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A review of the research on the past performance of managed funds

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A Review of the Research on the Past Performance of Managed Funds

Report prepared for the Australian Securities and Investment Commission

By the

Funds Management Research Centre (FMRC)
Of the Securities Industry Research Centre of the Asia Pacific (SIRCA)

Report prepared by FMRC Directors:
Professor David Allen (Edith Cowan University)
Professor Tim Brailsford (University of Queensland)
Professor Emeritus Ron Bird (University of Technology Sydney)
Professor Robert Faff (Monash University)

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Executive Summary

The Australian Securities and Investments Commission (ASIC) commissioned the Funds Management Research Centre (FMRC) to provide a report on research findings in relation to the performance of managed investment funds. This report would assist an ASIC project on how past performance information is used in investment marketing.

The central issue is *"how useful is past performance information when consumers (or their advisers) are selecting an Australian managed fund?"*

In this paper we undertake an extensive review of the academic literature on the "persistence" of managed fund performance.

The academic studies look at whether funds' past performance is related to their future performance. If a fund's performance is consistently above (or below) the average performance for a group of similar funds, this is called "persistence". Evidence of relative persistence has important implications for investor choices between funds.

Of the 100 or so relevant studies written over the past 40 years, we have focused on the more recent studies and those studies with the more robust methodology.

The majority of these studies look at US funds whilst a number have examined UK funds. We review their major findings vis-a-vis performance persistence. We also consider studies of the performance of Australian funds and devote more detail to a few of the larger studies. A majority of studies have examined equity funds, but some consider fixed interest funds and superannuation funds.

Although the studies address a common topic, they are characterised more by their differences than similarities: the studies cover different time periods, use different benchmarks and reach different conclusions. The Australian studies are broadly consistent with the pattern of overseas research.

We have kept in mind the situation facing retail investors and focused on the studies which are most relevant to real world situations:

- Returns need to be adjusted for fees.

- Most consumers have an investment horizon of at least several years and frequent switching between funds would incur costs and inconvenience.

- The risk level of different funds is a significant factor.

What can we conclude from this broad-ranging literature?

- Performance comparisons can be quite misleading if not done properly.

- Returns are only meaningful if adjusted for risk/volatility or comparing "like with like".

- The risk-adjusted studies involve complicated computer analyses that are only available to research houses and academics. They do not reflect the information available to retail investors via advertisements, league tables or formal offer documents. The risk-adjusted studies therefore measure the potential value of past performance information in the hands of experts, not ordinary consumers.

- Good past performance seems to be, at best, a weak and unreliable predictor of future good performance over the medium to long term. About half the studies found no correlation at all between good past and good future performance. Where persistence was found, this was more frequently in the shorter-term, (one to two years) than in the longer term. The longer-term comparison may be more relevant to the typical periods over which consumers hold managed funds.

- More studies seem to find that bad past performance increased the probability of future bad performance.

- Where persistence was found, the "out-performance" margin tended to be small. Where studies found persistence, some specifically reported that frequent swapping to best performing funds would not be an effective strategy, due to the cost of swapping.

- Where persistence was found, studies came to inconsistent conclusions about which time periods (historical and future) were correlated. However, Soucik (2002) has investigated this in detail. The general pattern appears to be symmetrical. Short-term past performance is only correlated with short term future performance. Longer term future performance is only correlated (if at all) with longer term past performance.

There are plausible explanations for these conclusions about the low persistence of past performance.

- The methods which work best in one set of market conditions will not work best at other times. For example, value and growth style managers tend to excel at different times. However, it is hard for a consumer to predict the likely market conditions over the next few years. One of the problems with many of these studies is that they might not track a manager through a full cycle of market conditions.

- Fund managers constantly strive to match the performance of competitors. If one firm is outperforming its peers, others will try to copy its methods and/or headhunt its staff. If it attracts a large inflow of funds it is likely to be difficult to place these funds and maintain relative performance, if it is an active as opposed to a passive fund.

- The future return on investments is extremely hard to predict, so a significant part of a fund's performance (compared to its peers) may be random luck.

- The findings are consistent with other research that shows that it is hard for fund managers to consistently outperform the relevant benchmark.

CONTENTS

1. Introduction

The Australian Securities and Investments Commission (ASIC) commissioned the Funds Management Research Centre (FMRC) to provide a report on research findings in relation to the performance of managed investment funds. This report would assist an ASIC project on how past performance information is used in investment marketing.

The central issue is "how useful is past performance information when consumers (or their advisers) are selecting an Australian managed fund?"

Subsidiary issues include:

- Selecting measures of "performance" which are relevant to consumers.
- Examining the relationship between the past and future performance of funds.
- Putting any such relationship in context with other factors relevant to the consumer's decision.

This report is a summary of the existing international literature. Our report gives a brief introduction to the issue performance measurement and appropriate performance benchmarks. We then present a summary of the US and UK empirical work on performance persistence, before reviewing Australian work in more depth. We then spend more time reviewing the latest work being undertaken currently at the Funds Management Research Centre, one of five research centres at the Securities Industry Research Centre of the Asia Pacific (SIRCA).[1]

2. Some Relevant Industry Features

The managed funds industry consists of collective investments schemes run by professional managers with the objective of producing returns for investors. Managed funds can be categorized into various types such as unit trusts, superannuation funds, approved deposit funds (roll-over funds). It is also customary to differentiate between wholesale and retail funds, though consumers now access wholesale funds via master trusts.

The Australian asset management market is expected to grow by 238% to more than A$ 1 trillion by 2015, one of the highest growth rates in the world. Such significant upsurge in the size of the managed funds sector highlights the need for fund selection to be undertaken on a sound basis.

All investors (whether they are private individuals or market professionals) would be interested in whether good future performance can be chosen by looking at each fund's past performance. Individual consumers will be concerned about retail funds if they are directing their own investments but they are also interested in wholesale funds, given that most superannuation savings are invested in this sector.

Australia's funds management industry manages more than $650 billion for over nine million investors. This covers superannuation, life insurance and other managed investments (unit trusts). Below are some general statistics on the industry:

[1] SIRCA is a university based, industry sponsored, financial markets research centre. It conducts applied research into the design of equities, futures, OTC markets and the market impacts of financial information. See website: http://www.sirca.org.au

Where the Money is Invested -Retail Asset Profile June 2001

Domestic Equities	12%
International Equities	8%
Australian Fixed Interest	10%
International Fixed Interest	1%
Property	2%
Cash	19%
Multi Sector	48%

Source: ABS and ASSIRT

Australian managed funds have substantial exposures to fixed interest securities. About 30% of funds in the ASSIRT database are pure fixed income funds, controlling 29% of funds under management. About 90% of managed funds hold at least some fixed income securities as part of their investment portfolio. It is therefore likely to be misleading if a benchmark based purely on equity returns is applied to measure the performance of these funds.

A measure of performance has to be relevant to both equity and fixed interest portfolios. It also may need to take into account investments in property and international equity, depending on the asset composition of the fund.

3. Factors to be considered in Performance Measurement

The use of past performance information is clearly linked to two related issues:

- What is an acceptable performance measure?

  A suitable measure needs to incorporate risk as well as return, given that performance figures are inextricably linked with the riskiness of investments.

- Given a performance measure, can past performance be used as a guide to likely future performance?

3.1 Risk and abnormal returns

The main objective of a managed fund is to maximize returns while controlling the level of risk. Much of the performance reporting and advertising focuses entirely on returns achieved. However, all portfolios of investments are subject to risk and an indication of a funds' riskiness is required before any statement about historical returns can be meaningful.

Much of the US literature in the area has traditionally concentrated on mutual funds (i.e. open-ended funds). This is because they are the most accessible to consumers and their fluctuating performance can be examined from their unit prices.

Academic studies concentrate on whether a fund's returns out-perform some appropriate benchmark (which typically might be a composite market index). Performance is not superior if it cannot match that of a comparably risky diversified benchmark portfolio. One potential strategy is passive diversification which should produce a performance which has the same return and risk characteristics as the market average (e.g. a composite market index). If the fund manager takes on more risk by trying to choose winning stocks then the investor needs a measure of whether or not the policy produced returns commensurate with the extra risk level adopted.

However, even if a strategy worked in one period there is no guarantee that it will continue to work in the next. This leads on naturally to the issue of performance persistence.

