N Pillay, C Muller and M Ward*

Fund size and returns on the JSE

ABSTRACT

Market sentiment, the popular press and academia are divided on the question of whether the size of a fund affects its performance. This study examines the issue by constructing hypothetical portfolios of varying sizes, using historical data for each of the years 1991 to 2008. Each portfolio consisted of 40 randomly selected stocks, chosen from an investment universe of the top 160 JSE listed shares in terms of market capitalisation. Rules were applied to limit the concentration of any particular share and to ensure that trading volumes were practical. Simulation was then used to explore the boundaries of possible returns for each portfolio.

The results of the simulation indicate that a fund's size is a contributing factor to its performance; liquidity being the underlying reason for this relationship. Performance was found to be affected for fund sizes greater than about R5bn. Large funds are increasingly forced towards market-cap weightings with a resulting concentration in resource stocks.

The relevance of these findings to the South African fund management industry is that large funds should switch to passive investment strategies. Small to medium sized portfolio managers must be aware of the size effect and ensure that their funds are 'capped'.

1. INTRODUCTION

The Association for Savings and Investment (ASISA) estimates that in South Africa there are currently around 900 equity unit trust funds in existence, with a combined asset value of about R700bn at the end of September 2008 (Association of Collective Investments, 2008). This represents a significant growth on the 30 funds registered at the end of December 1988, with assets of only R4,3bn. The smallest funds have assets of a few hundred million Rand whilst the biggest exceeds R30bn (Botes, 2005). Accompanying the increase in the number of funds has been the steady growth in the number of asset management companies (MANCOs), currently at 39, and a further 108 unlicensed 'white-labelled' asset management companies.

In addition to the unit trust industry, as of the end of 2005 the Registrar of Pension Funds reported that there were 13 390 registered retirement funds with total assets under management in excess of R1,283bn (Registrar of Pension Funds Forty-Seventh Annual Report, 2006).

These statistics indicate an industry that has attracted huge amounts of capital over the last few years, with the trend set to continue. The importance of research into asset management, and in particular the relationship between fund size and active management, cannot be overstated. The aim of this study is to determine if the size of an investment fund does indeed influence its returns, and thereby to formulate an optimal size and management strategy.

*First author from University of the Witwatersrand, second and third authors from Gordon Institute of Business Science, University of Pretoria, Ellovo, Johannesburg 2196.
Email: mchlwrd@gmail.com

The study is limited to equity portfolios invested in the top 160 JSE listed shares by market capitalisation, over the period 1 January 1991 to 31 December 2008.

2. LITERATURE REVIEW

A review of existing literature on fund size and performance reveals three distinct groups of findings. The first group proposes that a fund's size has no impact on its performance. The second group suggests that larger funds outperform smaller funds and the third group indicates that smaller funds outperform.

Sharpe (1966), using returns from 34 mutual funds for the period 1954 to 1963, calculated the correlation between each fund's Reward Volatility (R/V) ratio and its net asset value. The R/V ratio was computed as the difference between a funds average annual return and the pure interest rate divided by the standard deviation of the annual rate of return. He found that larger funds provided better performance, although this was marginal and not statistically significant.

Arguing that it is commonly assumed that small unit trusts perform better than large ones, and based on a market liquidity theory which states that a large unit trust has difficulty in realising its shareholdings without affecting the share price when it wants to change the balance of its portfolio, Moles (1981) analysed the performance of all the Department of Trade authorised unit trusts in existence between 1966 and 1975. He found that fund size had no effect on performance.

Using South African data, both Milburn-Pyle (1984) and Nurse (1998) concluded that a fund's size had no effect on its performance. Milburn-Pyle (1984) analysed the yearly investment yields of both privately administered and life office managed pension portfolios against their respective mean asset size over

the period 1975 to 1982. In each of the calendar years he found no significant correlation between the fund's mean asset size and its investment yield. Nurse (1998) investigated the effect of fund size on the risk-adjusted performance of unit trusts. Analysing 21 unit trusts using the Capital Asset Pricing Model (CAPM) with a size variable added, over the period 1987 to 1997, he found no statistically significant correlation between the fund's historic return and the fund size and concluded that one could not estimate a fund's return using its size attribute as a predictor.

Departing from the first cluster of literature, the second grouping revealed that larger funds outperform smaller funds. A synthesis of the collective research effort revealed six rationales that characterised these findings, *viz*. economies of scale, survivorship bias, substitutability of underlying asset class, aggressive trading strategies, stock selection and unclear causation.

Carter (1950) cited the greater research ability, lower brokerage commissions and greater influence in the market as reasons for the support of large funds outperforming. Adding credence to this view Cassidy (1991) investigated the relationship between the returns from nine South African unit trusts and their respective asset sizes from 1971 to 1985. She noted a positive correlation between the risk-adjusted returns and the asset size, concluding that this relationship was either due to the fact that the larger funds were able to afford more expert management or that they benefited from reduced transaction costs.

Elton, Gruber & Blake (1996) asserted that the relationship between a fund's size and its performance might be affected by survivorship bias. In their sample of 361 mutual funds, they found little or no performance differentials between large and small funds when survivorship bias was ignored. However, when survivorship bias was controlled for, smaller funds performed much worse than the larger funds. They argued that this was due to the fact that small funds did not survive due to poor performance.

