Active fund management performance and costs

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Abstract

Active weight, active expense ratio and active alpha are measures that can be calculated with relative ease for any fund using publicly available data. However, for active weight to be truly useful to an investor the relationship between these quantities and fund performance needed to be explored in greater detail. Furthermore, the costs of South African unit trust funds had not been studied using Miller's techniques and needed further study. Finally, active weight had not been used to study the evolution of active management over time. Using quarterly South African unit trust fund data this study delivered on the following key findings: that funds with higher active weight provide excess returns to their investors; that funds with a higher active expense ratio do not necessarily provide greater returns; and that the active alpha for South African unit trusts is negatively correlated with fund performance.

Keywords

Mutual fund, unit trusts, active management, passive management, active expense ratio

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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Signature

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Date

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1.1.2 Active fund management

According to the Association for Savings and Investment in South Africa (ASISA, 2011), the South African collective investment scheme industry was managing assets worth more than R939 billion at the end of 2010. Institutional and private investors invested more than R109 billion in a total of 943 funds (ASISA, 2011). This represents 700% growth over the last ten years and clearly demonstrates the popularity of collective investments schemes among today's investors. However, with such a myriad of options available, which investment should an investor choose?

When evaluating mutual fund investment options an investor can, broadly speaking, choose between two different types of funds. The first type of investment is called an actively managed fund, which refers to the active role that the fund manager plays in selecting the assets to invest in and the timing associated with making these selections. These actions are taken with one goal in mind - to beat the market (Grinold & Kahn, 1999). Due to the skill required in the management process, such actively managed funds typically charge investors higher fees, usually with the expectation of higher returns. A second type of investment is called a passive investment, which refers to the passive role played by the fund manager. Asset selection is usually done by tracking a relevant index and therefore these funds charge much lower fees. These passive funds never promise to outperform the market, only to match the returns offered by the market tracked by the index (Grinold & Kahn, 1999).

Recently, there has been a number of articles regarding the advantages of passive investment (Cameron, 2011; Collinson, 2010; Davis, 2010). Davis (2010) described a study that included 233 funds in the United Kingdom (UK) that found that active management contributed -3.8% to the average fund's returns. Cameron (2011) described a similar study performed on South African funds in 2004 and how it raised the issue of fund management. The conclusion of these articles is that with the efficient markets that exist today, no fund manager can really outperform the market over the long run and the low costs associated with passive investments make them very attractive investments.

Proponents of active management highlight a number of issues in defence of active management. They point to the fact that certain funds exist that are beating the market. Moreover, they point to the fact that these funds typically operate with strict mandates and policies that prohibit investment in certain types of assets. They also argue that passive investment does not take into account the

Figure 1.1: Norway's Government Pension Fund – Global (Passive aggressive, 2010)

inherent risk of the underlying assets, which might be in contravention of the investment policy required by their clients.

A good illustration of this debate comes in the form of the performance of the Norwegian Government Pension Fund - Global. This USD 444 billion fund manages the royalties from Norway's North Sea oil and gas reserves (Passive aggressive, 2010). During the financial crisis of 2008 the fund lost USD 111 billion in value which brought to light an interesting fact: the consultancy group Mercer found in a study commissioned by the Norwegian Ministry of Finance that the fund's performance could have been replicated by investing in a passive index fund. Follow-up studies by Ang, Goetzman and Schaefer (2009) confirmed this result, showing that active management only contributed 0.3% to the total return of the fund.

The fund has had a much better performance during 2009, with an annual return of almost 22% (Figure 1.1). However, if the world's second largest sovereign wealth fund struggles to come to terms with the right type and level of active

management, what is the ordinary investor to do?

1.1.3 Research problem and purpose

Should the investor decide on an actively managed investment rather than a passive investment, how would they select the most appropriate actively managed investment? Historical data shows that not all actively managed investments are created equal. There are funds that outperform their relevant indexes over a sustained period of time, but the average actively managed fund does not produce excess returns. In fact, when the performance of these funds is analysed it becomes apparent that for a small number of funds, a large proportion of the fund's performance can be correlated with the performance of the best-fit index fund (Davis, 2010). Even though these funds might market themselves as active investments, they are in fact passive investments. To avoid these closet indexers (Richards, 2010) investors require a measure that can assist them in choosing the best actively managed investment.