If past performance is going to be of use to investors, we need to know whether past performance (good or bad) is linked to future performance (good or bad); ie "performance persistence". If there is a link then this information can assist investors to make better investment choices. If there is no link between past performance and future performance in a statistical sense, then knowledge of past performance will not help an investor in choosing a likely high performance fund or in avoiding a probable below-average performer.

Even if we measure a fund's returns over a time interval accurately, this is only half the story. Measuring a fund's performance is more complicated than merely computing its realised or expected, returns. Two sources of the complications are discussed below.

3.2 Investment Risk

Since returns and risks are positively correlated, a manager can improve a portfolio's return simply by aggressively investing in more risky assets. Given that investors prefer less risk (other things being equal), investment performance measures should incorporate both these indicators: portfolio risks and returns. However, unlike returns, there are a variety of measures of risk which can be used. We will review some of the most common methods shortly.

3.3 Benchmarking

The next issue is what we compare performance against.

There are two broad investment strategies: passive diversification or an active investment strategy. If the former strategy is adopted, then the investor is seeking an appropriately diversified portfolio which the manager will purchase on his behalf. The investor should achieve a measure of return and risk commensurate with that achievable on a broadly diversified portfolio. If he is trying to invest in a liquid portfolio of Australian equities, such as the S&P 100 Australian index, then he should have a return and risk profile similar to that of this particular benchmark. It will then be held without much revision unless there are changes in the composition of the index.

With a more active stock selection strategy, investing in a managed fund is worthwhile only if the manager can add more value than the investors could achieve themselves. Again, the fund's performance must be compared with an appropriate benchmark. The benchmark should be an efficient naive portfolio replicable by average investors at low costs, such as the previously mentioned top 100 share index.

Ideally we require some composite measure of both return and risk. This composite measurement index must hold the risks of an evaluated portfolio constant, so that performance can be judged on the basis of risk-adjusted returns. We need to measure a portfolio's performance on two dimensions; relative performance (i.e. relative to other active portfolios) and absolute performance (i.e. relative to a benchmark).

3.4 Typical scenarios for retail consumers

When looking at studies of performance, we have to consider how relevant the study is to the situation of typical consumers.

While consumers will vary in their individual circumstances, the following issues will generally be relevant to some degree in selecting an asset mix, product and fund manager:

- Most consumers would want to hold a fund for several years at least. For most equity based funds, the investment horizon is at least five years. Frequent swapping involves both fees and inconvenience.
- Retail consumers face significant transaction and management costs for most managed funds. Ongoing fees typically range from 1% for a cash or fixed interest fund to 2.5% for an equity fund. Measures of performance need to be net of transactions costs. An investor is concerned with the dollars that subsequently end up in his pocket, not hypothetical measures.
  Consumers are interested in risk, including the risk of capital loss and the volatility of investment value over time.

We will review all of these issues in the course of this report.

4. Background to the Academic Literature

The academic literature on the measurement of managed fund performance stretches back over 40 years. The development of the Capital Asset Pricing Model (CAPM)[2] from modern portfolio theory (MPT)[3] created a method of measuring managed fund performance on at the basis of at least two dimensions: risk and expected return. MPT is built on the assumption that rational investors need information about the expected return and risk of their potential investments before they can make informed choices. This suggests that return and risk must be included in any performance measure.

However, there are a number of different ways of measuring risk. The CAPM only looks at market related risk (or beta), not total risk. The CAPM as its name suggests is an asset-pricing model. There is a range of views in the academic literature about the best asset-pricing model. Candidates vary from the CAPM, to arbitrage pricing based models, through to various ad-hoc factor-based models which have resulted from statistical exercises. In addition to studies using different pricing models, they also use a variety of benchmarks to represent the neutral market performance.

There is an extensive academic literature on both asset-pricing models and performance benchmarks. However, in this paper we can only report the underlying methodology for each of the various performance studies.

The issue is made even more complex by the fact that varied results have emerged from studies using similar methodologies or similar benchmarks.

[2] Sharpe (1964), Lintner (1965), Treynor (1965) Mossin (1966).
[3] Markowitz (1952).

5. Customary Measures of Investment Performance

With the development of Modern Portfolio Theory (MPT) and asset pricing theory, in particular the Capital Asset Pricing Model (CAPM), it was immediately obvious that the analysis provided a theoretical framework that could be applied to meet the challenges of performance measurement. Treynor (1965), Sharpe (1966), and Jensen (1968) were the first to realise the potential applications of MPT and CAPM for investment performance evaluation.

5.1 Standard Deviation

Markowitz (1952) suggested the use of standard deviation as a measure of risk. This metric measures the dispersion of returns from a central average value. The metric has distributional properties that allow inferences to be drawn. For instance, if the returns produced by a fund follow a bell-shaped normal distribution, then 95 times out of a hundred the return should be within plus or minus two standard deviations of the long term average.

The greater the standard deviation, the greater the fund's volatility.

5.2 The Sharpe Index

The Sharpe ratio is a risk-adjusted measure developed by the Nobel Laureate William Sharpe.

Markowitz (1952), the founder of Modern Portfolio Theory (MPT), suggested that investors choose optimum portfolios on the basis of their expected return and risk characteristics. As noted above, the overall risk of a portfolio is measured by the *standard deviation* of its returns.

Sharpe used this concept to build a "reward to variability" ratio which has become known as the Sharpe Index. The metric is calculated using standard deviation and excess return (i.e. return above a risk free investment) to determine reward per unit of risk.

The higher the Sharpe ratio, the better the fund's historical risk-adjusted performance. In theory, any portfolio with a Sharpe index greater than one is performing better than the market benchmark.

5.3 Jensen's Alpha

Jensen’s Alpha is also a reward to risk measure. However, it uses a different concept of risk. To explain, we first need to realise that this measure’s framework is taken from the capital asset pricing model (CAPM). In this model, among the assumptions, it is taken that every investor holds a diversified portfolio. This allows investors to diversify away some of their investment risk, leaving them exposed only 'systematic' or non-diversifiable market-related risk.

Jensen's Alpha uses only systematic risk for scaling a portfolio's return. Alpha measures the deviation of a portfolio's return from its equilibrium level, defined as the deviation of return from the risk-adjusted expectation for that portfolio's return.

For ranking purposes, the higher the alpha, the better the performance. The fund beats the market, on a systematic risk adjusted basis, if Jensen's Alpha is greater than zero, and vice versa.

5.4 Treynor Index

A third performance measure is the Treynor index. This is calculated in the same manner as the Sharpe index, using excess returns on the fund, but the excess return on the fund is scaled by the beta of the fund, as opposed to the funds' standard deviation of returns.

Of these three traditional measures, the regression-based Jensen's Alpha is most commonly used in academic research. It provides a measure of whether a manager beats the market, as well as suggesting the magnitude of over/under performance.

These performance measures are explained in more detail in Appendix One.

5.5 Survivorship Bias

Performance studies face a problem called "survivorship bias". This arises because some funds disappear during the period being studied. They may close or merge, or data on them may become unavailable. To the extent that being a survivor depends on past performance, using data based on surviving funds will bias upwards the true average performance of the managed fund industry. This is because the high-performing funds will tend to be over-represented in the sample. Funds with poor performance will tend to be merged or closed and will drop out of the sample. This may lead to predictable biases in empirical work on managed fund performance.

5.6 Performance Persistence

Performance persistence can be defined as a positive relation between performance ranking in an initial ranking period and the subsequent period.[4] Two forms of persistence, absolute and relative, have been distinguished in the literature. A fund possesses *absolute* performance persistence if it is able to consistently beat a specific benchmark. This has implications for the Efficient Market Hypothesis, or the speed with which information is reflected into security prices. This also has implications about the merits of actively managed versus index funds. However, these issues are not the focus of this paper.

On the other hand, a fund possesses *relative* performance persistence if its performance is consistently above the average performance of a cohort of funds. Evidence of relative persistence has implications for investor choices between funds.

Many of the early studies were prompted by the development of MPT and thus focussed on performance relative to a market benchmark. More recently greater emphasis has been placed on the issue of performance persistence.

The academic studies use two main techniques to study performance persistence.

One approach is a regression analysis of risk-adjusted returns from a benchmark (using Jensen's alpha). The studies then examine the correlation between alphas in the prior period and the later period.

[4] Carhart (1997).

The second approach is to compare returns (not risk adjusted) between funds in similar asset categories. Medians or quartiles are used to compare rankings in the prior period and the later period. This is the contingency table approach.

