

**MAF017**  
**UNIT TRUST PERFORMANCE IN SOUTH AFRICA:**  
  
**AN EMPIRICAL INVESTIGATION OF THE**  
**PERFORMANCE PERSISTENCE OVER THE PERIOD**  
**2001 TO 2010**

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### **Abstract**

The debate on whether actively managed funds are able to persist in their performance has been on-going for almost half a century. However, convincing empirical evidence is yet to be presented in the financial literature. This study contributes to the debate by examining whether unit trusts on average are able to persist in terms of their performance. This study used six performance measures (namely: nominal returns, Sharpe ratios, CAPM alphas, Fama and French (1993) 3-factor alphas, Carhart (1997) 4-factor alphas and Ferson and Warther (1996) conditional alphas) which are subject to three tests of persistence in performance (namely: contingency tables, rank tests and time series regression). In order to identify the extent to which performance persistence exists in a South African context, the tests were applied to the monthly total returns obtained from a sample of 151 South African domestic equity unit trusts, covering the 10-year period from 01 January 2001 to 31 December 2010. The results indicated that some evidence of short-run persistence was found, the strength of the evidence decreased over the long-run, disappearing almost entirely in some cases. The results also suggest that overall the results were sensitive to the methodology and the performance model employed, as well as the time period examined and the length of the evaluation intervals. While the dataset was subject to survivorship bias, the principal conclusion was that this study was unable to produce conclusive evidence that investors are able to choose future 'winners' on the basis of past performance.

**Keywords:** Unit Trust, Performance Persistence, Mutual Funds, South Africa

## 1. Introduction

While Marcus (1990) asserts that the prolonged superior performance of the Magellan fund is difficult to explain as a purely random outcome, the apparent superior performance of a small group of funds, such as the Magellan fund, raises the question of whether this is credible evidence of genuine stock picking skills, or whether it simply reflects the extraordinary luck of a few individual fund managers –after all, it is known from statistics, that if a sample is large enough, it is only a matter of time before outliers begin to appear. Thus, given the size and number of mutual funds in the world today<sup>1</sup>, it can be reasonably expected that some active funds will outperform so than at the roulette wheel, where some ga (Grinold and Kahn, 2000:559).

Although the usefulness of the track record approach seems fairly plausible, a large number of academics do not believe in this approach. This is in accordance with the Efficient Market Hypothesis (“EMH”), which implies that past p after adjusting for risk and other pricing factors. Finance academics have a fairly long history of studying active manager performance in the context of efficient markets theory. According to the strong version of the EMH, superior active management should be impossible and no amount of active research should lead to any significant outperformance as there should be no sources of superior information (Grinold and Kahn, 2000). If the hypothesis is true, then not only can the average manager not be expected to outperform the market, but even managers with the best historical record cannot be expected to keep up their performances in the future (Meyer, 1998; and Oldham and Kroeger, 2005).

Thus, the question that begs asking is do the winners in one period remain winners in a subsequent period? One common response made by Malk

<sup>1</sup> \$23 trillion (65,735 funds) at the end of 2009 \$18 trillion in 2005 –according to data from the ICI (2010:182-183).

performance does not Yet, predict Grinblatt and Titman (1992) note that there is a large and growing industry devoted to measuring mutual fund performance and that this industry, as evidenced by newsletters, regular features in the financial press, and the existence of firms that professionally evaluate funds, is based on the idea that funds that do well (or poorly) in the past, will continue to do so in the future.

Mutual fund performance rankings (such as *Morningstar* and *Raging Bull*) are compiled on a regular and timely basis and are widely followed. Mutual funds that do relatively well tout their performance prominently in their advertising material and even those that do not, search for some other measure that puts them in the best possible light. Hendricks, Patel and Zeckhauser (1993) state that directly or indirectly, investors are willing to act on such information of relative performance. Further, Patel et al. (1994) find evidence to support the premise that investors steer their money to funds that have performed well recently, while Brown, Goetzmann, Ibbotson and Ross (1992:554) notes that past performance is usually a high significant input into the decision to “

Using a sample of 151 Domestic Equity unit trusts (including 15 Exchange Traded Funds) and five performance evaluation models over the 2001 to 2010 period, this paper attempts to determine whether there is any persistence in performance for South African Domestic Equity Unit Trusts.

## **2. Literature Review**

### **2.1. International Studies**

Several studies have shown, based on different asset classes and different time periods, that performance does not persist. Jensen (1968) looked at the performance of 115 mutual funds over the 1945–1964 period and found no evidence for persistence. Kritzman (1983)

reached the same conclusion after examining the 32 fixed-income managers retained by AT&T for at least 10 years. Dunn and Theisen (1983) found no evidence of persistence in 201 institutional portfolios from 1973 to 1982. And Elton, Gruber, and Rentzler (1990) showed that performance did not persist for 51 publicly offered commodity funds from 1980 to 1988.

Several other studies, however, have found that performance does persist. Grinblatt and Titman (1988) found evidence of persistence in 157 mutual funds over the period 1975 to 1984. Lehmann and Modest (1987) report similar results from looking at 130 mutual funds from 1968 to 1982. In the United Kingdom, Brown et. al (1997) demonstrated evidence for persistence using data on 550 UK pension managers from 1981 to 1990. Hendricks et al. (1993) documented persistence of performance in 165 equity mutual funds from 1974 to 1988. Goetzmann and Ibbotson (1994) showed evidence for persistence using 728 mutual funds over the period 1976 to 1988. Bauman and Miller (1994) showed evidence for persistence using as many as 608 institutional portfolios from December 1972 through September 1991, but only when using periods corresponding to complete market cycles.