Philpot, Hearth, Rimbey & Schulman (1998) examined a sample of 27 bond mutual funds covering the period 1982 to 1993. They found a positive relationship between net risk-adjusted returns and size. They suggested that the size of a fund related to efficiencies, which they attributed to the relative substitutability of bond issues for one another. They argued that larger funds benefited because of their greater liquidity.

Dahlquist, Engstrom & Soderland (2000) found a similar relationship when investigating Swedish bond and money market mutual funds. They examined 42 bond funds and 42 money market funds and found a weak, positive yet statistically significant relationship between size and performance. They claimed that since these funds were quite small in relation to their respective markets, they were able to adopt aggressive trading strategies resulting in better returns. In contrast however, they found that the size of Swedish equity mutual funds negatively affected their performance returns, and they related this difference to the fact that the equity mutual funds are relatively large in relation to the equity market (in comparison to the bond and money market funds) and were therefore not in a position to adopt aggressive trading strategies that could result in out-performance.

In investigating how a fund's performance relates to a fund's fundamental characteristics (size being one of them) Chen, Lee, Rahman & Chan (1992) observed a relationship between performance and the investment strategy employed by the fund manager. Analysing the returns and size attributes of 81 US mutual funds they found a positive relationship between a fund's return and its size where the investment strategy employed was one of stock selection. However, their results were in the opposite direction when the investment strategy used was one of market timing. They found that a timing strategy resulted in a statistically significant negative correlation between a fund's size and its return, and argued that this pointed to the fact that large funds should concentrate on security selection instead of adjusting beta in anticipation of future market movements.

Annaert, Van den Broeck & Vennet (2003) evaluated the correlation between fund size and performance for European equity funds. Analysing data for the years 1995 to 1997 they found a positive relationship between performance and size; with 1997 being the most significant. However, they were not able to determine if causation ran from size to performance.

The third group of studies noted a negative association between fund size and performance. The collective research effort revealed six rationales for these findings, *viz*: risk, style, liquidity, aggressive trading strategies, market timing and optimal size.

Gorman (1991) examined whether mutual fund asset size was related to long term return after controlling for risk using the Capital Asset Pricing Model (CAPM). Using the annual returns and asset sizes for a sample of 335 mutual funds from 1974 to 1985, he concluded that the smallest funds had higher risk adjusted returns.

In evaluating the quarterly portfolio holdings of mutual funds Grinblatt & Titman (1989) found that the abnormal performance of funds, based on gross returns, was inversely related to fund size. The abnormal performance was more pronounced for growth style funds.

Similarly, in a study of 683 actively managed equity funds from 1993 to 1995, Indro, Jiang, Hu & Lee

(1999) found that fund size affects fund performance, and that fund size is more important for growth funds than for value and blended funds (funds with investments that contain a mixture of both value and growth stocks).

Supporting this view, Becker & Vaughan (2001) found that value managers could cope more easily with growth in assets under management. Using historical simulations, they looked at the 250 stocks that made up the Australian All Ordinaries Index over a three year period ending September 1999 and confirmed that efficiency is negatively related to asset size. Larger funds do not succeed in implementing the desired fund style profile as efficiently as the smaller ones, leading to a reduction in the value added from style.

Addressing the issue of liquidity, Perold & Salomon (1991) built upon research related to trade block size and transaction costs (Loeb, 1983) and the opportunity costs related to un-executed trades (Perold, 1988) and found diseconomies of scale within the active fund management industry. As the assets under management grow, trade block sizes also followed suit, and this led to higher transaction costs and greater negative market impact on stock prices, resulting in deteriorating fund performance.

Perold (1988) defined an 'implementation shortfall' (the difference between a paper portfolio and a real portfolio) to measure the execution costs and the opportunity costs of not transacting due to the size effect, thereby leading to under-performance. He stated that one indicator of too large an asset base was the out-performance of the paper portfolio relative to the real portfolio as assets continue to grow, thereby resulting in a greater implementation shortfall.

Related research carried out by Grinold (1989) identified three important dimensions that limit an investment manager from implementing strategy: depth (liquidity), cost and aggressiveness. Grinold noted that liquidity and holding restrictions get tighter as more money flows into a portfolio. He identified an increase in the tracking error between an ideal portfolio and an implemented portfolio when holdings and liquidity constraints were imposed and suggested that this was a measure of a fund's inability to absorb more assets.

DeRoche (2004) observed that as the level of assets under management rises, it becomes more difficult to achieve out-performance because of liquidity concerns. He developed a model (building upon Clarke, De Silva & Thorley, 2002) where the principles of active portfolio management were altered to incorporate transaction cost estimates and constraints that change as assets under management grow. Clarke *et al*. (2002) proposed the inclusion of an additional variable, the Transfer Coefficient (TC) to take into account such portfolio constraints. DeRoche's (2004) model was able to measure, with reasonable accuracy, how the TC degraded as assets grew, the invest-able universe shrank, transactions costs increased (as the dollar amount of a typical trade increased) and as liquidity constraints limited the maximum active weight that could be attained.

Chen, Hong, Huang & Kubik (2004) studied 3439 US equity mutual funds from 1962 to 1999 and found an increase in fund size eroded performance. This effect was most pronounced for funds that invested in small-cap stocks, suggesting that the lack of liquidity was the reason behind the erosion in performance.