6. Empirical Evidence

The first question in any discussion of performance is "can funds add value in the sense of 'beating the market'"? Early studies of managed fund performance focused on this issue. These studies were done to test the Efficient Markets Theory. They also assist investors to decide whether it is better to invest in an actively managed fund or an index fund. The subject is complicated, as different results are obtained depending on what benchmark is used. A stock market index (such as the All Ordinaries or Dow Jones) has inherent biases. However, this whole topic is outside the scope of this paper, as it addresses a different issue.

Recently more attention has also been focussed on whether past performance of individual funds can be used as a guide to their future performance. Can consumers successfully use measures of past performance as a decision tool for fund selection? This issue is also referred to as "performance persistence".

Our review of the literature will proceed in three segments: we will begin with the US literature, this is the largest, then we will briefly look at some of the UK studies before concluding with a more in depth review of the Australian empirical work.

6.1 US studies

There are more US studies of mutual fund performance than in other countries. They tend to have larger data sets and were among the first to use more sophisticated measurement methods.

Early studies of performance persistence indicated that superior performance does not persist through time [see Sharpe (1966) and Jensen (1968)]. Perhaps the most influential work on the topic is that of Jensen (1968), who concluded that not only *average* fund performance but also *individual* performance was no better than that predicted from mere random chance. Studies in the early 1990s, on the other hand, suggested that some mutual funds have persistent superior performance. [Grinblatt &Titman (1992), Hendricks, Patel & Zeckhauser (1993), Goetzmann & Ibbotson (1994), Elton, Gruber & Blake (1996a), and Gruber (1996)].

However, more recent studies tend to show that the persistence results may be subject to more doubt. First, Brown, Goetzmann, Ibbotson, & Ross (1992), Brown & Goetzmann (1995), and Malkiel (1995) find that survivorship bias in the construction of the mutual fund samples may give rise to the appearance of persistent superior returns. Secondly, Carhart (1997), Daniel, Grinblatt, Titman & Wermers (1997) and Wermers (1997) report that a naive momentum investment strategy can explain the apparent persistence in performance, especially among well performing funds.

Grinblatt and Titman (1992) examine a sample of 279 funds over the period 1975-1984 using the eight portfolio or P8 benchmark. This benchmark consists of a composite of passive portfolios which are constructed to take into account size (4 portfolios), dividend yields (three portfolios) and past returns (one portfolio). They use regression to calculate excess returns ('alpha') for each fund. This risk adjusted measure will be positive and significant if there is superior performance. They divide the sample into 1975-1979 and 1980-1984 sub-periods and examine whether above-average performance in the earlier period is indicative of above-average performance in the later period. Their results provide weak support for the hypothesis that better than average performance persists over time.

Hendricks *et al.* (1993) look at no-load (i.e no entry fee) growth-oriented mutual funds from 1974-1988. The data consists of quarterly returns (net of management fees) for a total sample of 165 funds. They transform all returns into excess returns by subtracting the one-month US Treasury bill rate. They find stronger evidence that funds that do well in the past do well in the short-term future. In their study, funds in the top octile (one eighth) of past performers over the previous year (as measured with raw returns), outperformed the lowest octile of past performers in the following year. They also report theoretical profits from a strategy of buying past winners as well as selling past losers. However, information about performance beyond the previous four quarters does not seem to predict future performance. They report positive persistence for four quarters and then a reversal. Therefore, they call their findings a "hot hand" phenomenon.

Brown *et al.* (1992) argue that results of persistence will appear spuriously in samples limited to surviving mutual funds. Their argument is that to choose high-risk strategies and survive in the first half of the sample period is likely to lead to above average returns. If these funds continue their-high risk strategy and continue to survive, they are also likely to achieve above normal returns in the second half of the sample. Therefore, only using a sample of surviving funds biases result toward finding performance persistence. The degree of this bias, amongst other factors, depends on the fraction of managers who drop out of the sample and whether their characteristics differ systematically from surviving managers.

Khan and Rudd (1995) use a sample of 300 equity and fixed-income mutual funds with in sample periods running from 1983-1987 for equity funds and 1986-90 for fixed income funds. They then test performance persistence in 1988-93 for equity funds and 1990 to 1993 for fixed income funds. They use a variety of performance metrics based on 'alphas' *(i.e. risk adjusted returns)* plus style analysis. Their persistence analysis is based on contingency table analysis. They do not find any equity fund performance persistence but did find fixed income fund performance persistence even after controlling for fund style and management fees.

Using a sample of surviving and non-surviving funds between 1971-1991, **Malkiel** (1995) finds some evidence of performance persistence during the 1970s. However, the phenomenon does not continue through the 1980s. This suggests that conclusions about the importance of survivorship may be sensitive to the time period studied. He provides evidence that using a sample consisting entirely of surviving funds creates an upwards-bias in apparent performance.

Brown and Goetzmann (1995), use data on both surviving and non-surviving funds, in a sample that is largely free of survivor bias. This sample consists of all common stock funds running from 1976 (372 funds) through to 1988 (829 funds). They use probabilistic regression analysis to analyse fund disappearance and report that past performance over several years is the major determinant of fund disappearance. Fund growth plays only a marginal role, and other variables; size and age are negatively related to disappearance, whilst expense ratio is positively related to it. They report clear evidence of relative performance persistence, especially in "losing" mutual funds. They suggest that investors can use historical information to beat the pack. Evidence that historical information can be used to beat previously set benchmarks, such as the return on the S&P 500 index is weaker, and depends on the time period of the analysis.

Elton, Gruber and Blake (1996) use a sample free of survivor bias consisting of all 'common stock' funds with $15 million plus of net assets, from 1997 to 1993, a total of 188 funds. They use a benchmark which captures the influence of four factors, the S&P 500 index to represent the market, a size factor, a growth factor, and a bond index factor. They estimate excess performance for each fund ('alphas'). Funds are ranked and placed in portfolios based on deciles of performance. They then rank subsequent performance for each portfolio. They find that ranking using one year's past data *gives greater persistence* prediction than ranking using three year's data if performance is being predicted over a one-year period. Raw returns *give greater persistence prediction* than risk-adjusted returns. They conclude in favour of the existence of performance persistence in the short run *and* in the long run. However, 3-year past returns are better than one-year's data in predicting returns over the next three years when ranking is done on a risk-adjusted basis. They suggest there is more to persistence of performance than the 'hot hands' phenomenon. They suggest that the very poor performance of the lowest decile is largely accounted for by the fact that it contains the majority of funds with very high expenses.

Carhart (1997) dismisses the "hot hand" phenomena of Hendricks *et al.* (1993). He uses a sample of all diversified equity funds in existence between 1962- 1993, a sample which is free of survivor bias. He finds that the hot hand result is mostly driven by the one-year momentum strategy. The fact that some funds by chance happen to have large positions in the previous year's winning stocks. Since the momentum strategy is based on past returns and replicable by uninformed investors, it should not be counted as a superior portion of performance. When he adds a factor representing the momentum strategy, evidence of persistently superior performance disappears. However, he finds positive persistence in strongly under-performing funds. He suggests three important rules of thumb for mutual fund investors: 1) avoid funds with persistently poor performance, 2) funds with high returns last year have higher than average expected returns in the next year, but not in years thereafter, 3) the investment costs of expense ratios, transactions costs, and load fees all have a direct, negative impact on performance.

Recently, **Daniel, Grinblatt, Titman and Wermers** (1997) and **Wermers** (1997) apply a portfolio-based performance measurement model to study performance persistence. Their results confirm that the momentum effect on stock returns and the persistent use of momentum strategies by fund managers are the main reason for performance persistence.

Christopherson, Person and Glassman (1998) employ conditional analysis to study performance persistence of pension funds. By conditional they mean the use of time-varying, 'conditional' alphas and betas instead of the usual 'unconditional' or average ones which are assumed constant after being estimated in regression analysis. They argue that institutional investment managers are likely to use current information about the state of the economy when forming expectations about returns. Their data consist of 273 pension funds from the period 1979-1990. They find evidence that the investment performance of the pension managers persists over time. In particular, low conditional alpha managers in the past tend to be abnormally low-return managers in the future. The conditional variables they uses include the lagged one-month T-bill rate, a lagged dividend yield measure based on a value-weighted NYSE and AMEX stock index, a lagged measure of the term structure of interest rates, a lagged measure of quality spread in the corporate bond market, plus a dummy variable to capture the January effect. Their unconditional measure is a standard Jensen alpha regression. They measure performance prediction by regressing current alphas (measures of superior performance) on past alphas. They also document that conditional measures are more informative about future performance than are unconditional measures *(i.e. average alphas and betas).* They report that persistence becomes stronger as the future return horizon increases out to three years.