Kahn and Rudd (1995), after accounting for style effects, fees and expenses, and database errors, found no evidence for persistence of performance for 300 equity funds from October 1988 through September 1994. They did, however, find evidence for persistence of performance for 195 bond funds from October 1991 through September 1994. Unfortunately, this persistence was insufficient to support an outperforming investment strategy: It could not overcome the average underperformance of bond mutual funds (especially after fees and costs). Kahn and Rudd (1997a, b) find similar results when they extend the analysis to additional time periods and to institutional portfolios as well as mutual funds, and when they focus on managers rather than just on mutual funds.

Brown et al. (1992) showed that survivorship bias could significantly affect performance studies. In particular, they demonstrated that survivorship bias would generate the appearance of significant persistence. This calls into question several of the studies that found evidence for persistence. The recent work on persistence has carefully utilized databases free of survivorship bias. Looking at all U.S. equity mutual funds from 1971 through 1991, Malkiel (1995) found evidence for persistence of performance in the 1970s, but it disappeared in the 1980s. However, Gruber (1996), also looking at 270 U.S. equity mutual funds from 1985 to 1994, found persistence so strong, that, he argued, it explained the growth in active mutual funds. Malkiel (1995) measured performance using simple CAPM regressions, while Gruber also controlled for size, book-to-price, and bond market effects. Finally, Carhart (1997) looked at 1892 diversified equity mutual funds from 1962 through 1993, controlling for size, book-to-price, and 1-year momentum effects. The only significant persistence he found was for the strong underperformance of the very worst mutual funds.

In summary, the research on persistence of performance has generated at best a mixed record. In spite of mutual fund advertising (though consistent with proxy statements), the connection between historical performance and future performance appears to be weak (Grinold and Kahn, 2000).

### **2.2. South African Studies**

Von Wielligh and Smit (2000) produced evidence of positive persistence in performance of South African unit trusts. In the short-run there was some persistence in performance for the General Equity unit trusts but none-run fo persistence in performance existed for the General Equity unit trust portfolio and to a

certain extent for the “All Unit Trust portfolio”-performing portfolio. Furth remained the worst performer while the best and average portfolios remained the best and average performers. In conclusion, there seemed to be some long-run evidence of persistence in performance among South African unit trusts. These results concurred with Meyer’s (1998) results, which suggested that longer period for South African unit trusts.

Firer (2001:7) was able to demonstrate short-run persistence in performance, finding that an investment strategy of selecting past superior performance may improve investment returns. The strongest overall persistence was found when using a 6-month formation period to predict a 3-month holding period. Firer (2001) concludes that the selection of above average funds based on past performance appears to be possible, but a more detailed analysis, taking into account switching costs need to be made.

Oosthuizen and Smit (2002) applied the evaluation techniques used by Zheng (1999) to establish whether South African unit trust investors displayed ex ante selection ability of investing in funds that would perform better. The results from the analysis indicated that investors on aggregate displayed a weak, but statistically significant, skill in identifying winners. Nonetheless, no evidence was found that investors could beat the market by investing in funds with positive money flows. Thus, similar to the findings of Zheng (1999), the ‘smart effect carried money’ no information value (Wessels and Krige, 2005:72).

Collinet and Firer (2003) analysed the relative performance of general equity unit trusts over a twenty-year period, using a database free of survivorship bias. The results proved to be highly sensitive to the holding period length, the time period studied and the ending date of the analysis. A positive but weak relationship existed between past and future rankings. The authors argue that the most important cause of the disparate results obtained in earlier South African studies was the selection of different sample periods. These short-term



studies using different sample periods and non-equivalent holding periods could not be expected to yield consistent results. An important result emerging from this study was that individual unit trusts did not perform consistently for any length of time.

Using a conditional performance evaluation approach, Akinjolare & Smit (2003:49) showed strong evidence that a fund's market to changes risk in the ex market indicators. The traditional measures (alpha) were found to be negative most of the time, which have been interpreted, albeit

wrongly, as poor fund performance. This, they claim, can be attributed to the unconditional time-variation of these models. This finding was consistent with Ferson and Warther (1996). They also found that the evidence for perverse market timing demonstrated by the traditional model was removed by its conditional version. More importantly, the study found no evidence of market timing using the conditional approach.

Oldham and Kroeger (2005:81) evaluated performance using the CAPM and APT tests –

for the CAPM, they use the JSE All Share Index for the Ind

APT, they use the Mining, Resources, Financial and Industrial indices as benchmarks. They used weekly returns from a sample of 20 domestic unit trust funds, selected from various sectors (namely: Domestic AA Prudential, Domestic Equity General, Domestic Equity Growth, Domestic Equity Smaller Companies and Domestic Equity Value sectors) for the 1998 to 2002 periods. From a performance persistence point of view, they found only weak evidence of short-run persistence, which appears to be short-lived anyway (Oldham and Kroeger, 2005:89).

Wessels and Krige (2005:80) found evidence of short-term persistence in performance return but concluded that in general, no long-term predictability value was exhibited. A few funds showed significant persistence in keeping their performance in the top quartiles or alternatively to beat the index on a regular basis. However, similarly some funds showed

persistence in underperforming. The rest delivered a wide dispersion of relative performance. Overall, they concluded that no infallible method exists to identify those active managers in advance that will substantially outperform the index.

Tests of persistence of South African unit trust performance are inconclusive. They appear to be a function of the time period analysed, the length of evaluation periods used and the testing method employed. There is very little evidence of long-term persistence, but the results of most short-term persistence studies suggest that at least a weak relationship between past and future rankings does exist.