Another aspect to consider when choosing an investment is cost. John Bogle, the founder of Vanguard, the low-cost fund management company, described, what he referred to, as the Cost Matters Hypothesis (Bogle, 2005). This implies that when taking into account the costs of a collective investments vehicle, especially when compounded over the lifetime of the investment, it can become excessive. Davis (2010) mentioned an American mutual fund where the costs related to active management came to -9%. Investors in South Africa have to be wary of the same trap. Stokes (2010) described a study that shows a R100 investment returning R727.31 instead of R1152.39 due to costs. The full extent of these fund management costs in the South African market will need to be studied in more detail. On the other hand, the managers of actively managed funds that do out-

perform the market will rightly lay claim to a portion of the excess returns that are being generated in the form of fees. If a metric existed that captured the level of active management skill, investors might feel more justified in paying the fees.

Collinson (2011) described the United Kingdom fund management industry's response to the regulatory changes in the form of a Retail Distribution Review (RDR) due to the perception of high costs. This included JP Morgan reducing charges to a third of the average fund management costs in the United Kingdom and TCF Investments capping their fees at a maximum of 0.8%. Also, Vanguard launched an index tracker fund with costs of only 0.15% per annum. However, despite these efforts Collinson (2011) reported that there is still evidence of excessive fees. Ross (2011) also reported on these actively managed funds being offered at costs similar to that of passively managed funds and how fund managers are moving to new platforms and exchange traded funds (ETF's) to ensure cost competitiveness. In his 2011 budget speech, Pravin Gordhan, the South African Minister of Finance, mentioned the cost of investment and that the government would want to address the imbalance of knowledge about these costs between the suppliers and the consumers (Cameron, 2011). This demonstrates that there is a need to understand the cost of investment as well as the impact this has on the long term returns to consumers from a regulatory perspective in SA. If a metric existed to monitor the performance of fund managers, regulatory bodies would be able to act against predatory practices, in the interest of consumers.

1.1.4 Research motivation

Due to the availability of good quality data, a large amount of research on the performance of the US mutual fund industry is available. For example, Jensen (1968) found that for the period from 1945 until 1964 passive fund management

on average outperformed active fund management. This result was confirmed by Kosowski, Wermers, and White(2006) for the period from 1975 until 2002. However, the research shows that some actively managed funds do outperform passive funds (Petajisto, 2010; Carhart, 1997). As was elaborated in the previous section, the question arises whether any measures exist that is related to the performance of actively managed funds. Historically, tracking error volatility (Grinold & Kahn, 1999) has been used to study active management. More recently, "Active Share" as proposed by Cremers and Petajisto(2009), "R-squared" as proposed by Amihud and Goyenko(2011) and "active weight" as proposed by Miller (2007), are all measures that have been developed to study the level of active management in an investment.

Cremers and Petajisto(2009) developed Active Share as a measure of active management. They developed a certain methodology that allowed for a detailed analysis of Active Share. In their study they compared Active Share to a number of fund characteristics including fund size, fund fees, fund flows and the prior returns of the fund. They performed a time series study of Active Share and also investigated how Active Share relates to fund performance. They found Active Share especially well suited to uncovering closet indexing. However, to calculate the Active Share for a fund the holdings of the fund as well as the benchmark index needs to be known, which is not always the case, as was highlighted by Cremers, Ferreira, Matos, and Starks(2011) in their study of mutual fund industry worldwide.

Amihud and Goyenko(2011) used the R^2 obtained from the regression of fund returns on a benchmark model to study fund performance. They found that a lower R^2 measures greater active management and that it predicts higher alpha, or excess returns. However, they did not study the impact of fund fees or analyzed active management style.

Miller (2007) developed active weight as a tool to study the costs of active fund management (which he termed the active expense ratio) and did not study the relationship with fund performance. Even though Miller proposed active alpha as a measure of the active management performance no analysis beyond some basic comparisons between fund types was done. One of the big advantages of active weight is that it can be computed reletavely easily using the fund's published total expense ratio, it's R^2 and the published excess returns (Davis, 2010).

This research therefore aimed to utilise the methodology used by Cremers and Petajisto(2009) to study the performance and costs of active fund management using the active weight and the related metrics of active expense ratio and active alpha, as developed by Miller (2007).