Zheng (1999) uses a different approach tracking the flow of investor's funds into mutual funds to examine whether investors can successfully discriminate between the relative performance of funds. He examines two basic issues. The first issue is whether investors are smart before the event? Do they move their investment money into funds which will perform better? The second issue is whether there is information in tracking this flow of funds and the issue of whether it can be used to make abnormal returns? His sample is made up of a comprehensive data set of open-end mutual fund data running from 1961-1993 including defunct funds. This includes both load and no-load (entry fee and no entry fee) funds. On average he has a sample of 478 funds in existence each month with a minimum of 281 funds and a maximum of 1,196 funds. He concludes that aggregate newly invested money in equity mutual funds is able to forecast short-term future fund performance, in that funds that receive more money subsequently perform better than funds which lose money. For the whole sample there is no statistical evidence that following the money flows will produce a strategy that will beat the market index, *but there is evidence for money flows into small funds.* However, this smart money phenomenon appears to be short-lived in that the performance ranking of positive and negative portfolios reverses after 30 months.

Table One summarises some major studies of mutual fund performance and indicates the key results produced by each study. The table is adapted from Ippolito (1993) drawing upon his summary of the early work and table format.

TABLE 1 -Overview of US Mutual Fund Performance Studies

Study	*Year*	*Period Covered*	*No. Funds*	*Type of Fund*	*Survivor Bias present?*	*Benchmark*	*Performance persistence?*
Sharpe	66	1954-63	34	All	Yes	DOW-JONES	No
Jensen	68	1945-64	115	All	Yes	S&P 500	No
Carlson	70	*1948-61*	82	Stock	Yes	S&P 500 DOW-JONES	Yes
McDonald	74	1960-69	123	All	Yes	EW-NYSE	No
Mains	77	1955-64	70	All	Yes	S&P 500	Partially
Kon & Jen	79	1960-71	49	All	Yes	EW-CRSP	Yes
Shawky	82	1973-77	255	All	Yes	EW-NYSE	No
Chang & Lewellen	84	1971-79	67	All	Yes	VW-CRSP	No
Henriksson	84	1968-80	116	All	Yes	VW-NYSE	No
Lehman & Modest	87	1968-82	130	All	Yes	VW-CRSP	Yes
Grinblatt & Titman	89	1975-84	157	STOCK	No	VW-CRSP 8P PORT	No
Ippolito	89	1965-84	143	All	No	S&P 500 VW-NYSE	No
Brown, Goetzmann Ibbotson & Ross	92	1976-87	126-153	Growth equity	No	S&P 500 index	Yes but shows effects of survivor bias
Grinblatt & Titman	92	1974-84	279	Mutual funds, all.	Yes	8 factor benchmark	Yes
Hendricks, Patel & Zechauser	93	1974-88	165	Mutual Funds, all.	No	Various	Yes
Goetzmann & Ibbotson	94	1976-88	728	Mutual Funds	Yes	S&P 500	Yes
Brown & Goetzmann	95	1976-88	372-829	Mutual Funds; All common stock	No	Median fund and various indices	Yes, relative performance persistence
Kahn &Rudd	95	1983-93	300	Mutual funds: equity & fixed income	Yes	S&P 500 and style indices	No for equity, Yes for fixed income
Malkiel	95	1971-91	Up to 724	Mutual funds, all	Yes	Wilshire 5000 S&P 500	Yes but stronger in 70' s than 80' s
Elton, Gruber & Blake	96	1977-93	188	Mutual funds, all	No	Four factor model	Yes
Gruber	96	1985-94	270	Mutual Funds, all	No	Market model Single index 4 factors	Yes
Person and Schadt	96	1968-90	67	All	Yes	CEB-AVG CEB-EW	Yes but mainly concentrated in the extremes.
Carhart	97	1962-93	1,892	All diversified equity funds	Yes	CAPM 3 factor model 4 factor model	Yes, mainly in short term.
Daniel, Grinblatt, Titman & Wermers	97	1975-94	2,500	All equity funds	Yes	Jensen 4 factor model, Jensen CRSP VW, + 2 other models	Yes, short-term, partly related to momentum.

Note: CAPM = capital asset pricing model; VW = value weighted; EW = equally weighted; CEB = conditional expectations benchmark; AVG = average of individual fund regression results;

Study	*Year*	*Period Covered*	*No. Funds*	*Type of Fund*	*Survivor Bias present?*	*Benchmark*	*Performance persistence?*
Wermers	99	1974-94	2,400	Mutual funds All		Control portfolios based on size	Yes, short-term, partly related to momentum
Christopherson, Person & Glassman	98	1979-90	185	All pension fund managers	No	NYSE & Amex VW Unconditional and conditional models	Yes, stronger over 3 years
Blake et al.	99	1986-1994	306	All	Yes	EXT-TREND EXT-N/TREND PEER-TREND PEER-N/TREND *	Yes

Note: EXT-TREND (N/TREND) = external index-based benchmark with (without) trend; PEER-TREND (N/TREND) = peer-returns based benchmark with (without) trend

6.2 UK studies

In this section we will review some of the more recent work on the topic in the UK. Draper (1989) provides a useful review of early work on the UK investment trust industry. Ashton (1996) reviews the power of tests of fund manager performance. He cautions that the conflict between the need to have a sample period likely to afford any statistical power and the shortness of the tenure of a typical fund manager mean that it is likely to be very difficult to discern superior performance. Giles, Wilsdon & Worboys (2002) provide the most recent and thorough review of UK research. The following section updates their work and draws upon their report.

Fletcher (1995) examines the selectivity and timing abilities of 120 UK trusts with Growth, General or Income Objectives as detailed in the Unit Trust Year Book for 1980. He applies a variety of indices and methods including Chen and Stockum and Hendriksson and Merton's measures of timing ability. He reports that the selectivity skills on average are positive but the timing performance is negative in his sample period from 1980 to 1989. He does not examine performance persistence in this paper but subsequently in **Fletcher** (1997), he investigates a sample of 101 UK unit trusts with the same objectives as in the previous study. He considers five portfolios based on a ranking of five-year risk-adjusted performance windows. He then repeats this examining a two-year performance window. Survivorship bias was partly allowed for by the continuation of funds through name changes or changes in management groups, though mergers are treated as terminations. Fletcher does not report any evidence of persistence of performance.

Brown, Draper and McKenzie (1997) analyse UK pension fund performance using data from the World Market Company. They examine risk-adjusted returns using the market model, over the period 1986-1992 in a sample of 409 funds. Applying one-year windows and contingency table analysis of performance persistence across quartiles of the sample they report some limited evidence of persistence. Their sample is not adjusted for survivor bias but their simulations and analysis of its likely impact suggest that it would not be likely to affect their results.

Quigley and Sinquefield (1998) use a similar approach by constructing portfolios, ranked by deciles, on the basis of relative performance in a given year. They then compare the performance of each of these portfolios in the next year. They have a large sample taken from the Micropal database of all equity UK unit trusts that were in existence between 1978 and 1997; a total of 752 funds. They include only those trusts that are classified as having objectives of Growth and Income, Growth, Equity income or smaller companies. They construct tests of performance persistence both before and after adjusting for risk. The difference between the average of the portfolio's performance at extremes of the deciles is positive over subsequent years but adjustment for transactions costs eliminates any gains. A variety of market and factor-based risk adjustments are then applied which wipe out any positive gains but lead to the conclusion that only poor performance persists.

Lunde, Blake and Timmerman (1998) use risk-adjusted returns to create portfolios of returns over three year periods using a large data-set of 2,300 UK unit trusts obtained from Micropal data. They construct performance measures based on bid prices and net income without any adjustment for expenses. Their analysis is based on inter-quartile fund performance over three year periods. Repeated analysis of inter-quartile performance reveals whether the members of the top quartile remain in that quartile and so on, as applied in the cases of members of the other three quartiles. Evidence of performance persistence would be revealed via inter-quartile transition probabilities in excess of 0.25; which is a probability equivalent to pure chance and consistent with no performance persistence. They report transitional probabilities for the top and bottom quartiles of 0.355 and 0.332, figures which are consistent with the existence of performance persistence.

