (YC_{t-1}). Substitution of equation (3) into equation (2) gives the conditional model for tests of market timing and selectivity.

$$RP_t = \begin{cases} \alpha_p + b_{1p} RM_t + \gamma_p RM_t^2 + b_{2p} RM_t \times JAN_{t-1} + b_{3p} RM_t \times D/P_{t-1} \\ + b_{4p} RM_t \times STI_{t-1} + b_{5p} RM_t \times YC_{t-1} + \varepsilon_{pt} \end{cases} \qquad (4)$$

This model provides a test of index tracking ($b_{1p} = 1$) as well as for selectivity ($\alpha_p > 0$) and timing ($\gamma_p > 0$) is the same as that applied in Heaney and Josev (2005).

While Ferson and Schadt (1996) and Ferson and Warther (1996) apply this test to USA data, it has also been applied to Australian equity funds by Sawicki and Ong

[3] While an alternative market timing model is described in Merton (1981) and Henriksson and Merton (1981) we focus on the Treynor and Mazuy (1966) model in this paper as the two methods generally provide similar results (Engstrom, 2003 and Ferson and Schadt, 1996).

(2000), to Australian international equity funds over the 1990s by Gallagher and Jarnecic (2004) and Heaney and Josev (2005) and to European mutual funds (Engstrom, 2003). To date, there has been little discussion concerning the possibility that the estimate of selectivity performance, alpha, might change through time.

3. Data

International equity funds are defined as those funds that invest 90% or more of available funds in international equities as at January 2005 and only those funds with a full set of monthly data over the period July 1995 to Jan 2005 [4] are included in the final sample. There are 715 funds in the initial list of funds as at January 2005 that meet the foreign investment requirement but most of these funds were excluded because they came into existence after 2000 and thus provided little time series data for analysis. Returns, net of the risk free rate, are calculated for the 75 funds that possess data that spans the full period of the study and these are graphed in Figure 1 while descriptive statistics are reported in Table 1. The funds in the sample report a loss on average after adjustment for the risk free rate over the period of -0.13% per month though there is considerable variation with the maximum fund average excess return of 0.33% per month and the minimum fund average excess return of –0.64% per month.

[Insert Figure 1 and Table 1 about here]

The fund risk premia and world equity market risk premia are required for implementation of the International CAPM though the Ferson and Schadt (1996) and Ferson and Warther (1996) model requires additional conditioning variables to capture predictable variation in fund beta. The conditioning variables used in this

[4] The period includes the important changes in the economic conditions that followed the 1997 Asian crisis and the 2000 "tech stock" correction.

paper include a January dummy variable (JAN_{t-1}), the dividend yield (D / P_{t-1}), a short-term interest rate (STI_{t-1}) and the yield curve slope (YC_{t-1}). The short-term interest rate and the dividend yield are expressed as continuously compounding return per month. Summary statistics are reported in Table 2.

[Insert Table 2 about here]

While there are commercially available dividend yield series these are generally smoothed, reflecting the average dividend for the previous 12 months as a percentage of the beginning of period price. To avoid induced serial correlation arising from such measures, a dividend yield series is calculated using the total return and price indices for the MSCI world index. Estimates of short-term interest rates are required for calculation of excess returns for individual funds and for the market portfolio proxies. The world risk free rate is approximated using an equally weighted average of the 3-month interest rates obtained from the OECD for the USA, Japan and Europe expressed as a rate per month. The yield curve slope estimates are calculated by taking the difference between the average OECD 10 year rate per annum and the average OECD 3-month rate per annum for the USA, Japan and Europe. The Risk premia for the market portfolio of risky assets are estimated is the difference between the return on the local currency MSCI world total return index and the world risk free rate estimated by averaging the short-term interest rates for the USA, Europe and Japan as supplied by the OECD.

4. Time Variation in Alpha Estimates

Rolling 24 month regressions are used to capture the time variation in alpha for each of the 75 Australian international funds that make up the sample. The first alpha estimate is calculated using the monthly observations from July 1995 to June

1997. The second is calculated using the monthly observations from August 1995 to July 1997. The third is calculated using the monthly observations from September 1995 to August 1997 and this is continued until the end of the sample. This procedure gives rise to 91 Jensen alpha and the Ferson and Schadt alpha estimates for each of the funds. We then calculate descriptive statistics for each fund's alpha estimates. Summary statistics are reported for each of the 75 fund level descriptive statistics in Table 3, Panels A and B. The last row in each of the tables is based on full sample Jensen alpha and Ferson and Schadt alpha estimates and this is provided for comparison with the rolling regression based estimates.