1.2 Research objectives

The objective of this research was to:

1. Analyse the relationship between active fund management and other fund characteristics such as fund size, fees, flows and prior returns.
2. Examine the evolution of active fund management over time using the active weight and the active alpha.
3. Understand if more active fund management leads to greater performance, by using the active weight and active alpha.
4. Analyse whether active weight or active alpha could be used to predict fund performance.

5. Determine the cost of active fund management when taking into account the returns from the passive component of the fund by using the active expense ratio.

1.2.1 Research Aim

This research aimed to evaluate the suitability of the active weight, the active expense ratio and the active alpha of a fund as measures to analyse and predict fund performance and explore fund management costs.

Chapter 2

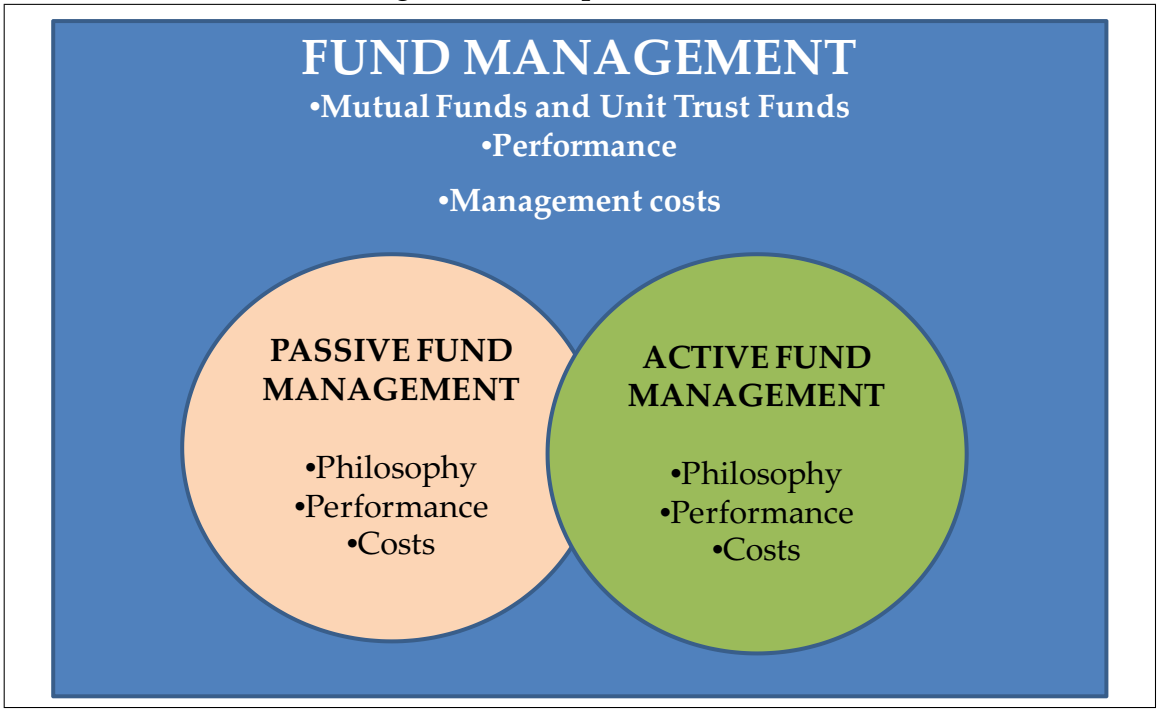
Literature Review

Figure 2.1 shows the structure of this chapter. It opens with a discussion of fund management, covering aspects such as the basic structure of mutual funds and unit trusts funds, the performance measures for these funds and management fees. The next section explores the literature on passive fund management including the passive management philosophy, performance measures and passive management costs. This is followed by a section on active fund management discussing the active management philosophy, performance and costs. The chapter concludes with a section on the identified areas for new research.

2.1 Fund Management

This section describes the history of mutual funds in the United States and unit trust funds in South Africa. It then describes the performance of fund management and concludes with a description of fund management costs. For the purpose of this study "fund management" refers to the professional management of investment funds on behalf of individuals, families and institutions.