Blake and Timmerman (1998) build on their previously mentioned study by analysing persistence at a greater level of dis-aggregation. They analyse performance from 1972-1995 in a sample that includes 973 dead and 1,402 surviving funds. Their database is comprehensive and covers domestic equities, international equities, bonds, property and commodities. They report under-performance of about 1.8 per cent per annum for the average UK equity fund after risk-adjustment. They also find evidence of performance persistence and suggest that survivor-bias accounts for about 0.8 per cent per year in their sample. Their analysis of fund births and deaths suggest a brief period of out-performance during the first year of a fund's operations and marked under-performance of –3.3% in the final year of a fund's life.

Fletcher (1999) examines 85 UK unit trusts with a US investment orientation between 1985 and 1996 and reports no evidence of performance persistence. Similarly the **Wood Mackenzie Company** (1999) applied a similar technique of estimating inter-quartile transition probabilities across five year windows for a sample of UK income and growth funds and found no evidence of performance prediction, but did report evidence of the top quartiles' performance persisting in the next year.

Allen and Tan (1999) report some evidence of persistence of performance in a sample of 131 UK funds for the period 1989-1995. Their study employs a United Kingdom sample data set of weekly returns from all equity mutual funds existing each year and available on the Datastream database. They analyse the relative performance of the funds and determine whether a good past-performance is indicative to any degree of the portfolio's subsequent performance. Unlike previous studies which compare fund performance with a benchmark (FTSE 100 or some benchmark index), the study compares the relative performance of the sample funds themselves. They examine the persistence in performance in the short and long run based on four major empirical tests. These are contingency table analysis of winners and losers and Chi squared tests on these tables, ordinary least squares regression analysis of CAPM risk-adjusted excess returns, and Spearman Rank Correlation Coefficient analysis of successive period performance rankings. If past performance is a good indicator of future performance we would expect superior managers in the first test period to continue to exhibit superior performance in the second test period, and so on. Overall we find that both raw and risk-adjusted returns exhibit evidence of persistence in the long run but not in the very short run. They also explore the relationship between performance and volatility by dividing funds into two groups: high and low variance. The performance in both of these groups exhibits repeat-winner patterns suggesting that superior performance is not conditioned purely by risky investment strategies.

Some of Allen and Tan's (1999) contingency table results for raw returns are presented below in table 2. The holding periods are for one year and a winner/loser is defined in terms of the median performance in the sample each year. The table summarises the results over a succession of periods.

Table 2
Two-Way Tables of Ranked Fund Raw Returns Over Successive One-Year Intervals

Winner-winner indicates the number of above median funds in the year that were also above median funds in the following year. Loser-winner, Winner-loser, and Loser-loser are defined similarly. The percentage of period 1 winners and losers that become period 2 winners and losers can be seen the parentheses. Source Allen and Tan (1999).

Combined Results in Successive Periods 1991-1995		
	Winners	**Losers**
Initial Winners	**185 (56.4%)**	**143 (43.6%)**
Initial Losers	**140 (42.8%)**	**187 (57.2%)**

The combined summary results, sourced from Allen and Tan (1999), for risk-adjusted returns are shown in Table 3 below:

Table 3
Two-Way Tables of Ranked Fund Raw Alphas Over Successive One-Year Intervals

Jensen's (1968) risk-adjusted performance measure is used to evaluate the mutual fund performance. This is defined as:

$$\alpha_t = R_{pt} - [R_{ft} + \beta (R_{mt} - R_{ft})]$$

where R_{pt} is the individual fund portfolio unadjusted total return for period t; R_f is the treasury bill return; R_{mt} is the UK fund managers return; β is the regression slope coefficient. The α (alpha) estimates the excess returns averaged over the sample period used to estimate the characteristic line regression. It indicates whether the portfolio manager is superior or inferior in market timing and/or stock selection. A significant positive α value giving consistent positive residuals would imply that the manager is superior. Source Allen and Tan (1999).

Combined Results in Successive Periods		
	Winners	**Losers**
Initial Winners	**189 (59.1%)**	**131 (40.9%)**
Initial Losers	**129 (40.3%)**	**191 (59.7%)**

These results suggest that winners tend to remain winners and losers remain losers, at least when winning or losing is defined relative to the median performance.

Dimson and Minio-Kozerski (2001) examine the closed-end fund discount and performance persistence in the UK. A closed-end fund is a collective investment fund that invests in other publicly traded securities. Closed-end funds typically trade at a discount to the underlying value of the securities which make up their portfolios. They use a sample of 244 funds for a period from 1987 to 1996 and add back 94 funds that disappeared providing a final sample of 338 funds. They apply Sharpe's style analysis to measure manager performance after adjusting for factor exposure. They find no evidence of performance persistence amongst closed-end funds.

Heffernan (2001) examines the relative performance of eight categories of UK investment trusts comprising 273 trusts for the period 1994-99. Two benchmarks are used - the average annual performance of a given fund category and a relevant market index. No relationship between fees and performance was evident but there is some ambiguous evidence of persistence in performance, particularly for short horizons.

Tonks (2002) examines the persistence in performance over time of the performance of fund managers making decisions in UK pension funds. He uses data from the Combined Actuarial Performance Services Ltd consisting of quarterly returns for 2,175 UK pension funds from 1983 to 1997. Tonks attempts to control for survivorship bias but concedes that look-a-head bias may affect his results, since his estimating procedures require at least 12 observations. He utilises a 3-factor model to control for risk and contingency table analysis to measure performance persistence. Tonks reports significant persistence in the performance of fund managers over one-year horizons and some evidence of persistence over other time intervals. Note that the results are not adjusted for fund management costs.

Wood Mackenzie (2002) have some interesting comments to make on persistence in performance and whether it exists or not. They report that they have carried out a number of studies in this area, and that in short, the answer is 'it depends'.

1. It depends on the time frame being considered. They have previously analysed the S&P UK 'All Companies' sector for persistence in trust performance. In the 1999 report they found no evidence of significant persistence looking at five-year time frames. In the 2000 report they provided "evidence of shorter-term persistence with a defined top quartile of trusts in any one year continuing to out-perform a group in the subsequent year."

2. It depends on the sector. They found no substantive evidence of longer-term persistence in the 'All Companies' sector, but have published research which would indicate greater consistency within the 'UK small cap' sector. Further, in a study of UK pension fund performance undertaken in the mid-1990's, they found that "the evidence appears to be: stronger over medium term periods (3-5 years) than over periods in excess of 5 years.
   - The evidence of consistency of performance is stronger when returns are adjusted for risk rather than when absolute return data is analysed.
   - Further, statistically significant results are consistently found for the Q4Q4 cell in their matrix analysis." (i.e. bottom quartile funds would have a tendency to remain bottom quartile).

3. It depends on the time periods. The results differ according to different periods. It seems to them to be impossible to tell when a period of persistency will be apparent and when it will not.

Wood Mackenzie further caution that: "short-term persistence (good or bad) is to be expected. In large part it is nothing more than a particular trust's investment style or approach being in (or out) of favour dependent on the phase of the economic cycle. It follows that many trusts' performances go through cycles: periods of out-performance are followed by periods of under-performance. This is what investment consultants are referring to when noting the lack of consistency in many manager track records. A failure to recognise these cycles can lead investors (whether retail or institutional) to purchase a manager at the top of its cycle or sell at the bottom. This is not a recipe for successful investment."

The problems with trying to follow such a strategy are the systematic identification of 'top' and 'bottom' and the costs of switching. Sometimes, managers might be victims of their own short-term success in that their 'successful' investment approach can be effected adversely by the inflow of substantial amounts of new money 'chasing' this performance. As assets grow, the quality of the portfolio and ease of transacting may fall, impairing performance. They conclude by cautioning that the kind of long-term consistent out-performance that may indicate skill through economic cycles is, by and large, simply not available.

Table 4 provides a summary of the findings in recent UK performance persistence studies. It can be seen that there is fairly consistent evidence of performance persistence which suggests that past performance would be useful information to fund investors.