[Insert Table 3 about here]

Figure 2 provides a graph of the time series variation in the rolling Ferson and Schadt alphas.[5] Each fund is allocated a line in the graph and so the more lines the darker the graph. There is considerable dispersion in the alpha estimates prior to 2000, particularly around the Asian crisis, which began late in 1997. Further, the baulk of the funds appear to follow a patterm of positive alphas in the first half of the period followed by negative alphas in the second half of the period. To gain some further insight into the impact of the Asian crisis we separated those funds whose titles identified the fund as having a specific regional emphasis from the remainder. We identify two funds with a UK and/or USA focus (Figure 3). There is also a group of nine funds with a clear Asian emphasis (Figure 4). The remaining funds that make up the largest category are those funds that include the term "global" or "International" in their product descriptions (Figure 5).

[Insert Figures 3, 4 and 5 about here]

[5] The rolling Jensen Alpha estimates are similar though the Jensen measures are a little less widely dispersed consistent with the standard deviation of the mean reported in Table 3.

The two USA/UK funds exhibit positive alphas from 1998 to 2002 and negative alphas from 2002 to 2005 though these estimates are considerably more stable than those reported for most of the Asian funds. The downturn that occurred in both the UK and the USA after 2000 probably best explains the negative alphas after 2000. The Asian focused funds show considerable volatility relative to the other funds in the study with quite dramatic negative values from late-1997 to mid-1999 consistent with the Asian crisis. There is some improvement in the alphas from mid-1999 to mid-2001 and again in the period from mid-2002 to January 2005.

The majority of the funds fall into the last category. This group of funds is certainly more stable that most of the Asian funds though as was apparent with the two USA/UK there is tendency for positive alphas in the period from mid-1997 to mid-2001 with negative alphas generally evident after 2000 onwards.

Thus there is considerable variation in alphas over the study period even after adjustment for predictable change in beta and market timing (Ferson and Schadt, 1996). We take an arbitray 50% break point and test for change in the alpha estimate using a dummy variable with ones for the months from July 1995 to February 2000 and zero otherwise. A t-test on this dummy variable provides a rough test for stability of alpha over the study period and and the t-statistics are calculated for each of the 75 funds in the sample, with summary statistics reported in Table 4. At the 5% (10%) level of significance there is a statistically significant change in alpha for 30 (49) of the 75 funds where the Jensen alpha is used and statistically significant change in alpha for 38 (51) of the 75 funds where the Ferson and Schadt alpha is used. The nine Asian focused funds all fall into the group of funds where there is no evidence of a statistical change in alpha after February 2000. This is not surprising given the time series behaviour of the alphas for these funds (Figure 4).

5. Conclusion

Analysis of Australian international equity funds is limited, aside from Gallagher and Jarnecic (2004) and Heaney and Josev (2005). In both these studies it is found that while some funds exhibit superior selectivity ability and there there were few if any funds that exhibited timing ability. The techniques that were used in the study accounted for predictable changes in beta over time using Ferson and Schadt alphas but there is very little evidence in the literature of studies where alpha is allowed to change over time.

The results from rolling regression that are reported in this paper suggest that the international fund alphas are not constant over time and this leads to some question about whether funds selectivity ability is as poor as it seems. It appears that there are considerable periods over the last 10 years of this study when the global/international funds have out performed the MSCI world index after adjustment for risk and for the possibility of market timing. There are other periods when this group of funds has underperformed the world index.

Future research will focus on the whether the observed time variation in alpha could be applied in identification of superior active funds. A further study will focus on whether a viable investment strategy could be set up is based on information about changes in an active managers alpha over time.