Figure 2.1: Chapter structure



2.1.1 Mutual funds and unit trust funds

The first documented record of a collective investment vehicle comes from the 18th century Netherlands where Adriaan van Ketwich created an investment trust called *Eendrag maakt Magt* in 1774. He theorized that the diversification offered by his vehicle would appeal to smaller investors with limited amounts of capital available for investment (McWhinney, 2009). It is interesting that the same strength through unity offered by the principles of risk diversification and low investment threshold continues to drive the appeal of mutual funds to this day. Over the next century the idea of a closed-pool investment trust spread through the rest of Europe and eventually to the United States, where the The Boston Personal Property Trust was created in 1893 (McWhinney, 2009).

The first true mutual fund, the Massachusetts Investor's Trust (see Figure 2.2), was launched in 1924 in Boston and carried the characteristics of a modern-day mutual fund in that it was an open-ended pool of investments, managed by a

Figure 2.2: A copy of the original certificate issued to shareholders of the Massachusetts Investor's Trust (MFS Investment Management, 2011)

number of experts in the field, making investment more accessible to the common man (MFS Investment Management, 2011). Today the United States mutual fund industry is the largest in the world, with USD 11.8 trillion worth of assets under management (ICI, 2011).

Modern day United States collective investment vehicles can be structured as unit investment trusts, as mutual funds or as closed-end funds (Securities and Exchange Commission, 2007). The studies used in this research is based on US mutual fund data. A mutual fund refers to a type of investment company that pools money from many investors. The investors in a mutual fund will purchase shares in the mutual fund from the fund itself or through a broker. The price paid for these shares will be equal to the net asset value (NAV) per share plus any fees. Each of the investors then owns shares in the fund that represent a portion of the holdings of the fund (Securities and Exchange Commission, 2010).

According to the SEC Mutual Fund guide for investors (Office of Investor Education and Advocacy, 2007) mutual funds can provide a return to investors in one

of three ways. Firstly, the dividend payment from stocks and the interest payments on bonds in the fund's portfolio which is received by the fund and then paid to the investors. Secondly, capital gains distributions accrue to the investors if the fund sells any securities that have increased in price. Thirdly, when the value of the fund's portfolio increases the NAV of the fund increases, resulting in an increase in the price of the mutual fund shares (Office of Investor Education and Advocacy, 2007).

Markowitz (1952), in his seminal paper on portfolio selection, showed that for a certain level of risk, an efficient portfolio can be created that maximises the return to the investor. Different mutual funds, through the construction of an underlying portfolio using this principle, offers investors different risk profiles aligned to the mandate of the mutual fund.

Collective investment vehicles in South Africa are referred to as unit trusts (ASISA, 2011). The first unit trust in South Africa was the SA Growth Equities (Sage) Fund which was launched in June 1965 and was soon followed by the National Growth Fund (Kok, 2006). South African unit trusts are structured differently from US mutual funds, but have the same end results for investors (Meyer-Pretorius & Wolmarans, 2006) and operate under the Collective Investments Schemes Control Act No. 45 of 2002. This new Act introduced a number of changes, including the renaming of "unit trusts" to "collective investments" and "units" to "participatory interests", however most investors still use the old terms. A unit trust fund is made up of equal portions called or units. Each unit has a price, or net asset value based on the underlying assets of the fund that could be cash or securities. Units are priced daily because the value of the underlying assets changes every day in line with market movements. When investors invest in a unit trust, they are allocated units according to the size of the investment and the price of the units on the day of the investment (Investonline, 2011).

2.1.2 Measuring fund performance

As was mentioned in Section 1.1.4, a large body of academic research exists studying the performance of the US mutual fund industry. This includes the work by Sharpe (1966) to illustrate that the ratio of returns to volatility can be used to evaluate mutual fund management performance. This ratio is now referred to as the Sharpe-ratio Bodie, Kane, and Marcus(2011).

Jensen (1968) studied the inherent paradox facing any fund manager: the need to increase returns on a portfolio whilst minimizing the risk to the portfolio holders. He focused on the fund manager's ability to forecast security prices thereby increasing the portfolio returns by producing non-zero alpha, where alpha refers to the excess returns achieved by the fund. This portfolio alpha is sometime referred to as Jensen's alpha (Miller, 2007) or Jensen's measure (Bodie et al., 2011) and is used to this day as a measure of fund management performance.