Table 4
Summary of some recent UK studies of unit trust performance persistence

Study	Year	Period	Type of fund	Risk and other adjustments	Retail charges	Survivor bias	Performance persistence
Brown, Draper & McKenzie	1997	1986-90	409	Market models	No	Yes	Yes
Fletcher	1997	1981-89	101	Yes	No	Partial	No
Fletcher	1999	1985-96	85 Funds with American investment objectives	Yes/no	No	No	No
Quigley & Sinquefield	2000	1978-97	752 funds Growth, Income, Equity Income or smaller companies	Yes and no. CAPM and size and value.	No (but adjusts for expenses)	Yes	Yes, Persistence in poor performance.
Blake, Lunde & Timmerman	1998	1972-95	2,300	Yes	No	Yes	Yes, especially after accounting for survivorship.
Blake & Timmerman	1998	1972-95	2,300	Yes/no	No	Yes	Yes
Allen & Tan	1999	1989-95	131 managed funds	Yes/no	No	No	Yes even after accounting for risk over 1-2 years.
WM Company	1999	1979-98	UK Growth and Income	No	No	No	No
Dimson & Minio-Kozerski	2001	1987-96	UK closed-end, most types	Yes	No	Yes	No
Rhodes	2000	1980-98	UK Equity Growth, UK Growth and Income, UK Income and Income Sector	Accounts for risk by adopting a 'novel' utility based approach	No	Yes	No, weak persistence pre-1987, no persistence from then on
Heffernan	2001	1994-99	UK various categories	Yes	Fees analysed	No	Yes in short term
Tonks	2002	1983-97	UK pension funds UK equities	Yes	No	Yes	Yes
WM Company	2002	1982-2001	All companies sector	Relative to an index	Yes	No	Mixed, for 'short' horizons.

Source: This table is an updated version of table 7 in Giles, Wilsdon & Worboys, Charles River Associates, "Performance persistence in UK equity funds – a literature review", (2002).

6.3 Australian work

Bird, Chin and Macrae (1983) examine the investment performance of Australian superannuation funds and their managers over a period from 1971 to 1981. They examine the Sharpe, Treynor and Jensen indices as potential benchmarks. They conclude that the three different metrics do not lead to differences between the funds and managers in their study.

The process of adjusting for risk does not alter the perceived performance of funds and managers in the first half of the study but does make a difference to the relative rankings in the second half. They find no evidence that managers perform consistently over time.

Sawicki and Thomson (1999) examine the performance of Australian rating agencies' lists of approved funds as opposed to the ones not included on the list (the 'non-gratae') in terms of differences in actual subsequent performance. They utilise research company data on the performance of 500 managed funds over a six-year period from 1989 to the end of 1994 along with lists of approved funds each year. They also examine the impact of selecting funds on the basis of past performance and did not find significant evidence of performance persistence. The ranking was conducted over successive three-year intervals and no examination of shorter performance intervals was undertaken.

Sawicki and Ong (2000) examine the performance of 97 Australian wholesale funds using monthly data over the period 1983-1995. They use a conditional benchmark approach which permits time-varying measures of risk or 'betas'. Tests using successive three-year periods indicate that there is little consistency in performance from period to period.

Hallahan (1999) examines the relation between past and future performance for a subset of Australian investment funds, namely, roll-over funds. Four categories of funds are examined: fixed interest; multi-sector yield; multi-sector balanced; and multi-sector growth. This study uses three methodologies to explore the "information content" of fund performance history for groups of funds differentiated by investment objective: 1. Regression analysis; 2. non-parametric contingency tables; and 3. top and bottom quartile rankings to explore the information content of fund performance history for groups of funds classified by investment objective. The results of the regression analysis suggest that there is evidence in support of persistence in performance for the fixed interest funds, particularly on a risk-adjusted basis, but more ambiguous evidence in relation to the multi-sector funds.

Contingency table analysis of fund performance histories of varying lengths reveals quite different results depending on whether raw or risk-adjusted returns are used. The use of raw returns creates an overall impression of performance reversals whereas the use of risk-adjusted returns suggests the existence of performance persistence. The dataset of roll-over funds varied annually from 224 to 118 but includes only surviving funds and is likely to be subject to survivor bias.

Hallahan and Faff (2001) examine persistence and reversals in fund performance in the Australian Rollover funds. They also examine whether survivor bias appears to lead to spurious persistence, as argued by Brown et al. (1992) or to apparent induced performance reversals or non-persistence, as suggested by Grinblatt and Titman (1992).

Their study applies the contingency table methodology to the year-on-year raw returns of a sample of Australian Rollover funds.

Their sample period runs from 1989 to 1995. The dataset consisted of monthly index series for a sample of rollover funds. To enable more valid comparisons across funds, the sample was classified as (a) fixed interest; (b) multi-sector yield; (c) multi-sector balanced; (d) multi-sector growth. The four classifications represent a range of investment objectives or styles with different attendant risk profiles. The total sample size varied from 121 to nearly 300 separate funds, over the sample period. The data set used consists of annual raw (i.e. not risk adjusted) returns for all funds contained in each category of rollover fund. They test for the implicit effects of survivor bias because their four categories have different rates of attrition. They examine whether the groups with higher rates of attrition appear to exhibit greater or less evidence of performance persistence.

A simple test for persistence is to use the non-parametric contingency table analysis to identify the frequency with which funds defined as winners or losers maintained that rating over succeeding time periods. To get an overall view of fund performance annual percentage returns were calculated for each fund for the years 1989 to 1995. Winning and losing funds were defined in relation to the median fund return for each year and 2x2 contingency tables were constructed. Winner-Winner (WW) refers to a fund which achieved returns above the median return in each period, Winner-Loser to a fund which was above the median in the prior period but below the median in the post period, and so on.

Although some evidence of persistence in performance was found, there were significant differences across the fund categories. Overall, the dominant pattern was one of performance reversals. Similarly, selecting funds based on their ranking in the top quartile does not appear to be a successful strategy, a finding supportive of the earlier work of Dunn and Thiesen (1983). "Given that raw returns are the most widely published performance measures, reliance on raw return performance rankings for fund selection would seem to be a courageous [i.e. unreliable] approach." Their results are reproduced below:

Table 5 - Fixed Interest Funds - Raw Returns

Prior Year	Winner-Winner	Winner-Loser	Loser-Winner	Loser-Loser	Statistically significant?	Top Quartile in both Prior & Next Year (%)
1989	11	10	10	12	No	72.7
1990	18	6	6	19	Yes	66.7
1991	21	6	6	21	Yes	42.9
1992	22	6	6	22	Yes	57.1
1993	8	21	21	9	Yes	0.0
1994	4	29	29	4	Yes	0.0
Total	84	78	78	87	No	36.1

Source: Hallahan, T. and Faff, R.W. (2001), "Induced Persistence or Reversals in Fund Performance? The Effect of Survivorship Bias", *Applied Financial* Economics, Vol. 11(2), pp. 119-126.

Table 6 - Multisector Yield Funds - Raw Returns

Prior Year	Winner-Winner	Winner-Loser	Loser-Winner	Loser-Loser	Statistically significant?	Top Quartile in both Prior & Next Year (%)
1989	3	4	4	3	No	0.0
1990	7	7	8	8	No	50.0
1991	10	8	8	11	No	55.6
1992	14	11	11	14	No	61.5
1993	6	23	24	8	Yes	6.7
1994	12	24	24	12	Yes	0.0
Total	52	77	79	57	Yes	26.9

Source: Hallahan, T. and Faff, R.W. (2001), "Induced Persistence or Reversals in Fund Performance? The Effect of Survivorship Bias", *Applied Financial* Economics, Vol. 11(2), pp. 119-126.

Table 7 - Multisector Balanced Funds - Raw Returns

Prior Year	Winner-Winner	Winner-Loser	Loser-Winner	Loser-Loser	Statistically significant?	Top Quartile in both Prior & Next Year (%)
1989	2	4	4	2	No	33.3
1990	5	6	6	5	No	16.7
1991	6	7	7	7	No	42.9
1992	9	8	8	10	No	33.3
1993	7	14	15	9	No	9.1
1994	13	12	12	11	No	0.0
Total	42	51	52	44	No	18.8

Source: Hallahan, T. and Faff, R.W. (2001), "Induced Persistence or Reversals in Fund Performance? The Effect of Survivorship Bias", *Applied Financial* Economics, Vol. 11(2), pp. 119-126.