The mixed results on persistence of performance clearly show that a simple strategy of picking last year's winners (above-median performers) will not have much (if any) more than a 50 percent chance of being a winner (outperforming the median) this year. These results do not definitively say that active management is impossible. At the same time, they are hardly a dramatic vindication of active management. These results do say that it isn't easy to find successful active managers from their track records alone.

### **3. Research Methodology**

A sample of 151 South African Domestic Equity (including 15 Exchange Traded Funds (“ETFs”)) covering-year period from the 2001 to 2010 was selected. Nominal returns and the alphas derived from five performance evaluation models were used as the bases for the performance persistence tests.

#### **3.1. Sample Data and Construction**

Using the BFA McGregor database, discrete monthly share returns were calculated from end of month closing prices for each share. End of year market capitalisation, price-to-book ratios and book value per share values were also obtained for each share. The 90-day Banker's Acceptance rate-free rate was of return, used while the following the 91 government bonds were used as proxies for long-term rates: (i) R157 South African Government Bond (Jan 2000 to Dec 2005); (ii) R204 South African Government Bond (Jan 2006 to Dec 2007); and (iii) R207 South African Government Bond (Jan 2008 to Dec 2010)

Using I-Net Bridge, discrete monthly index returns were calculated from end of month values for the JSE All Share Total Return. Discrete Index end of month ("JSE total returns for the sample of unit trusts were obtained from Morningstar. This study considers the total returns of unit trusts and hence does not exclude that portion of unit trust returns that stem from dividends as do some of the previous researchers (for example, Oldham and Kroeger (2005)). The sample was not free from survivorship bias as only data for the surviving funds up to 31 December 2010 were obtained.

Data covering the 10-year period from 01 January 2001 to 31 December 2010 is further divided into a number of sub-periods of varying lengths to test whether unit trust performance in one period ("Formation Period" or "Period 1") contains an information relating to the performance in a subsequent adjacent period Holding ("Period" or "Period 2"). Given the trend over the past decade of 20 one year years or less (particularly in the 1990s and 2000s), this study uses formation and holding period lengths of 3-months, 6-months, one-year, two-years, four-years and five years. Unlike Fama (2001) who tests adjacent formation and holding periods of varying lengths, this study only uses adjacent formation and holding periods of equal length. To increase the number of available observations and thereby increase the robustness of the study (Fama, 2001), overlapping periods are used for formation and holding periods in excess of one-year. For

any particular formation or holding period, only unit trusts in existence for the full length of that period were included in those periods.

### 3.2. Performance Evaluation Models

As nominal returns do not adjust for the underlying risk inherent in a particular fund, various well-known and widely accepted performance evaluation models were used which explicitly adjust for risk. These included: (1) Sharpe Ratios, (2) Jensen Alphas, (3) Fama and French (1993) 3-factor alphas, (4) Carhart (1997) 4-factor alphas, and (5) Ferson and Warther (1997) Conditional Alphas. Each of the models are described below.

Model	Performance Measure	Model Description
Sharpe (1966) Ratio <sup>2</sup>	Sharpe Ratio	$\text{Sharpe Ratio}_p = \frac{R_p - R_f}{\sigma_p}$
Jensen (1968)	Jensen's alpha	$R_{it} - R_{ft} = a_i + b_i(R_{Mt} - R_{ft}) + e_{it}$ <sup>3</sup>
Fama and French (1993)	Fama and French alpha	$R_{it} - R_{ft} = a_i + b_i(R_{Mt} - R_{ft}) + s_i\text{SMB}_t + v_i\text{VMG}_t + e_{it}$ . <sup>4</sup>
Carhart (1997)	Carhart Alpha	$R_{it} - R_{ft} = a_i + b_i(R_{Mt} - R_{ft}) + s_i\text{SMB}_t + v_i\text{VMG}_t + m_i\text{MOM}_t + e_{it}$ <sup>5</sup>
Ferson and Warther (1996)	Conditional Alpha	$R_{it} = a_i + b_0R_{Mt} + b_1(R_{Mt} * \text{DY}_{t-1}) + b_2(R_{Mt} * \text{TS}_{t-1}) + e_{it}$ <sup>6</sup>

<sup>2</sup>  $R_p$  is the return of the portfolio (or unit trust),  $p$ , over a specified evaluation interval (e.g. 3-months);  $R_f$  is the risk-free rate over the same evaluation interval; and  $\sigma_p$  is the total risk of portfolio,  $p$ , over that interval as measured by its standard deviation.

<sup>3</sup>  $R_{it}$  is the return on unit trust,  $i$ , for month  $t$ ;  $R_{ft}$  is the risk-free rate (being the 90-day Banker's Acceptance rate);  $b_i$  is the beta coefficient;  $R_{Mt}$  is the market return (the return on the JSE ALSI TR Index), and  $e_{it}$  is the regression residual or error term.  $a_i$  is the intercept term or measure of performance, also known as Jensen's alpha.