Swartz & Gopi (2005) examined the impact of fund sizes on transfer coefficients and revealed that fund size plays a role in reducing skill transfer into active portfolios. In simulating three fund sizes (R500m, R5bn and R15bn) their study revealed a minimal effect of skill transfer for the smallest fund size. However, for the R5bn fund, significantly lower transfer coefficients were attained, with the largest fund being severely negatively influenced, with a TC of 0,4 indicating an erosion of 60% of manager skill due to portfolio constraints and asset growth.

These results are important to the fund management industry with the implication being that large funds should curtail their active bet taking to lower tracking errors, as higher tracking errors cause inefficient utilisation of skill (Swartz & Gopi, 2005).

Many researchers have suggested that there is an optimum fund size. Indro *et al.* (1999) conclude that funds must attain a minimum size in order to achieve adequate returns. They also note that marginal returns become negative after a fund exceeds its optimal size. The study found the three year average returns for a sample containing 683 actively managed equity funds for the period 1993-1995 increased monotonically as the size of the net assets increased. However, the marginal return diminished as the asset base grew.

Related researched by Shawky & Li (2004) estimated optimal asset sizes for small-cap growth and value funds. Their study suggested that small cap mutual funds would be able to enhance their performance by either increasing or decreasing their asset sizes towards the optimal point.

The study of the available literature on fund size and performance, although inclined towards a negative association after an optimal point, is inconclusive. This study attempts to shed further light on the subject as regards the JSE.

3. RESEARCH METHODOLOGY

The methodology was that of a simulated study of portfolios of varying size, which were constructed using historical share price data within realistic constraints. Daily data from January 1991 to December 2008 (18 years) were used, with simulations confined to an individual calendar year. The steps involved in the simulation were as follows:

A set of funds of increasing size was created at the start of each year. For 2008, a starting fund size of R10 million was assumed, and additional fund sizes were then created, each a factor of 25% larger than the previous fund, until the maximum fund size was reached. This approach was employed to ensure that the key fund sizes of R10 million, R100 million, R1 billion and R10 billion were included. As a mechanism to standardise the data for inflation and liquidity, these amounts were adjusted on the basis of the total value traded over the year, for the years prior to 2008, and all the results expressed in 2008 terms.

Statman (1987) showed that a well diversified portfolio of randomly selected stocks must include between 30 and 40 stocks. Further, anecdotal evidence from the South African fund management industry indicates that the number of shares held in equity portfolios varies between 40 and 65 (Personal Finance, 2006). On this basis, each portfolio was assumed to hold 40 stocks in each simulation.

To limit survivorship bias, the share universe for each simulation consisted of all stocks that were listed on the JSE as at the last trading day, prior to the start of the selected simulation year. Shares which de-listed during the year were included until they de-listed.

The market capitalisation of each stock was calculated as at the last trading day, prior to the start of the simulation year, as was the value of each stock's annual value traded over the prior year. All stocks were then ranked in descending order of calculated market capitalisation and the invest-able population was determined as the top 160 stocks (to approximate the composition of the constituents of the ALSI) on the ordered list.

Many researchers have identified constraints in the real world portfolio construction process which limit a manager's ability to transfer skill into active portfolio positions (Clarke *et al.*, 2002; Swartz & Gopi, 2005; Sodeyama & Yano, 2004; Perold & Salomon, 1991). In an effort to realistically model these problems, the portfolio construction process was as follows: 40 shares from the list of 160 were randomly selected from the invest-able population to form the basis of an equal-weighted hypothetical portfolio. Duplications were not permitted.

The use of an equal weighting approach ensured that each stock maintained the exact same weight, relative to the portfolio size, at the start of the simulation. A stock's weight, in monetary value, was used to calculate the number of shares to be purchased at the start of the simulation year.

In recognition of the negative market impact and possible corporate governance issues related to large purchase trades, a one-third (1/3) annual purchase trade constraint was built into the process. Based on a share's prior year value traded, a maximum holding of 1/3 of this value was permitted.

As portfolio size increases, the desired equal weighting in shares is constrained by the 1/3 value traded constraint for smaller shares. Large amounts of cash start to accrue outside the portfolio as a residual balance. In such a scenario, the model engages a routine to equally weight the total residual cash balance amongst those stocks within the portfolio that have excess capacity (in terms of the 1/3 value traded constraint), using an iterative process.

However at the very large end of the fund size spectrum, it becomes impractical to hold many of the smaller shares. In this instance, the 40 randomly selected stocks within the simulated portfolio are arranged in descending order in terms of their annual value traded. The stock with the lowest annual value traded is removed from the simulated portfolio. The model randomly re-selects another stock from the invest-able population (160 stocks) and adds it to the simulated portfolio, ensuring that the newly selected stock is not a duplicate and that its annual value traded exceeds that of the previously removed stock. The asset allocation process, where all stocks making up the simulated portfolio are initially equally weighted, is then re-initiated for the entire portfolio.

Towards the larger end of the fund size spectrum the sequential 25% increase in the value of the fund starts to pose a problem. At some point, the fund can no longer be fully invested into a 40 stock portfolio, even after the capacity weighting logic described above has been iteratively executed. When this occurs, the model calculates a maximum fund size by ranking all stocks within the invest-able universe, for the selected simulation year, in descending order based on their prior annual traded value. The top 40 stocks are then selected from the ordered list. Thereafter, the cumulative 1/3 of each stock's annual value traded is calculated, yielding the maximum fund size.