Table 8 - Multisector Growth Funds - Raw Returns

Prior Year	Winner-Winner	Winner-Loser	Loser-Winner	Loser-Loser	Statistically significant?	Top Quartile in both Prior & Next Year (%)
1989	14	11	11	15	No	15.4
1990	15	19	19	15	No	17.6
1991	20	20	20	21	No	25.0
1992	17	27	27	18	Yes	27.3
1993	18	30	30	19	Yes	25.0
1994	25	29	29	25	No	11.1
Total	109	136	136	113	Yes	20.3

Source: Hallahan, T. and Faff, R.W. (2001), "Induced Persistence or Reversals in Fund Performance? The Effect of Survivorship Bias", *Applied Financial* Economics, Vol. 11(2), pp. 119-126.

Soucik (2002) stresses that when making conclusions about the performance of managed funds, it is critical that the framework in which such performance is measured provides an accurate and unbiased environment. He examines various performance metrics in an effort to identify (in a consistent setting) the most accurate and least biased methodology. He also uses an extensive Australian dataset consisting of monthly returns covering 636 equity funds over a fifteen-year period between January 1985 and December 1999. The data were sourced from ASSIRT.

The results suggest that pre-existing benchmarks are neither objective and informative. He develops a benchmark that satisfies these criteria, sourcing from fifteen factor candidates across four categories. One key finding in Soucik for current purposes is the variation in performance according to the choice of benchmark. He concludes that the choice of benchmark has a critical impact on performance results. He reports that many popular benchmarks appear to be biased.

Soucik uses a *regression methodology* [see Grinblatt and Titman (1992)] to test for persistence in separate samples of equity managed funds and fixed interest managed funds. He investigates how past periods of different duration impact on various prediction time frames (both up to five years). Finally, he also tests the persistence in excess returns as well as raw returns.

His sample of managed fund returns are separated into samples of equity funds (914 series of data) and fixed interest funds (825 series of data). Index funds are excluded. To form his test samples he first selects a portfolio of randomly selected funds comprising 25% of the population, a ratio found to best balance the robustness of the sample with the risk of cross-portfolio repeats (see Barber, Lyon & Tsai, 1999).

If he seeks to find the relationship between the past 36 months of returns and future 12 months, the study period will equal 48 months. He eliminates survivorship bias by randomly selecting funds existing at the end point of each study period, not the starting point. This process is then repeated for a matrix of 12 months of past returns up to 60 months returns (past) selection and used to predict returns for anything from 12 months future returns out to 60 months (future prediction months) in quarterly intervals.

The following two diagrams show how excess returns (i.e. risk adjusted returns) for varying sample periods (S12 to S60) are related to predicted returns in subsequent future prediction periods (PI2 to 60). The chart merely shows whether there is a statistically significant relationship between the periods, not how strong the predictive power is. Figure 1 graphically presents the results for equity funds. Persistence is present (albeit slightly erratically) and follows a strong diagonal pattern where performance of past *n* months is significantly related to the following *n* months. Thus, for example, an investor looking at three-year horizon should examine *at least* three years of past returns to reach a more informed decision. Similarly, examining past two years of data helps paint a picture of *up to* two years into the future.

FIGURE 1: Prediction of Performance Persistence of Equity Managed Funds

Source: V. Soucik, (2002) extension of work in Ph.D dissertation;"Finding the True Performance of Australian Managed Funds", School of Accounting, Finance, and Economics, Edith Cowan University.

The left-hand side of the graph shows the sample period taken from one month out to five years (60 months S60) whilst the right hand side of the graph shows the prediction period also looking out to five years (prediction months up to P60). The darker shaded areas show statistically significant relationships between the sample (prior) periods and prediction periods. The surface shows how many months of sample period is required to predict forward for a given length of time up to five years. The dark (purple) areas show the ability to predict at a statistically significant level whilst the white shaded areas show the strongest statistical results. Areas shaded light grey (light blue) in the right-hand side of the diagram are not possible to predict in a statistically significant sense in Soucik's sample.

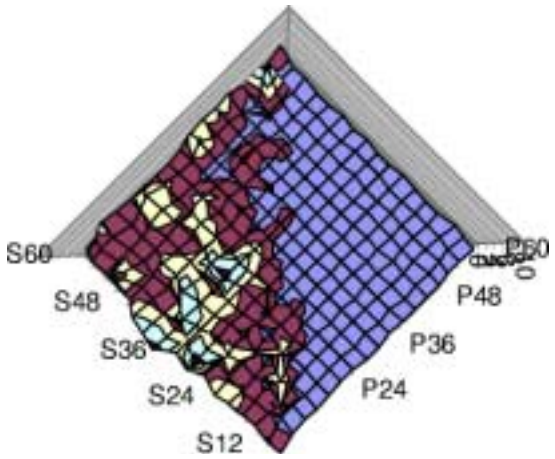
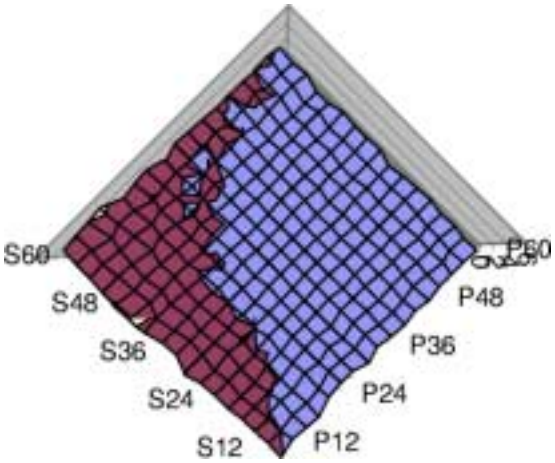


Figure 2 summarises the results for fixed interest funds. Whilst the prediction curve is more conservative than it is for equity managed funds, it is more consistent giving good credence to the argument of momentum in fixed interest fund returns. An investor looking at a three-year investment horizon now, however, needs to look as far back as four years. On the other hand, examining the last two years of return helps explain *at most* the ensuing 18 months.

FIGURE 2: Persistence of Fixed Interest Managed Funds

Source: V. Soucik, (2002) extension of work in Ph.D dissertation; "Finding the True Performance of Australian Managed Funds", School of Accounting, Finance, and Economics, Edith Cowan University.

The left-hand side of the graph shows the sample period whilst the right hand side of the graph shows the prediction period. The darker shaded (purple) areas show statistically significant relationships between the sample (prior) periods and prediction periods.



The above analyses suggest that it is possible to predict performance and that a longer estimation window is required for fixed interest funds as opposed to equity funds. In figure 2 above five years of monthly data are needed to predict three years of future performance. This is not surprising given likely term structure effects. The picture for equity funds in figure 2 is more equally balanced in that to look forward three years you need a past window of three- years returns.

These graphs do not tell the whole story. The ability to predict appears to be more concentrated in the extremes of the distribution. As noted in some of the previously-mentioned UK studies, it is the very poor-performers and the top performers who tend to have some degree of persistence in performance. The other problem is how far ahead you are trying to predict. Soucik found that more powerful predictions are associated with performance prediction out to two years and beyond this.

A summary of the Australian studies is presented below in table 9.

Table 9 - Summary of some Australian studies of managed fund performance

	Year	Period Bias Present	Funds Covered Persistence	Risk and Other	Survivor	Performance
Bird, Chin and McCrae	1983	1973-81	Superannuation funds	CAPM and Jensen Alpha	Yes	No
Robson	1986	67	All	CAPM	Yes	No
Hallahan	1999	1989-93	Rollover funds	Jensen alpha	Yes	Yes
Hallahan and Faff	1999	1988-97	65 All types	CAPM CAPM-	Yes	No
Hallahan and Faff	2001	1989-1995	Rollover funds	No	Yes	No
Holmes and Faff	2000	1988-97	Equity trusts	CAPM and others	Yes	No
Sawicki and Ong	1999	1983-95	97 All types	CAPM	Yes	No
Sawicki and Thomson	1999	1989-94	500 All types	CAPM	Yes	None
Soucik	2002	1985-1999	636 Equity and fixed interest	Yes Five Models, 3 risk-free proxies 9 benchmarks	No	Yes

7. Conclusions

This paper has summarised the academic literature on the "persistence" of managed fund performance. Of the 100 or so relevant studies from the past 40 years, we have focused on the more recent studies and the studies with the more robust methodology.

The majority of studies have examined US funds while a significant number examined UK funds. We also considered some studies of the performance of Australian funds. A majority of studies look at equity funds. The studies cover different time periods, use different benchmarks and reach different conclusions. The Australian studies are broadly consistent with the pattern of overseas research.

We have kept in mind the situation facing retail investors and focused on the studies which are most relevant to practical situations:

- Returns need to be adjusted for fees.