<sup>4</sup>  $R_{it}$  is the return on unit trust,  $i$ , for month  $t$ ;  $R_{ft}$  is the risk-free rate (90 day Bankers' Acceptance rate);  $R_{Mt}$  is the market return (the return on the JSE ALSI TR);  $\text{SMB}_t$  and  $\text{VMG}_t$  are the size and value-growth returns of Fama and French (2008).  $a_i$  is the intercept or average return left unexplained by the benchmark model (that is,);  $b_i$ ,  $s_i$  and  $v_i$  are estimates of the coefficients of the independent variables:  $R_{Mt} - R_{ft}$ ,  $\text{SMB}_t$  and  $\text{VMG}_t$ ; and  $e_{it}$  is the regression residual or error term. In the words of Fama and French (2008:29), the intercept in the time-series regression of the unit trust "the average abnormal return needed to judge, whether that manager can use managers special information to beat the market and generate average returns greater than those on passive combinations of the mim

<sup>5</sup> Save for the momentum return term,  $m_i\text{MOM}_t$ , the equation is no different to that of the 3-factor model used by Fama and French (2008).  $m_i$  is the coefficient of the independent variable  $\text{MOM}_t$ .  $\text{MOM}_t$  is defined similarly to  $\text{VMG}_t$  except that the sorts are made on the basis of prior return as opposed to book-to-market equity ratios and the momentum sorts are refreshed monthly as opposed to annually in December.

<sup>6</sup>  $R_{it}$  is the return on unit trust,  $i$ , for month  $t$ ;  $R_{Mt}$  is the market return (the return on the JSE ALSI TR), and  $e_{it}$  is the regression residual.  $\text{DY}_{t-1}$  and  $\text{TS}_{t-1}$  are market indicators and are used to denote the one-year lagged value-weighted market dividend yield and term structure of interest rates, respectively. The difference between the lagged levels of the monthly long-term and short-term rates represents the term structure variable,  $\text{TS}_{t-1}$ . Whereas Akinjole and Smit (2003) use the monthly value of the 3-month Negotiable Certificate of Deposit-month short ("NCDs"), term interest rate, as the term interest rate, this study uses the 90-day Bankers' Acceptance rate instead of the year Government Bond interest rate.

In the case of nominal returns, "winners" or superior funds were categorised as those that were able to 'beat' the JSE ALSI TR for the sample period in question, while "losers" were categorised as those unable to 'beat' the index. In the case of Sharpe Ratios, "winner" included those funds that were able to produce a higher ratio than that of the market index, while "losers" had lower ratios. For all the other performance models, funds with positive alphas were categorised as "winners", while "losers" included those funds with zero or negative alpha values.

### 4.3 Tests of Persistence in Performance

#### Contingency Tables

Following the methodology of Meyers (1998), Kahn and Rudd (1995) and Goetzman and Ibbotson (1994), to test for the 'winner/lose analyse performance persistence. In addition to producing 2 x 2 contingency tables, this

study also produces 4 x 4 contingency tables. Contingency tables are produced for adjacent period pairs –that is, for all permutations of Period 1 and Period 2 pairs.

Winners are distinguished from losers by ranking fund performance according to each of the performance measures. The top half of the ranking table is defined as winners, while the bottom half is defined as losers, such that there should be an equal number of winners and losers in each period. If the statistical evidence shows that winners (losers) in Period 1 remain winners (losers) in Period 2, evidence in support for persistence of performance is found. The contingency tables show the numbers of funds that were winners in both periods, losers in both periods, winners then losers and losers then winners (Kahn and Rudd, 1995) –each of these categories can be a des

contingency table produces 4 such cells. Because half the funds are winners and half are losers in each period by definition, if performance does not persist, the numbers in each of the 4 cells of a 2 x 2 contingency table should be equal. Evidence for persistence in performance will, thus, be an observation of a higher number of actual observations in the 'Period–win/Period1 2-win' ("persistent)and 'Periodwinners"–lose/Period21-lose' ("Persistent Losers") cells. Similarly 4 x constructed, resulting in 16 cells, by ranking unit trust returns into quartiles.

To ensure that persistence of performance (if any) across the entire sample as a whole is not mere random chance, statistical significance is tested for using two methods, namely:

- (1) the Chi-Squared Statistic as Kahn and Rudd (1995) did in their earlier study; and (2) Spearman's Rank-efficientCorrelationasHendriksetal.(1993)Coand Meyer (1998) did in their respective studies.

Test of Statistical Significance	Description
Chi-Squared-Statistic	$\chi^2 = \sum_i \frac{(O_i - E_i)^2}{E_i}$
Spearman's Rank Correlation	$\rho = \frac{16 \sum d_i^2}{n(n^2 - 1)}$

The Chi-square statistic is used to discern whether unit trust performance on average in period 1 is related in any way to performance in period 2. Thus, the greater the value of the Chi-Squared statistic, the greater the likelihood that some relationship exists between period 1 performance and period 2 performance. Further, if the Chi-Square statistic is found to be statistically significant, it may be concluded that a significantly important relationship exists between period 1 performance and period 2 performance taken as a whole.

The sign of the Spearman correlation indicates the direction of association between the performance of all unit trusts in period 1 and their performance in period 2. More specifically

the Spearman correlation describes the relationship of the underlying performance measure in period 1 with that of period 2. Thus, a positive Spearman rank correlation for unit trusts ranked on the basis of alphas indicates that the alphas of unit trusts on average in period 1 tends to increase in period 2, while conversely a negative Spearman rank correlation indicates that the alpha values of unit trusts on average in period 2 are less than those of period 1. Spearman rank correlations in excess of +0.5 may be inferred as evidence of significant of persistence.

As nominal returns and Sharpe ratios move up and down from period to period naturally in tandem with market cycles, calculating Spearman Rank Correlations on the basis of nominal returns and Sharpe Ratios is nonsensical. For example, a positive Spearman Rank correlation may be observed between two periods merely due to markets rising over the two periods, even though unit trusts in general underperformed the market during the second period.