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Table 1
Descriptive Statistics for Portfolio Returns Net of the Risk Free Rate

Descriptive Statistics	Mean	Median	Maximum	Minimum	Standard Deviation
Mean	-0.1286	-0.1113	0.3367	-0.6411	0.1790
Median	0.0265	-0.0119	0.7080	-0.9256	0.3573
Standard Deviation	3.9228	3.7058	7.2799	1.7454	1.0472
Maximum	9.6956	7.9819	23.9540	4.7847	4.1857
Minimum	-11.8567	-10.4457	-5.8523	-28.0877	4.6369
Excess Kurtosis	0.4823	0.1773	3.2070	-0.5660	0.9230
Skewness	-0.2947	-0.3316	0.4405	-0.6719	0.2468
AR(1)	0.1207	0.1406	0.2808	-0.1574	0.0918
AR(2)	0.0184	0.0134	0.1948	-0.1266	0.0579
AR(3)	0.0301	0.0385	0.1475	-0.1093	0.0483
AR(4)	0.0301	0.0331	0.1655	-0.1465	0.0662
AR(5)	0.1080	0.1157	0.2729	-0.0718	0.0772
AR(6)	0.0288	0.0244	0.2423	-0.1083	0.0654
AR(12)	0.0862	0.0978	0.2716	-0.2582	0.0990

Note: All returns are continuously compounded rates of return per month expressed as percentages. The return for each month is calculated for each of the 75 funds net of the 30-day bank accepted bill yield for the month. There are 115 monthly observations in the study period from July 1995 to January 2005 available for each of 75 funds that are included in analysis. Column 2 provides the mean of the various descriptive statistics calculated for each of the International funds included in the sample. The median, maximum, minimum and standard deviation for each of the fund based descriptive statistics are provided in the remaining columns.

Table 2
Descriptive Statistics for Equity Market Indices, Interest Rates and Conditioning Information

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
RM	0.4415	1.1430	7.7764	-15.7619	4.3282	-0.9200	4.0813
RM^2	18.7655	8.0035	248.4380	0.0002	30.9092	4.3926	29.5526
D / P	0.1518	0.1445	0.3064	0.0615	0.0475	1.2144	4.9237
STI	0.2228	0.2606	0.3711	0.0852	0.0854	-0.3419	1.6618
YC	1.4171	1.5484	2.4597	-0.0076	0.6303	-0.4545	2.2855

Note: All returns are continuously compounded rates of return per month expressed as percentages. These variables are the equity market indices, interest rates and conditioning information required for fund performance tests. The data spans the period from July 1995 to January 2005. RM is the world market risk premium and is the difference between the return on the local currency MCSI world total return index and a world risk free rate estimated by averaging the short-term interest rates for the USA, Europe and Japan as supplied by the OECD. RM^2 is the world market risk premium squared and this is included to capture market timing. D / P is the monthly dividend yield estimated from the monthly MCSI world index total return and price indices. STI is the average of the short-term interest rates for the USA, Europe and Japan as supplied by the OECD expressed as a return. YC is the difference between the average of the long-term interest rates for the USA, Europe and Japan as supplied by the OECD less STI.

Table 3
Summary Descriptive Statistics for Estimated Alphas

Panel A: Jensen Alpha Estimates for Each Fund

	Mean	Median	Max.	Min.	Std.dev.
Mean	-0.2510	-0.2196	0.3084	-1.0771	0.2337
Median	-0.0817	-0.0500	0.5360	-0.9850	0.2678
Std. dev.	0.8547	0.8169	1.6157	0.2466	0.2413
Max.	1.1738	1.1487	2.9092	0.2975	0.4703
Min.	-1.7840	-1.6016	-0.4813	-5.1530	0.8287
Kurtosis	-1.1728	-1.3631	0.0017	-1.5878	0.4216
Skewness	-0.1874	-0.2510	0.9862	-0.8665	0.3152
AR(1)	0.9720	0.9775	0.9894	0.9002	0.0163
AR(2)	0.9450	0.9519	0.9717	0.8298	0.0269
AR(3)	0.9202	0.9326	0.9558	0.7221	0.0395
AR(4)	0.8920	0.9121	0.9393	0.6193	0.0535
AR(5)	0.8605	0.8866	0.9215	0.5135	0.0688
AR(6)	0.8316	0.8581	0.9036	0.4347	0.0806
AR(12)	0.5932	0.6616	0.7591	-0.1492	0.1637
Sample average for full period	-0.3329	-0.3290	0.1318	-0.9597	0.1951