Daniel, Grinblatt, Titman, and Wermers(1997) showed that the forecasting ability referred to by Jensen can be explained to a large extent by the use of momentum strategies by the portfolio managers rather than some inherent skill. Any further excess returns generated by certain funds are attributed by the authors to the characteristics or style of the fund.

Wermers (2000) augments this study by using previously unavailable fund stock holdings data. The conclusion reached by Wermers was that mutual fund portfolio's outperformed a broad market index by 1.3% per year, of which 0.6% is derived from the style of stocks invested in and 0.7% is due to the stock-picking ability of the manager. However, once fees are subtracted the net-return performance is 1% below the market.

Fama and French (2010) studied this stock-picking ability and asked whether it is

related to luck or skill. Their conclusion was that there are very few fund managers that produce excess returns able to cover their costs. Based on their results they found that only 2.3% of fund managers generate excess returns greater than 2.5% per annum - before expenses.

Fund performance can be measured relative to a number of theoretical benchmarks. The Capital Asset Pricing Model (CAPM), the Fama-French 3-factor and the Carhart 4-factors benchmarks are usually employed in academic research (Carhart, 1997). For the CAPM, the benchmark for a US mutual fund is defined as

$$r_{it} = \alpha_{iT} + \beta_{iT} VWRF_t + e_{it} \tag{2.1}$$

where r_{it} is the excess portfolio return over the risk-free rate and $VWRF_t$ is the excess return on the Center for Research in Security Prices (CRSP) value-weighted portfolio of all NYSE, Amex and Nasdaq stocks (Carhart, 1997). The Fama-French 3-factor benchmark is defined as

$$r_{it} = \alpha_{iT} + b_{iT} RMRF_i + s_{iT} SMB_t + h_{iT} HML_t + e_{it} \tag{2.2}$$

where $RMRF_i$ is the excess return on a value-weighted aggregate market proxy, SMB_t is the excess returns on small cap stocks and HML_t is the excess returns from value stocks (Carhart, 1997). However, this model does not include the effects of momentum found by Jegadeesh and Titman(1993), where good or bad recent performance of particular stocks continues over time. Therefore, in most active management studies, including the work by Cremers and Petajisto(2009), benchmark comparisons are done using Carhart's 4-factor model which is defined as:

$$r_{it} = \alpha_{iT} + b_{iT}RMRF_i + s_{iT}SMB_t + h_{iT}HML_t + p_{iT}PR1YR_t + e_{it} \quad (2.3)$$

where $PR1YR_t$ is one year momentum in stock returns (Carhart, 1997).

The first security market index, the Dow Jones Average, was created in 1884 by Charles Dow and Edward Jones, as a way to communicate to the readers of the Customer's Afternoon Letter the performance of the US markets during the day (Dow Jones, 2011). Today, investors have a large variety of indexes such as the New York Stock Exchange's Dow Jones Industrial Average and the Standard's & Poor 500 or the Johannesburg Securities Exchange's All Share Index or TOP40 index. The performance of these indexes are used as practical benchmark by most investors when evaluating the performance of their investments.

These practical benchmarks can also be used to benchmark the performance of any fund. From the literature study it was clear that these indexes were used for performance comparison, as in the case of the work by Cremers and Petajisto(2009), Petajisto(2010) and Miller(2007). For this research only the relevant index will be used as benchmark when measuring fund performance.

2.1.3 Fund management costs

Mutual fund management fees in the US are typically broken down into two components (Investopedia, 2011): ongoing yearly fees, referred to as the management expense ratio that covers the on-going costs of managing the fund, and transaction fees referred to as "loads" that typically occur when buying or selling shares in the mutual fund.

Management fees for unit trust funds in SA are described in terms of a total expense ratio (TER). This was introduced in 2007 when the Association of Collective

Investments (ACI), the forerunner of ASISA, required it's members to quantify their direct costs, showing the expenses as a percentage of the total fund assets. The TER therefore shows the percentage of portfolio value that was consumed in fees and operating costs. It also includes the annual service fees. However, fund entry costs are not included in the TER. Trading costs are included by some managers but not by others. This means that the difference between the TER and the annual service fee percentage gives an idea of the operating cost-efficiency of the fund. A TER of 2.5% and an annual service fee of 1.5% means that 1% per annum of portfolio value was eroded by operating costs.