### **3.3.2. Repeat Performance Rank Tests**

Since the construction of the contingency tables relies on the relative ranking of unit trusts without reference to a benchmark of any kind, a second rank test is proposed that explicitly introduces external benchmarking –that is, unit trusts are not just ranked relative to each other. It is argued that this kind of approach makes sense from the viewpoint of the investor, who may not only be interested in investing in just the top performing unit trusts when ranked relative to each other on the basis of performance persistence, but also on the basis of being able to ‘beat’ the market or s

For each performance measure, unit trusts are ranked according to the number of adjacent pairs of periods during which a particular unit trust is able to record either ‘winning

performance in both periods or 'losing' performance—that is, repeat performance is tested for. The observation of several pairs of 'win may be interpreted as evidence for persistence in the performance of that unit trust.

### **3.3.3. Time Series Regression Analysis**

Using the methodology of Kahn and Rudd (1995:45) and Oldham and Kroeger (2005:84), Period 2 performance measures are regressed against Period 1 performance measures as follows:

$$\text{performance}_t = c + b \times \text{performance}_{t-1} + \varepsilon$$

Positive estimates of the co-efficient,  $b$ , with significant  $t$ -statistics (on the basis of  $n-2$  degrees of freedom and a 5% level of significance) can be inferred as evidence of persistence in performance—that is, Period 1 performance contains useful information for predicting period 2 performance. The regression analyses are performed using all possible permutations of formation and holding periods. For the regression analyses, only the alpha performance measures were used.

## **4. Results**

### **4.1. Contingency Tables**

#### **4.1.1. Spearman's Rank Correlation**

In the case of CAPM alphas it is observed that the mean Spearman Co-efficients are positive in only 5 out of 14 cases, with merely one observation having a value of greater than 0.3 and no observations of values greater than 0.5 are made. Moreover, it appears that more often than not, negative Spearman Co-efficients are recorded. Looking at the tails



of the frequency distribution, it is observed that few observations are recorded in the frequency classes: -1 to -0.75; -0.75 to -0.5; 0.5 to 0.75; and 0.75 to 1, with the majority of the observations falling in the -0.25 to 0 and 0 to 0.25 classes. Over the entire 10-year sample period and the first 5-year period, limited evidence, albeit extremely weak, of persistence can be found when 6-month and one-year formation and holding periods are used. No evidence of persistence is found over the second five-year period. Isolated instances of persistence appear when 3-month formation and holding periods are used across the 10-year period and second five-year period.

When Fama and French (1993) alphas are used, it is observed that the mean Spearman Co-efficients are positive in only 5 out of 11 cases –with merely one observation being greater than 0.3 and no observations in excess of 0.5. No values falling in the 0.75 to 1 frequency class are observed; however more often than not positive Spearman co-efficient values are observed –unlike the results obtained when CAPM alphas are used. As with the CAPM alphas, no evidence of performance persistence is found over the second 5-year period from 2006 to 2010. However, some evidence is found, somewhat stronger than that produced by the CAPM alphas, of persistence in performance over the 10-year period and the first 5-year period from 2001 to 2005 using formation and holding periods of 6-months and one-year.

Using Carhart (1997) 4-factor alphas, it is observed that the mean Spearman Co-efficients are positive in only 4 out of 11 cases –with no observations being greater than 0.2. No values falling in the 0.75 to 1 frequency class are observed. Over the 2001 to 2005 period, more positive observations are recorded over all evaluation intervals, while the opposite is true for the 2001 to 2010 and 2006 to 2010 periods. As with the CAPM and Fama and French (1993) alphas, almost no evidence of performance persistence is found over the second 5-year period from 2006 to 2010; all the mean Spearman Co-efficients are negative

and the frequency classes recording the greatest number of observations are all negative. However, some evidence is found, albeit weaker than that produced by the Fama and French (1993) alphas, of persistence in performance over the first 5-year period from 2001 to 2005, particularly when 1-year formation and holding periods are used.

In the case of conditional alphas, out of the 11 mean value observations, 4 are positive, with only one observation having a value greater than 0.3 and no observations of values in excess of 0.5 are made. Overall, positive observations are made more often than not, but only 2 observations falling in the 0.75 to 1 frequency class are recorded, while a handful of observations falling in the 0.5 to 0.75 frequency class are noted. Very weak evidence of persistence in performance is found over the entire 10-year period and second 5-year period when formation and holding periods of one-year are used. No evidence of persistence is found in the second 5-year period.

In summary, conclusive evidence to support the persistence of unit trust performance on average could not be found. Limited evidence of persistence, albeit weak, is found over the 10-year period and first 5-year period using formation and holding periods of 6-months and 1-year; however some evidence of persistence may be inferred on the basis of Conditional alphas when 1-year periods are used over the 10-year period and the first 5-year period.

### **4.1.2. Chi-Squared Statistic**

On their own, the results of the Chi-Square tests reveal little about the direction of persistence of unit performance save that, almost without exception unit trust returns in one period are related to the returns observed in a previous period when funds are ranked into quartiles (in the case of 4x4 tables) and medians (in the case of 2x2 tables) –that is, more often than not statistically significant Chi-Square statistics were observed over the full 10-

year period and both 5-year periods from 2001 to 2005 and 2006 to 2010, regardless of the length of the formation and holding periods and regardless of the performance measure used to generate the performance rankings. There were a handful of exceptions. However, beyond inferring that adjacent period unit trust returns are related in a statistically significant manner, the results do not say whether superior (or inferior) performance persists or whether superior (inferior) performance in one period is followed by inferior (superior) performance in the next period. The results from the Chi-square tests do however add some credibility to the findings from the Sp persistence of unit trust performance.