To determine the number of shares to be purchased for the creation of the hypothetical portfolios, the calculated amount to spend on any share is divided by the closing price of the selected stock as at the last trade day prior to the selected simulation year. At this point a hypothetical portfolio with all of its funds invested into a 40 stock portfolio is created and the

requisite number of shares in each stock is maintained.

A buy and hold strategy is calculated for each portfolio, assuming that the appropriate shares are purchased on the first trading day (using closing prices of the previous trade day) and held until the end of the calendar year.

1000 simulated portfolios were executed following this process, and the portfolio mean, median and standard deviation of returns was calculated. The methodology is summarised in Table 1:

Table 1: Outline of the steps in the methodology

Step	Process
1	Select YearOfAnalysis (commence January 1991).
2	Determine the FundSize (starts with R10m in 2008 values).
3	Normalise the FundSize for the YearOfAnalysis by adjusting in terms of the total value traded in the YearOfAnalysis against the 2008 benchmark.
4	Identify all the JSE listed shares on the first trading day of the YearOfAnalysis
5	Calculate the MarketCapitalisation of each share on the last trading day of the prior year.
6	Calculate the ValueTraded of each share in the prior year.
7	Rank the data in terms of (descending) MarketCapitalisation and select the top160 shares.
8	Construct a portfolio of 40 randomly selected shares on an equal weighted basis, at the start of the YearOfAnalysis.
9	Identify any portfolio shares whose starting portfolio value > 1/3 of their ValueTraded in the prior year.
10	Limit the investment in each of these shares to 1/3 prior year ValueTraded and place surplus into Cash.
11	Iteratively reallocate the Cash amongst remaining portfolio shares on an equal basis.
12	Iteratively check that no portfolio shares exceed 1/3 ValueTraded limit.
13	If Cash still remains, remove the portfolio share with lowest 1/3 ValueTraded limit and randomly select a replacement share ensuring that it has a higher ValueTraded Limit. Repeat until all Cash is invested and the 1/3 ValueTraded constraint is met. (MaxFundSize is determined when this constraint cannot be met).
14	Apply a buy and hold approach to value the portfolio for the calendar year, assuming de-listed shares revert to cash holdings etc. and calculate portfolio return.
15	Repeat from step 8 until 1000 random portfolio returns are obtained.
16	Increase the FundSize by 25% and repeat from step 3.
17	Select next Year of Analysis and repeat from step 1.

As a data integrity check, a monthly market capitalisation weighted index was constructed from the monthly returns and market capitalisation of all shares used in the simulation model. The monthly returns of this contrived index were then compared to the monthly ALSI returns over the sample period. A cumulative tracking error[1] in the order of -20% over the period was observed, which can be explained by the following:

The market index comprised two indices namely the JSE Actuaries All Share Index (CI01) and the FTSE/JSE Africa All Share Index (J203) that were maintained at different points in time across the research period. The CI01 was the earlier index and was used to represent the overall market from the start of the research period up until 21 June 2002. On 24 June 2002, the CI01 ceased to be calculated and was replaced by the J203 (JSE Limited, 2003). In addition, the methodology used by the JSE and the Actuarial Society of South Africa in constructing these two indices varied in a number of ways over the study period. Furthermore, the contrived index was rebalanced on a monthly basis whereas both the CI01 and J203 indices were rebalanced on a quarterly basis. Taking into account these factors it was felt that the data was sufficiently reliable.

4. RESULTS

Over the period under investigation, the liquidity on the JSE improved dramatically. This is the result of a number of factors, including the liberalisation of securities dealing in 1995, the introduction of an electronic trading system (STRATE) in 1999, the gradual relaxation of exchange controls and South Africa's improving economy. Figure 1 below shows the increase in liquidity over the period:

[1]Tracking error is the difference between a portfolio's return and a benchmark index. In this instance, over the full 17 years of monthly data the value of the contrived index was 20% lower than that of the ALSI.

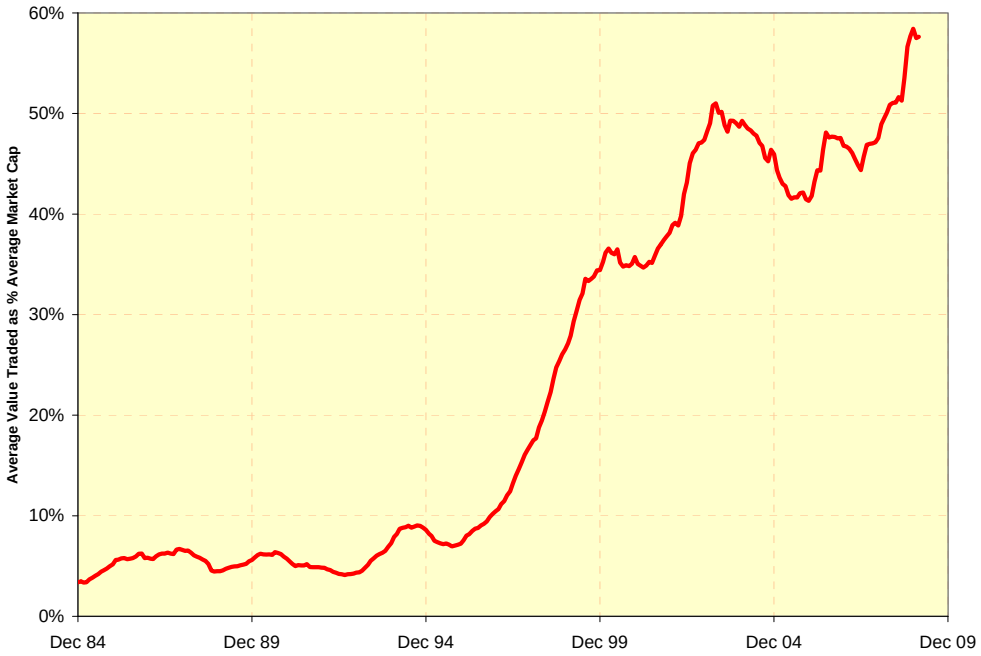

Figure 1: Liquidity on the JSE, defined as the average value of equity traded as a percentage of the average market capitalisation in the preceding 12 months.