TER's are reported quarterly by all ASISA members, usually within a month of quarter end. Performance fees are included in the TER. However, to enable investors to determine the extent of performance fees (which may vary considerably over time), the fund manager must disclose the performance fee for the period as a percentage of the fund. So, for example, if a fund which charges a performance fee discloses a TER of 3.5%, a annual service fee of 1.5% and a performance fee of 1.2%, we know that on average 0.8% of portfolio value was expended in operating costs.

2.2 Passive fund management

This Section describes passive fund management (see Figure 2.1). The philosophical roots of passive fund management are explored and the measures of passive fund management discussed. Then passive management performance and costs are described and it concludes with a report on the growth of passive management over time.

2.2.1 Philosophy and measures of passive fund management

The emergence of benchmark indexes (described in Section 2.1.2) led investors to ask the question, why not just invest in the index? This led to the rise of so-called index trackers or passive funds. The first index tracker fund was launched in 1971 in the United States by William Fouse and John McQuown of Wells Fargo Bank (Investopedia, 2011). According to the Investment Company Institute (2011), by the end of 2010, 365 index funds managed total net assets of USD 1 trillion in the United States market, with investors adding USD 58 billion in net new cash flow to these funds.

The theoretical grounding for passive investment comes from the work on market efficiency performed by Fama (1970). The implication of an efficient market, even in its weak form, is that no investor can consistently outperform the market and by implication its proxy, the index.

These passive funds are constructed by exactly mirroring the holdings of the index being tracked. This has the advantages that no forecasting is required on the part of the fund managers, which reduces research and management overheads. It also minimises taxes and minimises asset turnover. High turnover will introduce brokerage costs and can introduce a spread between bid and asked prices when securities are traded in large blocks (Malkiel, 2003).

Tracking error volatility is a commonly used metric (Grinold & Kahn, 1999) of fund management that measures the standard deviation of the difference between the fund return R_{fund} and its benchmark index return R_{index} which is defined as

$$Tracking\,error = Stddev\left[R_{fund} - R_{index}\right] \tag{2.4}$$

Passive managers will attempt to mirror the performance of the benchmark index fund to such a degree that it minimises this metric.

Index tracking funds offering a passive fund management alternative in South Africa have not grown as quickly as in the United States. Wierzycka (1996) indicated that this may have been due to a variety of reasons, including the high transaction costs and vested interests of the limited number of dominant active fund managers. Wessels and Krige(2005a) estimated that pure index investment made up only 1.5% of all invested capital on the JSE by the end of 2003. ASISA releases quarterly statistics on the size of the South African collective investment industry, however these statistics do not break down index tracking funds separately. It is therefore difficult to estimate the extent of passive investment in South Africa.

2.2.2 Passive fund management performance

Sharpe (1991) described the arithmetic of fund management. Given that passive investors will own all the securities in the market, a passive manager will obtain precisely the market return, before costs. "From this, it follows that the return on the average actively managed dollar must equal the market return. Why? Because the market return must equal a weighted average of the returns on the passive and active segments of the market. If the first two returns are the same, the third must be also" (Sharpe, 1991, p. 7-9).

In his seminal article Jensen (1968) showed that passive management outperforms active management on average in the long run. Recent studies have confirmed that this is still the case in the United States (Kosowski et al., 2006; Petajisto, 2010) and that the average active fund under performs its passive equivalent by

at least 1% per annum over the long term. Malkiel (2003) studied fund management performance in US and European markets and found that passive management outperformed other investment strategies in efficient markets conditions and even when markets are not efficient. He found that despite well known behavioural factors, or predictable patterns in stock markets leading to possible market inefficiency, no profitable investment strategies are constructed from these inefficiency. This was also demonstrated by the fact that professional investors were unable to outperform the market (Malkiel, 2003).

Furthermore, Sharpe (1991) proposed the measurement of passive fund management performance by using comparable feasible passive alternatives, defined in advance of the measurement period.

Wessels and Krige(2005b) investigated South African mutual funds over 156 investment periods and found that in South Africa active funds outperform passive investments before costs. However, they found that after costs, index investing is preferred. Muller and Ward(2011) showed that a low cost index tracking fund outperformed more than 70% of unit trust funds on the JSE on a five year holding period from 2002 until 2010.