Taken together, the results of the Spearman Co-efficients and Chi-Square tests, indicated that some persistence in performance does occur. However, it is re-iterated that performance up to this point is measured in terms of relative performance –that is, even the best performing funds may not be able to outperform. The following sections identifies whether ‘winning’ unit trust performance fro market –or ‘losing’ performance can persist.

### **4.2. Repeat Performance Rank Tests**

Over the 10-year period from 2001 to 2010, it is clear that the proportion of funds recording more repeat ‘winner’ or ‘loser’ performance formation and holding period increase. With the exception of the results produced on the

basis of CAPM alphas and Conditional alphas, a greater proportion of funds with more repeat ‘loser’ performance are observed across

For the most part, it appears that the persistence in unit trust performance decreases as the investment horizon increases and ‘losing’ per

Over the 5-year period from 2001 to 2005, contrasting results are obtained. It appears that as the lengths of the formation and holding periods increase, the proportion of funds displaying more repeat 'winner' performance proportion of funds with more repeat 'loser' appears that there is a greater proportion of funds with more repeat 'wi observations than those with more repeat 'lo widens as the formation and holding period lengths increase. Thus, it seems that over 2001

to 2005, persistence performance is infound . 'winner' Investors could have profited in the following period by investing in 'winners' notwithstanding that the proportion of funds below 50% - that is, the evidence to support the persistence strong. Moreover, as the investment horizon increases, investors would have had a decreasing chance of 'loser' performance goi 'losers'.

Over the 5-year period from 2006 to 2010, results similar to those observed over the 10-year period are produced. While the trends are less clear than for the entire 2001 to 2010 and 2001 to 2005 periods, it appears that, for the most part, as the lengths of the formation and holding periods increase, the proportion performance decreases, while the proportion o displays no trend as such. In most of the cases, the proportion of funds recording more repeat 'loser' performance is greater than performance. Overall, these results imply that investors would have been disappointed by investing in past 'losers', and of th past pers period st performance was weak at best and decreased as investors investment horizons increase.

In short, some evidence of persistence in unit trust performance is found, albeit more so for 'losing' performance. Persist (whether 'winner' perform decrease on average as the investment horizon increases. Yet examples of funds may be provided that would have proven profitable in the following period if they were chosen on the basis of their ancepast. The point 'winning' is that, even though perform isolated, examples demonstrating strong evidence of persistence in performance do exist. However, whether investors would have been be able to profit from this observation remains questionable.

### 4.3. Regression Analysis

Evidence of persistence is sought by examining the number of funds that recorded a positive and statistically significant slope-co-efficient. The Co-efficients of determination ( $R^2$  value) for each regression model are also examined and the  $R^2$  values are presented in the appendix as well.

Persistence on the basis of CAPM alphas is considered first. Over the 10-year period from 2001 to 2010, some evidence to support persistence seems greatest when 6-month formation and holding periods are used with almost 29% of (or 44) funds recording a statistically significant and positive slope co-efficient. These results should be viewed with some caution as the co-efficients of determination for the regression models exceeds 0.3 in only 10 of these 44 funds. Some evidence of performance persistence is also found when 2-year formation and holding periods are used; however, despite higher  $R^2$  values being observed, the regressions are performed over adjacent overlapping periods. Limited evidence of performance persistence is found when formation and holding periods of other lengths are used. Surprisingly, almost no evidence of performance persistence can be

found when returns are analysed over the two 5-year periods from 2001 to 2005 and 2006 to 2010 respectively.

Next persistence of performance is considered on the basis of Fama & French (1993) 3-factor Alphas. Almost no evidence of persistence can be found. One exception is when 4-year and 5-year overlapping formation and holding periods are used over the 10-year period from 2001 to 2010. However, even though the  $R^2$  values for the regression models are significant, the regressions were performed over overlapping periods and must be viewed with caution.

When persistence of performance is tested using Carhart (1997) 4-factor alphas, again almost no evidence of persistence in performance can be found. Over the 10-year period from 2001 to 2010, slight evidence of performance persistence is found when overlapping formation and holding periods of 2-years, 4-years and 5-years are used. As is the case with Fama and French (1993) alphas, even though the  $R^2$  values are significant, overlapping periods do not constitute realistic investment opportunities from the viewpoint of the investor. Almost no evidence of performance persistence can be found when returns are analysed over the two 5-year periods from 2001 to 2005 and 2006 to 2010 respectively.

It is observed that when conditional alphas are used to test for persistence in performance, some evidence –albeit stronger than that produced by the Fama and French (1993) and Carhart (1997) alphas –to support the persistence in performance is found over the entire 10-year period when formation and holding periods of all lengths (except 3-months) are used. The evidence becomes stronger –that is, the proportion of funds recording positive and statistically significant regression slope co-efficients –increases as the length of the formation and holding periods increase. As with the other models, the reader is cautioned to view the results with caution in the case of formation and holding period lengths of 2-years,

4-years and 5-years as overlapping periods are used. Again, relatively no evidence of persistence is found over the two 5-year sub-periods.

For the most part, the results of the time-series regressions, reveal that persistence of unit performance is a rare occurrence among unit trusts, notwithstanding that some evidence to support persistence is found when 6-month formation and holding periods are used and when persistence is tested over the full 10-year period. Limited evidence of persistence is found when overlapping formation and holding periods of 4-years and 5-years are used and persistence is tested over the entire 10-year period. However, this evidence must be viewed with caution due to the use of overlapping periods. Surprisingly, almost no evidence to support the persistence of unit trust performance can be found when formation and holding periods of any length are studied over the two 5-year sub-periods –no explanation can be provided for this. It is pointed out that the observations made for funds not in existence for the entire 10-year sample period could have slope-coefficients that are biased upwards (for example, due to ‘freak’ observations that may, in part, be cancelled by the higher t-statistic required to test for statistical significance –the fewer the number of regression estimates, the lower the degrees of freedom and the higher the t-statistic value required to achieve statistical significance. Last, even though minimal evidence in support of persistence in performance is found, a limitation of the results from the time series regression is that it does not measure performance. The results merely suggest whether performance in general persists.