As can be seen in Figure 1, liquidity improved from a level of around 5% between 1984 and 1994 to a peak of almost 60% in 2008. The increase in liquidity has a significant impact on fund size, because of the constraint imposed of a maximum holding for any share of one third of the prior year's value traded.

As indicated above, hypothetical portfolios of increasing fund size were simulated in the study. Each portfolio size is simulated 1000 times per research year thus yielding 1000 fund return values, from which a probability distribution of fund returns is derived. A mean return and its associated standard deviation can be calculated for each fund size distribution and plotted graphically. The results for 2008 are presented in Figure 2.

The mean returns track the equal-weighted index until a fund size of about R6bn is achieved. Thereafter liquidity constraints shift the mean returns towards the market-cap weighted index.

As can be seen from Figure 2, the returns over the period 31 Dec 2007 to 31 Dec 2008 were negative. Small funds (those with a fund size less than about R6bn) have a mean return of about minus 31% and closely track the return of the equal weighted index. Once the fund size exceeds R6bn the mean fund return trends upwards, culminating in a return of minus 26% for the largest possible fund size (given the liquidity constraints imposed) of R640bn. Not unexpectedly, this final point lies close to the return of the market cap weighted index. It is also noticeable that the standard deviation of returns from the simulation (shown as the 'Low' and 'High' dotted lines) remains more or less equidistant at plus and minus 4% from the mean return. The standard deviation increases to +/- 5% when the fund size reaches R100bn, before reducing to zero for the largest fund, for which the simulation was constrained to a single observation.

By subtracting the mean return for each fund size from the equal weighted index return for each year, it is possible to standardise the above data so that the mean returns of all 18 years can be presented on a single chart. Figure 3 shows the deviation from the equal weighted return for each of the 18 years in the sample.

From Figure 3 it can be seen that the mean returns are clustered around the equal weighted mean for small fund sizes. In some years, (e.g. 2006, 1998) there is relatively little tracking error from the equal weighted mean across all the fund sizes. In most years however, strong size effects are evident and the mean returns for large funds are drawn away from the equal weighted return towards the market liquidity weighted return. In some of these years, when the fund size exceeds approximately R2bn, the mean returns begin to disperse. For fund sizes of R5bn, the distance from the (relevant) equal weighted return is +2,6% in 1999 and -2,7% in 1991. For fund sizes of R10bn the deviation from the mean is +4,4% and -4,8% in 1999 and 1991 respectively.

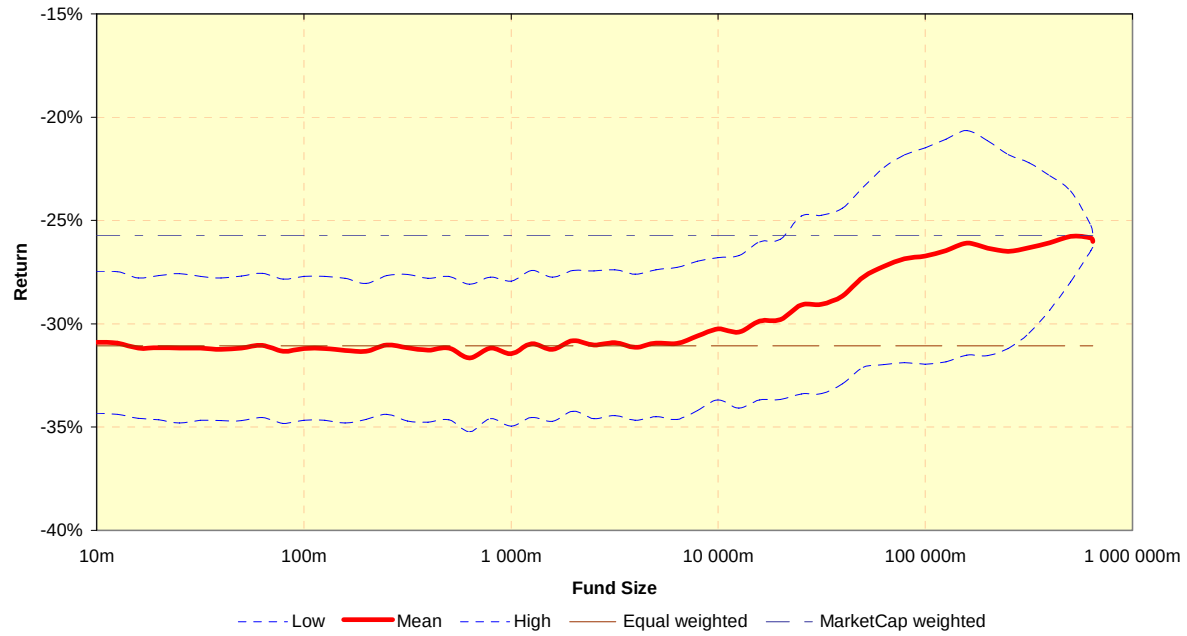

Figure 2: The distribution of returns from simulated portfolios of increasing fund sizes (2008).