2.2.3 Passive fund management costs

As was described in Section 2.2.1 passive management investments carried low management fees. Malkiel (2003) reported index funds with fees of 10 or 20 basis points in the United States. Philips and Ambrosio(2007), in their analysis of United States mutual funds, found that the average passive fund in the US charges 31 basis points in fees. Bartens and Hassan(2010) reported an expectation that fund management fees in South Africa, as in other emerging markets, would be higher than the average fees in the developed world. Meyer-Pretorius

and Wolmarans(2006) reported that data on passive management fees in SA is not available. In fact, South Africa performed poorly in the Morningstar Global Fund Investor Experience 2011 (Alpert & Rekenthaler, 2011) report due to limiting foreign investment regulations and limited disclosure. The report found that historical expense ratio information, detailed fees, trading costs, and portfolio holdings were generally lacking or difficult to obtain.

2.2.4 Passive fund management over time

Passive fund management have grown in popularity since it's inception in the United States. According to the 2011 Investment Company fact book (ICI, 2011), equity investments in index funds have increased to 14.5% of all equity investments made in the US, up from 5.2% in 1996. It is even popular under active fund managers: Petajisto (2010) found that the level of passive management under active managers has been increasing over time since the early 1990's in US markets. Bhattacharya and Galpin(2009) found that passive management investing is on the increase in numerous developed and emerging markets. Muller and Ward(2011) found similar results for the South African market over a 23 year period from 1988 until 2010. In their analysis they found that active management, as measured through Active Share, has reduced from 50% to 15%. Their conclusion, in line with that of Bhattacharya and Galpin(2009), is that investors are moving towards an optimal market capitalisation weighted equity portfolio.

If one were to study active management from the perspective of active weight, as defined by Miller (2007), the question arise if similar trends will be observed.

2.3 Active fund management

This section describes the philosophy and measures of active fund management (see Figure 2.1), as well as the performance and costs of active management. It concludes with a discussion on the evolution of active management over time.

2.3.1 Philosophies and measures of active fund management

Active management refers to any fund management strategy that differs from passive fund management. A variety of active fund management strategies exist including stock picking and sector rotation. Stock picking refers to the act of selecting stocks based on certain criteria, with the aim of achieving excess returns over the market (Investopedia, 2011) whereas sector rotation refers to the action of a fund manager to move investments from one economic sector to another in an attempt to profit from an economic cycle (Investopedia, 2011).

The level of active management can be calculated in a number of different ways, using either the tracking error, Active Share, R-squared or the active weight. These metrics are discussed in greater detail in the remainder of the section.

2.3.1.1 Tracking error volatility

Tracking error volatility can also be used to measure the performance of active management. Active managers will try to maximise tracking error with strong excess returns for their funds. This metric provides a good indication of systematic factor risk (Petajisto, 2010). Tracking error is by far the oldest measure of active management and a lot of research has been done to determine a relationship between active management performance and tracking error. However,

Cremers and Petajisto(2009) found that tracking error on its own is an inadequate measure for the study of active fund management.

2.3.1.2 Active Share

Active Share, another metric used to evaluate active management, is defined by Cremers & Petajisto (2009) as

$$Active\ Share = \frac{1}{2}\sum_{i=1}^{N} |w_{fund,i} - w_{index,i}| \tag{2.5}$$

where $w_{fund,i}$ is the weight of stock i in the fund's portfolio, $w_{index,i}$ is the weight of the same stock in the fund's benchmark index, and the sum is computed over the universe of all assets. This metric indicates the fraction of the portfolio that is different from the benchmark index . They researched the relationship between Active Share and active management performance and their conclusion was that high levels of Active Share is related to good fund performance (Cremers & Petajisto, 2009). However, the biggest issue with Active Share is that it requires knowledge of the fund holdings. This is usually only released on a quarterly basis or, in certain instances in other markets around the world, not released at all (Cremers et al., 2011).

2.3.1.3 R-squared

Amihud and Goyenko(2011) used the R^2 obtained from the regression of fund returns on a benchmark model to study fund performance. They found that a lower R^2 measures greater active management and that it predicts higher alpha,

or excess returns. However, they did not study the impact of fund fees or analysed the active management style, which meant that it was difficult to uncover closet indexing using R^2.