## 5. Conclusion

On the debate of unit trust performance between academics and practitioners for over forty years (Grinold and Kahn, 2000:567), this study is

unable to produce conclusive evidence supporting the persistence in the performance of South African domestic equity unit trust returns. The results appear to be sensitive to the time periods examined, the methodology, and performance models employed. Also, the lengths of the formation and holding periods affect the results. Some evidence of short-term persistence is found over the 2001 to 2010 and 2001 to 2005 periods, while minimal evidence of persistence is found over the 2006 to 2010 year. Over the longer-term, however, the strength of the evidence decreases, disappearing almost entirely in some cases. Moreover, it appears that 'losers' performance management requires expenditure on research and trading activities, this result is not surprising. Also, Brown et al. (1992) explains that negative performance can persist where

a subset of managers are immune from periodic performance review, and where it is difficult to short sell unit trusts; the latter being a common feature of most unit trust markets, including South Africa.

While evidence of short-run persistence is evident, such short-run persistence may not translate into viable investment strategies for investors of unit trusts and mutual funds. The shorter the holding period (which effectively translates into a shorter investment horizon for the investor), the more difficult it is to economically benefit from performance persistence, due to the increasing costs of more frequent rebalancing. The high initial and exit fees charged by unit trust managers makes this strategy even less appealing. In addition, there is hardly any evidence that picking only the best-performing fund over the formation period would result in superior performance in the subsequent holding period. At best, the odds to achieve better-than-average performance during the holding period may be somewhat increased by selecting a portfolio of funds on the basis of past performance (Patari, 2009). On the other hand, while taking advantage of past superior performance may be "cumbersome" for the unit trust investor, Patari at least be able "to benefit from the findings o



underperforming funds that have it is unlikely high that investors expense can profit from pursuing strategies of investing in the top-performing funds of prior periods, and even where this may be possible, it may be prohibitively expensive to do so.

While the dataset used in this study is not free from survivorship bias, it is asserted that the conclusions reached in this study are unaffected since survivorship bias tends to bias mean unit trust returns upwards. That is, if non-surviving funds were included in the sample, the mean return unit trust returns would have probably been lower and even less persistent, thereby further supporting the conclusions reached.

Although the performance of individual unit trusts may differ, as an investment vehicle, unit trusts seem to offer a small investor an acceptable, inflation-beating return over the medium to long-term, while the “excitement of the upside type of investment attractive (Pretorius and Wolmarans, 2006:51). Moreover investors have successfully used unit trusts and mutual funds to supplement retirement funds. While, Krell

(2005) found that an increasing number of investors worldwide are investing in mutual funds in order to provide for retirement, as often fall short of expectations, Rusconi (2005) found evidence for a similar trend in South

Africa. Rusconi (2005) also found that unit trusts are on average offer a more cost-effective way to provide for retirement funding than individual life insurance products. Furthermore, many investors looking for exposure to equity investments lack the knowledge, acumen and time required to successfully manage their own share portfolios, while many investors fear investing directly into the stock market. Thus, it appears that unit trusts serve a necessary function in society and provide a channel for such investors to gain exposure to equity securities.

Perhaps the main objective of unit trusts is not to outperform. Unit trusts, for the most part, tend to hold large diversified portfolios, and it appears that

minimising the insurable risk borne by shareholders”:415). This(Jensen,would,in 1 part, explain what Gruber (1996:784) describ many of whomtinue“conto pour money” into actively m convincing evidence of outperformance could not be found in this study, the results

reported should not be construed as indicating that mutual funds are not providing a socially desirable service to investors. The evidence does indicate, however, a need on the part of the funds themselves to evaluate both the costs and the benefits of their research and trading activities in order to provide investors with maximum possible returns for the level of risk assumed (Jensen, 1968).

## 6. List of References

- 4.1.5 Akinjolare, A. & Smit, E. V. D. M. (2003) strategy in a changing climate (1998-2002)"*Investment Analysts Journal*, 58:41-50.
- 4.1.6 Bauman, W. S. & Miller, R. E. (1994) "Cane Managed Portfolio Performance be Predicted?", *The Journal of Portfolio Management*, 20(4):31-40.
- 4.1.7 Brown, G., Draper, P. & McKenzie, E. (1999) Investment Performance" *Journal of Business Finance & Accounting*, 24(2):155-178.
- 4.1.8 Brown, S. J., Goetzmann, W. N., Ibbotson, R. in Performance *The Review Studies" of Financial Studies*, 5(4):553-580.
- 4.1.9 Carhart, M. M. (1997) "On persistence" *Journal of Finance*, 52: 57-82.
- 4.1.10 Collinet, L. & Firer, C. (2003) "Character South African general *Omega*, 31(6):523-533. unit trusts"
- Dunn, P. C. & Theisen, R. D (1983) *The "How" Journal of Portfolio Management*, 9(4):47-50.
- 4.1.6 Elton, E. J., Gruber, M. J. & Rentzler, J. Commodity *Financial Funds" Analysts Journal*, 46(4):23-30.
- 4.1.7 Fama, E. F. & French, K. R. (1993) "Common and bonds" *Journal of Financial Economics*, 33:3-56.
- 4.1.8 Fama, E. F. & French, K. R. (2008) *Working Paper*, "Mutual F  
Graduate School of Business - University of Chicago and Amos Tuck School of  
Business - Dartmouth College.
- 4.1.9 Ferson, W. E. & Schadt, W. R. (1996) "Measuring fun changing economic *Journal of conditions" Finance*, 51(2):425-459.
- 4.1.10 Ferson, W. E. & Warther, A. V. (1996) "Eva market" *Financial Analyst Journal*, November-December:20-28.