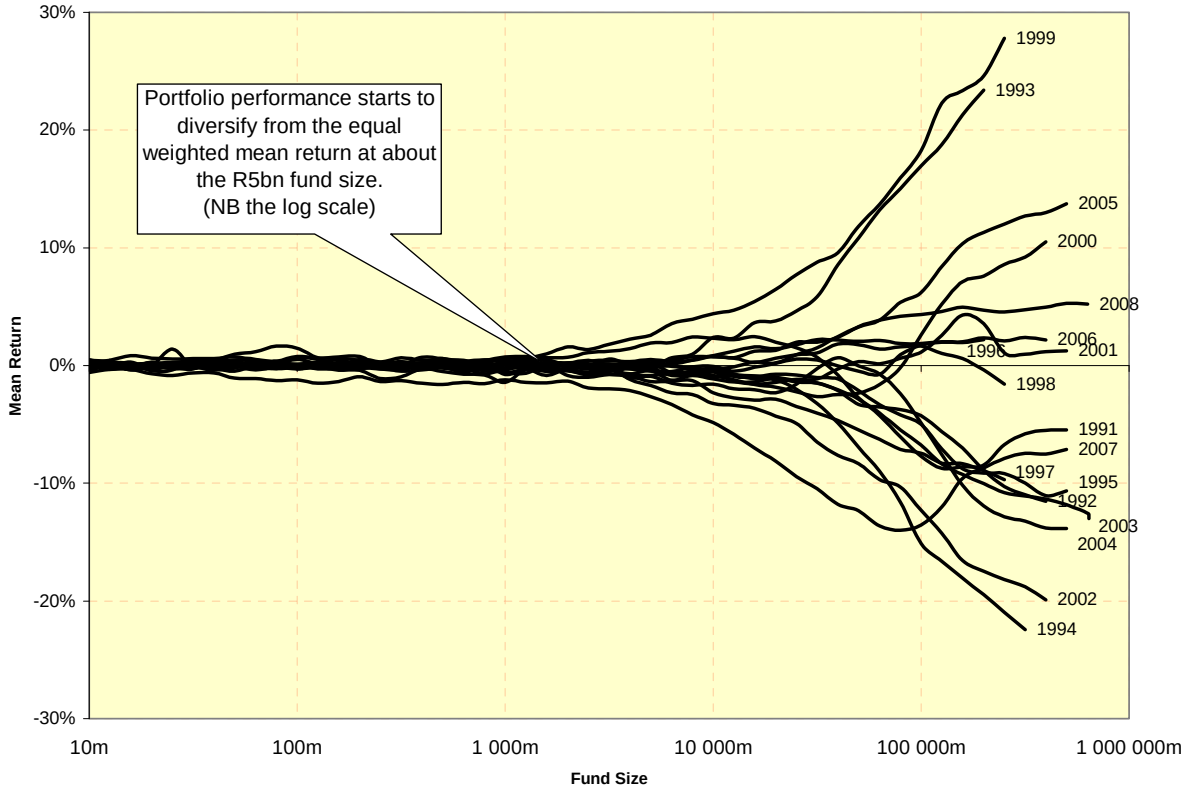

Figure 3: Deviations from the equal weighted return, for mean fund returns of differing sizes, for each of the 18 years in the sample.

Figure 3 also shows several instances of dual (or multiple) points of inflection in the data (see 2007 for example when the strongly downward trend becomes positive around the R100bn fund size). A close examination of the data found no consistency in these further points of inflection, and no explanation for these was apparent.

By consolidating each year's results onto the prior year, a long term view of fund performance by each of the major simulated fund sizes is possible. A value index, commencing at R1, can be constructed for each fund size to show each fund's average performance over the 18 year period, with a rebalancing of the portfolio (in terms of stock selection and asset weighting) occurring at the start of each simulation year. These results are presented in Figure 4 in which the value of R1 invested in 1990, in each of the major fund sizes for the 18 year review period is presented.

Over the period the trend is upwards, although the crash of 2008 is clearly visible. A strong size/liquidity effect is apparent, with the large, liquidity constrained funds, showing significantly worse performance. There is almost no discernable difference between the R10m and 100m fund sizes. For the fund size of R1bn, lower performance becomes apparent after about the first 5 years, and this is even more the case for the R10bn fund. Table 2 shows the results in more detail.