Panel B: Ferson and Schadt Alpha Estimates for Each Fund

	Mean	Median	Max.	Min.	Std.dev.
Mean	-0.1971	-0.1905	0.6028	-1.2960	0.3679
Median	-0.1817	-0.1790	0.6372	-0.9435	0.3361
Std. dev.	0.9216	0.8387	2.0904	0.2424	0.3281
Max.	1.5863	1.5334	3.6870	0.6399	0.5431
Min.	-2.0251	-1.7582	-0.4431	-6.4809	1.1332
Kurtosis	-0.8788	-1.0838	1.0492	-1.5631	0.5912
Skewness	-0.1038	-0.0803	0.6886	-1.2430	0.3435
AR(1)	0.9426	0.9562	0.9821	0.8474	0.0358
AR(2)	0.8902	0.9156	0.9635	0.6924	0.0723
AR(3)	0.8355	0.8696	0.9390	0.5374	0.1043
AR(4)	0.7804	0.8276	0.9133	0.3711	0.1360
AR(5)	0.7359	0.7900	0.8873	0.2235	0.1669
AR(6)	0.6904	0.7482	0.8626	0.1730	0.1793
AR(12)	0.3599	0.4339	0.6521	-0.5547	0.2618
Sample average for full period	-0.4196	-0.3958	0.2827	-1.5020	0.3484

Note: Rolling Jensen alpha (Panel A) and Ferson and Schadt alpha (Panel B) estimates are calculated for each of the funds using a 24 month rolling window and this gives 91 separate alpha estimates for each fund. Descriptive statistics are calculated for the time series of alpha estimates obtained for each of the funds (mean, median, standard deviation (Std.dev.), maximum (Max.), minimum (Min.), excess kurtosis, skewness and autocorrelation coefficients for lags 1, 2, 3, 4, 5, 6 and 12). Summary statistics, mean, median, maximum, minimum and standard deviation, are then calculated for each of these individual fund descriptive statistics and these are reported above. The final row in each of the panels refers to the average alpha estimates across the 75 funds calculated using the full sample period from 1995 to 2005.

Table 4
Summary Statistics for Change in Alpha

Panel A: Jensen Alpha Estimates for Each Fund

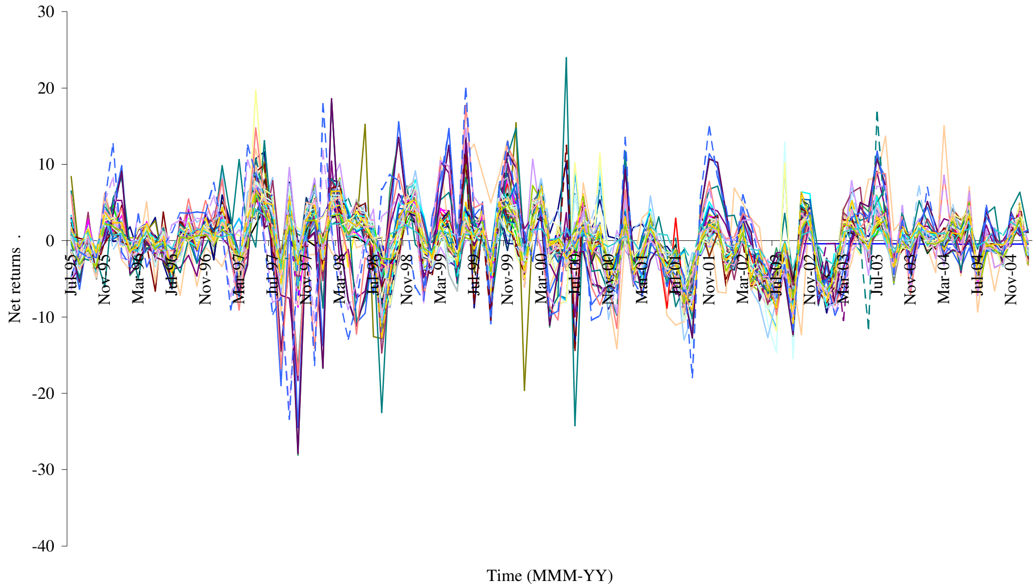
	Average	Median	Max	Min	Std Dev	N>5%	N>10%
Change in alpha	0.7528	0.9029	1.6167	-0.8772	0.4822		
Standard Error	0.5264	0.4645	1.2788	0.2218	0.2053		
t-test	1.6473	1.7911	3.3140	-0.8855	0.9018	30	49