4.1.7 Firer, C. (2001) "The Persistence of SouthPerfor

*African Journal of Business Management*, 32(2):1-8.

4.1.8 Goetzmann, W. N. & Ibbotson, R. *The Journal of Portfolio Management*, 20(2):9-18.

4.1.9 Grinblatt, M. & Titman, S. (1988) *The evaluation of mutual fund performance: an analysis of monthly returns*. California, USA: John E Anderson Graduate School of Management, UCLA.

4.1.10 Grinblatt, M. & Titman, S. (1992) "The Persistence of Performance" *The Journal of Finance*, 47:1977-1984.

4.1.11 Grinold, R. C. & Kahn, R. N. (2000) *Active Portfolio Management: Quantitative Theory and Applications 2<sup>nd</sup> Edition*. Chicago, USA: McGraw-Hill.

4.1.12 Gruber, M. J. (1996) "Another puzzle: The g

*Journal of Finance* (51): 783–810.

4.1.13 Hendricks, D., Patel, J. & Zeckhauser, R. "The Persistence of Performance, 1974–88" *Journal of Finance*, 48: 93-130.

4.1.14 Jensen, M. C. (1968) "The Performance-1964" *The Journal of Finance*

*Journal of Finance*, 23: 389-416.

4.1.15 Kahn, R. N. & Rudd, A. (1995) "Does His Performance" *Financial Analysts Journal*, 51(6):43-52.

4.1.16 Kahn, R. N. & Rudd, A. (1997a) "The Persistence of Performance: Evidence from Mutual Funds" *Journal of Portfolio Management*, 23(2): 1-24. (Eds. F. J. Fabozzi, R. D. Arnott, & J. C. Cogle)

*The Handbook of Equity Style Management 2<sup>nd</sup> Edition*. Pennsylvania, USA: Frank J. Fabozzi Associates).

4.1.17 Kahn, R. N. & Rudd, A. (1997b) "Income Style: The Performance Persistence Evidence from Mutual Funds" *Journal of Portfolio Management*, 23(2): 25-44. (Ed. F. J. Fabozzi)

*Managing Fixed Income Portfolios*. Pennsylvania, USA: Frank J. Fabozzi Associates.

J. Fabozzi Associates, Chap. 18).

• Krell, E. (2005) "The Changing *Baylorface Business of Review* retirement", 23(1):26-31.

4.1.5 Kritzman, M. (1983) "Can Bond Managers *The Journal of Per Portfolio Management*, 9(4):54-56.

4.1.6 Lehmann, B. N. & Modest, D. M. (1987) "Mutual Fund Comparison of Benchmarks and *The Benchmark Journal of Finance*, Com 42(2):233-265.

4.1.7 Malkiel, B. G. (1995) "Returns from Investi *The Journal of Finance*, 50(2): 549-572.

4.1.8 Malkiel, B. G. (2005) "Reflections on the E *The Financial Review*, 40(2005):1-9.

4.1.9 Marcus, A. J. (1990) "The Magellan *The Journal of Fund Portfolio and Management*, 17(1):85-88.

4.1.10 Meyer, M. C. (1998) "The Persistence of Un 1985-June 1995" *South African Journal of Business Management*, 29(3):100-108.

3.2 Oldham, G. & Kroeger, J. A. (2005) "Perfor selected South African unit trusts for the period 1998-2002" *South African Journal of Business Management*, 36(4):81-90.

3.3 Oosthuizen, H. R. & Smit, E. v.d. M. (2002) and information *Journal for effects" Studies in Economics and Econometrics*, 26(3):19-41.

3.4 Patari, E. J. (2009) "Do Hot Hands Warm th Performance Persistence *International Research Phenomenon" Journal of Finance and Economics*, 34:117-139.

• Patel, J., Zeckhauser, R. J. & Hendricks, D. (1994) "Investment Flows Evidence from mutual funds, cross-border investments, *In Sato, and R., new Ramachandran, R.V. & Levich, R.M. (eds.) Japan, Europe, and International Financial*

*Markets: Analytical and Empirical Perspectives*. New York, USA: Cambridge University Press, 51-71).

• Pretorius, M. M. C. & Wolmarans, H. P. (20 from 1965 to June 2005: *MeditariAre AccountancyinvestorsResearch* , bett  
14(1): 49-67.

4 Rusconi, R.st(2005)ofsavings“Co for retirement*Pensions:An* in  
*International Journal*, 11(1):16-29.

5 Sharpe, W. F. (1966) “Mutual*TheJournal ofFundBusiness* Performa(Special Supplement) 39:  
119-138.

6 Von Wielligh, J. F. C. &tenceSmitinthe performanceE.v. ofdSouth.M. (2 African  
unit*SouthAfricantrusts” JournalofBusiness Management*, 31(3):120-129.

7 Wessels, D. R. & Krige, J. D. (2005) “The performance”*SouthAfrican Journal of Business  
Management*, 36(2):71-82.

8 Zheng, L. (1999) “Is money smart? A study ability”*TheJournal of Finance*, 54(3):901-933.