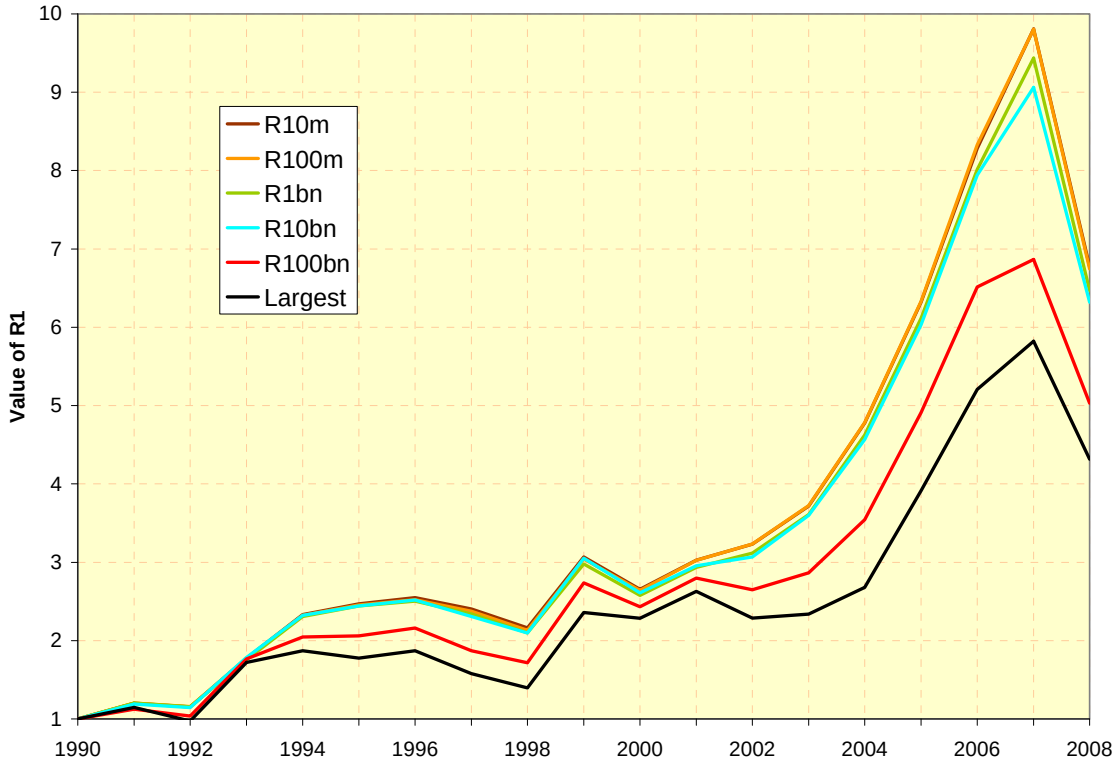

Figure 4: Performance indices for the major fund sizes over the 18 year period, assuming annual re-balancing.

Table 2: End values and average annual returns of a R1 investment in 1991 into varying fund sizes over the sample period 1991 – 2008

Fund Size	R10m	R100m	R1bn	R10bn	R20bn	R50bn	R100bn	Largest
End Value	6,78	6,74	6,47	6,32	6,02	5,57	5,03	4,32
Performance vs. the benchmark R10m fund over the whole period	0,0%	-0,5%	-4,5%	-6,7%	-11,2%	-17,8%	-25,8%	-36,3%
Annualized Return	11,2%	11,2%	10,9%	10,8%	10,5%	10,0%	9,4%	8,5%
Range around the mean return (+/-1 std dev)	12,4%	12,4%	12,3%	12,4%	12,8%	14,5%	16,1%	0,3%

The differences described above can be seen in Table 2. For fund sizes of R10bn there is a relatively small but discernable size related under-performance over the 18 year review period. If measured against the end value of the R10m fund, this under-performance amounts to a total (for the period) of -6,7%. For fund sizes greater than R10bn the level of under performance increases rapidly, to a maximum of -36% for the largest possible fund.

It can also be observed from Table 2 that the spread of the distribution of possible returns around the mean (as measured by the range between plus and minus 1 standard deviation) remains at about 12,4%[2] until the fund size reaches R20bn. Thereafter it increases to 16% for the R100bn size fund before reducing to zero for the largest fund.

In most years there was a significant difference between the returns of small funds and those of large funds. This result contrasts the collective findings of the first group of researchers referenced within the literature review (Sharpe, 1966; Moles, 1981; Milburn-Pyle, 1984 and Nurse, 1998) who asserted that fund size has no effect on performance.

The relationship between fund size and return was positive in 8 of the 18 years, and negative in 10 – as can be seen in Figure 2. However, from Figure 3 it is clear that smaller funds achieve superior returns. The reason for this is that as a fund's size increases, the liquidity of the fund becomes a critical issue to fund managers. Large funds must increasingly focus on highly liquid stocks, which equates to the 'large-cap' shares listed on the JSE. The reason fund managers follow this route is two-fold; highly liquid stocks ensure that managers are able to purchase or dispose of positions without negative liquidity constraints (see: Loeb 1983; Perold & Salomon, 1991 and Du Preez, 2006)). Secondly, 'large-cap' shares allow fund managers to take meaningful positions in these stocks without compromising corporate governance issues relating to share ownership and control (Swartz & Gopi, 2005).

Therefore, as a fund increases in size, stock selection gravitates towards the more liquid, 'large-cap' opportunities within the invest-able population. Illiquid (small cap) shares are excluded. As the fund size further increases it becomes necessary to relax the constraint of equal weighting, and the fund manager is forced to move from active weightings and increasingly adopt market-cap like weightings. Grinold (1989), Strongin, Petsch & Sharenow (2000) and DeRoche (2004) showed similar findings. The end result is that for large funds, performance cannot be attributed to the manager's skill or research effort but rather to the vagaries of the market, and specifically those that affect the highly liquid, 'large-cap' stocks. This finding is in direct contrast to Chen *et al.* (1992) who posited that a positive relationship existed between a fund's size and its performance.