Panel B: Ferson and Schadt Alpha Estimates for Each Fund

	Average	Median	Max	Min	Std Dev	N>5%	N>10%
Change in alpha	0.8328	0.9661	1.7036	-0.9060	0.5134		
Standard Error	0.5354	0.4685	1.3038	0.2294	0.2090		
t-test	1.7905	2.0284	3.7115	-0.8994	0.9448	38	51

Note: The alphas are estimated using the full sample period from July 1995 to January 2005. Change in alpha is the parameter value for the dummy variable with a value of one for the period from July 1995 to January 2001 and zero for the remainder of the period from February 2001 to January 2005. Ordinary least squares regression is used for each of the estimates. Descriptive statistics include the mean, median, standard deviation (Std.dev.), maximum (Max.) and minimum (Min.) and these are calculated for the change in alpha estimates for the 75 funds in the sample for both the Jensen alpha and the Ferson and Schadt alpha estimates. N>5% refers to the number of funds where the t-statistic is statistically significant at the 5% level of significnce and N>10% refers to the number of funds where the t-statistic is statistically significant at the 10% level of significnce.

Figure 1
Net Monthly Returns for 75 Mutual Funds
for the Period from July 1995 to January 2005



Note: The continuously compounded returns are calculated for the period from July 1995 to January 2005 for each of the 75 Australian international funds that make up the sample. Net returns are calculated by deducting the 30 day bank accepted bill yield from the fund return for each month. Time is expressed in terms month (MMM) and year (YY).

Figure 2
Full Sample Ferson and Schadt Alphas
Calculated Using a 24-Month Moving Window
for the Period from July 1995 to January 2005

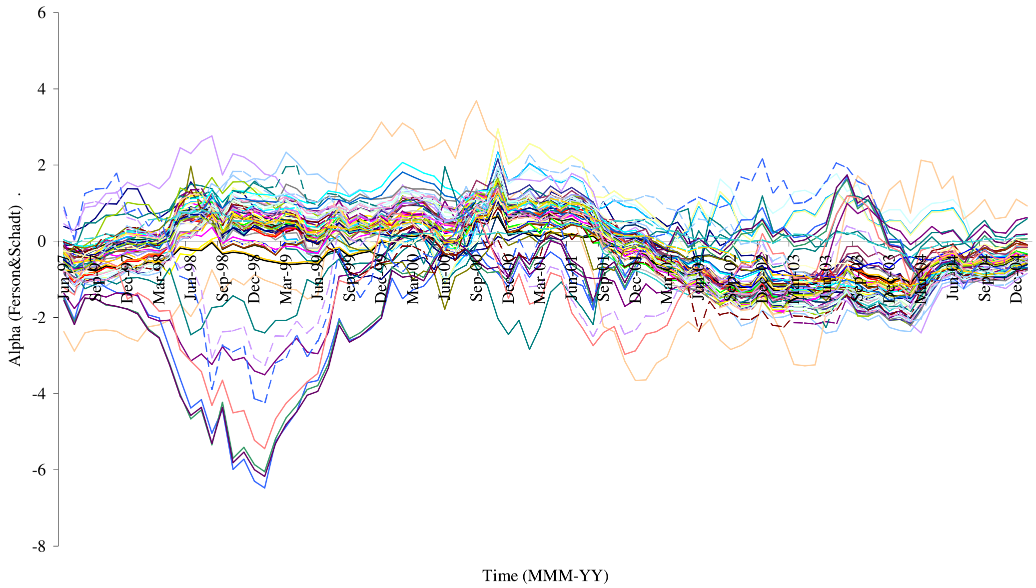


Figure 3
USA/UK Fund Ferson and Schadt Alphas
Calculated Using a 24-Month Moving Window
for the Period from July 1995 to January 2005