- Most consumers have an investment horizon of at least several years and frequent switching between funds would incur costs and inconvenience.

- The risk of different funds.

What can we conclude from this broad-ranging literature?

- Performance comparisons can be quite misleading if not done properly.

- Returns are only meaningful if adjusted for risk/volatility or comparing "like with like".

- The risk-adjusted studies involve complicated computer analyses that are only available to research houses and academics. They do not reflect the information available to retail investors via advertisements, league tables or formal offer documents. The risk-adjusted studies therefore measure the potential value of past performance information in the hands of experts, not ordinary consumers.

- Good past performance seems to be, at best, a weak and unreliable predictor of future good performance over the long-term. About half the studies found no correlation at all between good past and good future performance. Where persistence was found, this was more frequently in the shorter-term, (one to two years) than in the medium- to long-term (see Appendix 2). The medium to long-term comparison may be more relevant to the typical periods over which consumers hold managed funds.

- More studies seem to find that bad past performance increased the probability of future bad performance.

Appendix 1: Performance Measures

With the development of Modern Portfolio Theory (MPT) and asset pricing theory, in particular the Capital Asset Pricing Model (CAPM), it was immediately obvious that the analysis provided a theoretical framework that could be applied to meet the challenges of performance measurement. Treynor (1965), Sharpe (1966), and Jensen (1968) were the first to realise the potential applications of MPT and CAPM for investment performance evaluation.[8]

Standard Deviation

Markowitz (1952) suggested the use of standard deviation as a measure of risk. If the returns produced by a fund follow a bell-shaped normal distribution, then 95 times out of a hundred the return should be within plus or minus two standard deviations of the long-term average. By definition, approximately 68% of the time, the returns of any given fund are expected to differ from its long term average return by no more than plus or minus the standard deviation figure. Thus, the standard deviation is a statistical measure of the variability of a fund's performance. When a fund has a high standard deviation, its range of past-performance has been very wide, indicating that there is a greater potential for volatility.

The greater the standard deviation, the greater the fund's volatility. For example, an investor can compare two funds with the same average annual return of 15%, but with different standard deviations. If the first fund has a standard deviation of 2.0, this means that its range of returns can be expected to range between 11% and 19%. On the other hand, assume that the second fund has a standard deviation of 4.0. This higher deviation suggests that this fund might be expected to produce returns fluctuating between 7% and 23%. With the second fund, an investor might expect greater volatility.

The Sharpe Index

The Sharpe ratio is a risk-adjusted performance measure attributable to the Nobel Laureate William Sharpe.

Markowitz (1952), the founder of Modern Portfolio Theory, suggested that investors choose optimum portfolios on the basis of their expected return and risk characteristics. The overall risk of a portfolio is measured by the *standard deviation* of its returns.

Sharpe used this concept to build a "reward to variability" ratio called the Sharpe Index (SI). The ratio is calculated using standard deviation and excess return to determine reward per unit of risk.

First, the average return of Treasury bills over the relevant period is subtracted from the fund's average return. The difference in these figures represents the "excess return", that is, what the fund earned in addition to the risk-free Treasury bill benchmark. The excess return is then divided by the standard deviation of the fund's excess returns creating a ratio of return to risk.

Some of the lay person's explanations here are adapted from Morningstar.com

The SI is an excess return per unit of risk. For ranking purposes, the higher the Sharpe ratio, the better the fund's historical risk-adjusted performance.

In theory, a fully diversified portfolio would have a Sharpe Index (SI) of one. Any portfolio with an SI greater than one is performing better than this market benchmark. Any portfolio with an SI lower than one is under-performing.

Jensen's Alpha

The capital asset pricing model (CAPM) assumes that every investor holds a diversified portfolio (plus a few other assumptions). Some risk can therefore be diversified away. This means that only 'systematic' or non-diversifiable market-related risk should be included in a performance measure.

Jensen's Alpha (JA) uses only systematic risk for scaling a portfolio's return. This measures the deviation of a portfolio's return from its equilibrium level, defined as the deviation of return from the risk-adjusted expectation for that portfolio's return.

The JA of portfolio p is defined as:

$$JA_p = (E(r_p) - R_f) - \beta_p (E(r_m) - R_f)$$

The term "$(R_f + (\beta_p (E(r_m) - R_f)$" is portfolio p's equilibrium return implied by the SML and the CAPM. For ranking purpose, the higher the JA_p, the better the performance. The only problematic term in the above approach is the portfolio beta. This can be estimated by regressing the excess return on the fund (the return above the risk free -rate) on the excess return on the market, similarly defined. The intercept from running this regression is the Jensen alpha). To see whether fund p adds value, one has to merely check the numerical sign of the JA. The fund beats the market, on a systematic risk adjusted basis, if "$JA_p > 0$", and vice versa.

Beta is a measure of a fund's sensitivity to market movements. It measures the relationship between a fund's excess return over a risk free investment (such as Treasury bills) and the excess return of the benchmark index. A fund with a 1.10 beta has performed 10% better than its benchmark index—after deducting the T-bill rate—than the index in up markets and 10% worse in down markets, assuming all other factors remain constant. Conversely, a beta of 0.85 indicates that the fund has performed 15% worse than the index in up markets and 15% better in down markets.

For ranking purpose, the higher the JA_p, the better the performance. The only problematic term in the above approach is the portfolio beta. This can be estimated by regressing the excess return on the fund (the return above the risk free -rate) on the excess return on the market, similarly defined. The intercept from running this regression is the Jensen alpha). The fund beats the market, on a systematic risk adjusted basis, if Jensen's Alpha is greater than zero, and vice versa.

A third measure is the Treynor index. This is calculated in the same manner as the Sharpe index, using excess returns on the fund, but the excess return on the fund is scaled by the beta of the fund, as opposed to the funds' standard deviation of returns.

Of these three traditional measures, the regression-based Jensen's Alpha is commonly used. One advantage is that because investors are likely to spread their wealth into a number of funds, it is more important to focus on the marginal contributions of a fund to the total risks and returns of the investors. This requires a marginal risk measure, like beta [Grinblatt & Titman (1995)]. However, the measure is also both an absolute and a relative measure. It provides a measure of whether a manager beats the market, as well as suggesting the magnitude of over/under performance.

Appendix 2: Summary of major performance persistence studies, by holding period

Persistence studies examine whether there is a correlation between the past performance of a fund and the future performance. Different studies examine different future (or holding) periods. This table categorises the various studies according to the length of the holding period studied and whether persistence was found.

Holding period (post)	Found persistence	Did not find persistence
Up to 2 years	• Goetzman and Ibbotson 94 • Brown and Goetzmann 95 (yes but varies by year) • Lunde, Timmerman and Blake 1998 • WM99 • Hendricks, Patel and Zeckhauser 93 • Malkiel 95 (for 1970s) • Gruber 96 • Elton, Gruber and Blake 96 • Carhart 97 (12 month persistence) • Christopherson, Person and Glassman, 98 (12 months out to three years) • Allen 99 • Hallahan 99 (stronger for fixed interest rollover funds, less strong for multi-sector balanced and yield funds). • Blake and Morey 2000 Poor performance persists • Quigley and Sinquefield 2000 Poor performance persists • Hallahan and Faff 200 1 (positive for Fixed Interest funds in 90-92, but negative in 93 and 94, negative in Yield & Growth funds) • Soucik 2001 (for Equity & fixed interest funds)	• Blake, Elton and Gruber 93 (Bond Mutual Funds) • Malkiel 95 (for 1980' s) • Fletcher 97 • Hallahan 99 (Multi-sector growth roll-over funds) • Hallahan and Faff 2001 (Balanced funds)
3 years and over	• Carlson 70 (slight) • Lehman & Modest 87 • Grinblatt and Titman 89 (slight) • Brown et al 92 (2 out of 3 periods) • Grinblatt and Titman 92 • Kahn and Rudd 95 (for fixed interest funds) • Gruber 96 • Elton, Gruber and Blake 96 • Christopherson, Person and Glassman 98 (2 to 3 years) • Blake and Morey 2000 Poor performance persists • Soucik 2002 (for equity funds and for fixed interest funds	• Friend, Blume and Crockett • Bird et al 83 • Henrikkson 84 • Fletcher 97 • WM99 • Hendricks et al 93 • Kahn and Rudd 95 (for equity funds) • Carhart 97 • Sawicki and Ong 99 • Sawicki and Thomson 99

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