A number of researchers (see Gilbertson & Goldberg, 1981, Van Rensburg, 2001 and Van Rensburg and Robertson, 2003) have noted that the mining and industrial sectors of the JSE each comprise a significant proportion of the JSE's total market capitalisation and that the factors affecting these two sectors can be quite different over extended periods of time. It is likely that this dual market effect and the resulting bi-modal distribution of returns underlies these results. Figure 5 shows the skew towards resource shares, which exists for large funds.

The graph is constructed as follows: The top 160 shares by market capitalisation at 31 Dec 2008 are ranked in descending order by value traded over the previous year. The percentage of 'Resource' shares across all 160 shares is then calculated (25%) and plotted against the value traded for the lowest ranked share. The share least traded is then dropped and the calculation repeated for 159 shares etc. until only the highest traded share remains.

Figure 5 shows the skewness towards 'resources' for shares with higher liquidity. As can be seen from the graph, 'resource' shares constitute about 25% of the population of shares if low levels of value traded are permissible. As fund size increases, many of these low value traded shares will fail the liquidity constraint, and the fund will increasingly comprise 'resource' shares, and consequently the resulting returns will track the ALSI and not the equal weighted index.

5. CONCLUSIONS

The purpose of this study was to determine whether a fund's size influences its ability to out-perform an equal weighted index. A review of the literature found three distinct groupings of findings. The first group found no evidence that a fund's size impacts its performance. The second group supported the notion that larger funds outperform smaller funds, whilst the third found evidence that smaller funds out-perform.

By constructing random portfolios of defined sizes and simulating these using historical data over the 18 year period 1991 to 2008, we find that the size of a fund is a determinant of performance. This effect becomes evident for funds larger than R5bn – as shown in Figure 3.

[2]Note: The range shown in Figure 1 for 2008 is about 8%, which coincidentally happens to be the lowest in any year.

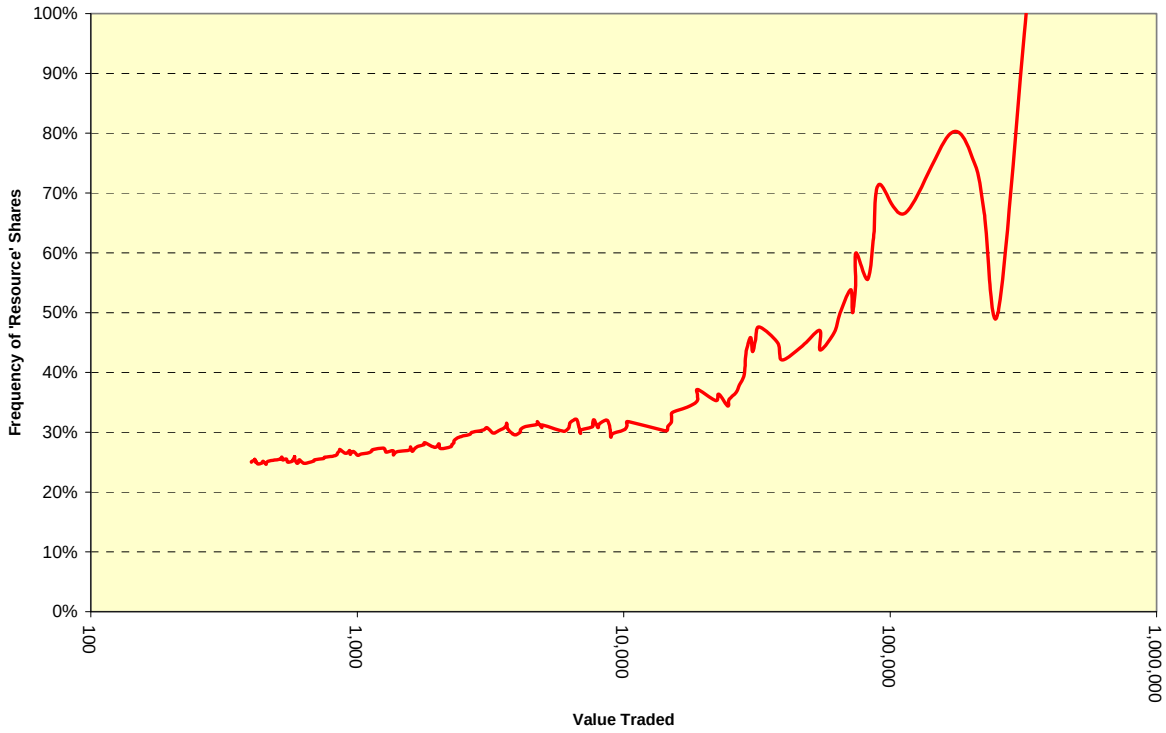

Figure 5: The frequency of 'resource' shares by value traded.

The relationship in general, is neither positive nor negative, with certain years favouring large funds on account of the resources bias in the large cap shares listed on the JSE. The general trend is for a fund's performance to track away from the equal weighted index towards the ALSI as fund size increases. Out-performance against the equal weighted index by large funds is confined to only 8 of the 18 years examined. When the funds are compared over the full 18 years of the study, small funds out-perform their larger counterparts. Therefore it can be concluded that, for large funds, an active investment management strategy is unlikely to be effective.

Finally, the dual market effect on the JSE as highlighted by Gilbertson & Goldberg (1981), Van Rensburg (2001) and Van Rensburg and Robertson (2003) is a likely reason underpinning these results.

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