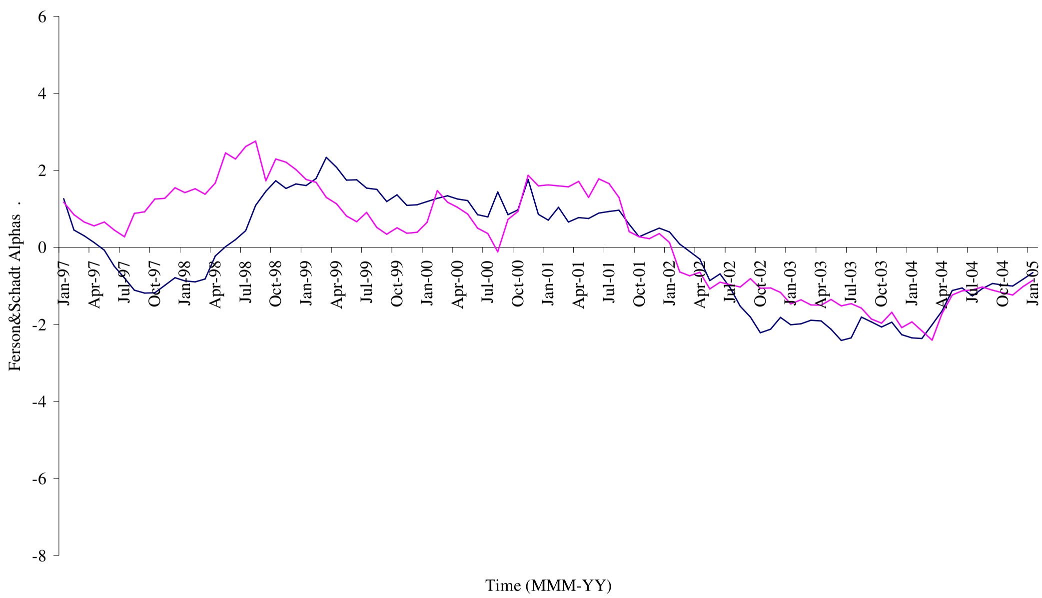


Figure 4
Asian Fund Ferson and Schadt Alphas
Calculated Using a 24-Month Moving Window
for the Period from July 1995 to January 2005

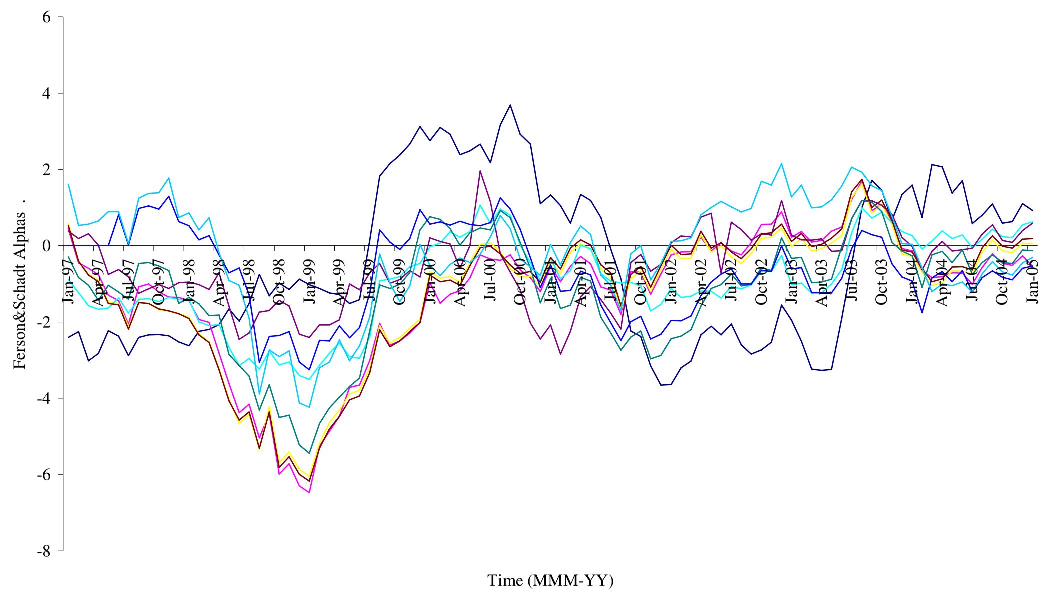


Figure 5
International or Global Fund Ferson and Schadt Alphas
Calculated Using a 24-Month Moving Window
for the Period from July 1995 to January 2005