2.3.1.4 Active weight

Active weight is a metric that has been used by Miller (2007) to measure the level of active management and was defined as

$$w_A = \frac{\sqrt{1 - R^2}}{R + \sqrt{1 - R^2}} \tag{2.6}$$

where R^2 is calculated from the regression of the fund's returns against the returns of the index. This metric has the advantage that it is independent of the portfolio's beta. Beta is an indication of the portfolio's sensitivity to the index (Bodie et al., 2011). Active weight was created in the context of determining the costs associated with active management and allocating the correct levels of cost to the actively managed portion of the fund. Active weight has the added advantage that it can be calculated on daily returns data. It is important to note that no research has been found that study the relationship between active weight and fund performance.

2.3.2 Performance of active fund management

Despite the issues highlighted with regards to the average performance of active management in both United States and South African markets, some active funds do outperform the market on a consistent basis (Cremers & Petajisto, 2009; Petajisto, 2010).

Previous research have provided a number of different factors that determined fund performance. Bogle (1999) and Carhart (1997) have argued that higher expenses lead to lower fund performance, whereas Hendricks, Patel, and Zeckhauser(1993) and Wermers (2000) have argued that market timing and stock picking are even greater determinants of fund performance. Cremers and Petajisto(2009) used a combination of tracking error and Active Share to classify the performance of actively managed funds. No studies could be found that correlates the active weight, active alpha and active expense ratio of a fund with fund performance. Miller (2007) indicated this as an avenue for possible future work. Miller (2007) derived the active alpha for a fund as follows

$$\alpha_A = \alpha_P + \frac{R(\alpha_P + C_I)}{\sqrt{1 - R^2}} \tag{2.7}$$

where α_P is the portfolio alpha. This active alpha is the risk premium above the market for the actively managed component of the fund and provides an indication of the opportunity costs involved in the investment. The question therefore arises whether there is a relationship between active weight and active alpha. Does a certain level of active weight relate to out performance on the part of the active management being practised?

Cremers and Petajisto(2009) studied active management and fund management performance persistence and found that funds with high Active Share showed performance persistence over a one year period. This study will analyse active weight and fund management performance persistence to determine if it correlates with the finding on Active Share and performance persistence.

A number of studies on active management performance in South Africa have been conducted. These studies confirmed the results from the US market, that only a few active managers provide excess returns. Wessels and Krige(2005a)

found that only three actively managed funds outperformed the markets over long periods and that three other funds provide good returns over shorter evaluation periods. Muller and Ward(2011) studied active management and found no relationship between Active Share and the performance of South African domestic general equity funds.

2.3.3 The costs of active fund management

Any study on fund performance will need to investigate the impact of fees, as investors will only have access to the fund returns after fees. Conventional wisdom dictates that higher fees should be paid for higher performance and we know that active management usually requires higher fees. Malkiel (2003) found that for actively managed funds in the United States the average expense ratio was in excess of 140 basis points. Philips and Ambrosio(2007) showed that there is still a substantial difference between active and passive management fees in the US mutual fund industry.

Miller (2007) asked if the true cost of active fund management can be determined taking into account the fact that passive management can explain a large portion of a fund's performance. Miller (2007) proposed the following breakdown of fund management costs

$$C_P = (1 - w_A)C_I + w_A C_A \tag{2.8}$$

where C_P is the overall portfolio expense ratio, C_I is the passive expense ratio of the benchmark index fund and C_A is the active expense ratio. The active expense ratio is defined as

$$C_A = C_P + \frac{R(C_P - C_I)}{\sqrt{1 - R^2}} \tag{2.9}$$

This ratio metric provides an indication of the cost of active fund management performed for the fund being investigated.

As was mentioned in Section 2.2.3, historical fund management fee data for the South African market is difficult to obtain. This will frustrate efforts to determine the breakdown between active and passive cost components.

2.3.4 Active fund management over time

Petajisto (2010) found that the level of active management has been decreasing since the early 1990's in markets in the United States. Bhattacharya and Galpin(2009) found a reduction in active management in numerous developed and emerging markets. If one were to study active management from the perspective of active weight the question would be if similar trends will be seen. Muller and Ward(2011) found that Active Share on the JSE declined from a level of 50% in 1988 to a level of 15% in 2001. They found that Active Share on the JSE remained at this level until 2010.

2.4 Conclusion

In this Chapter a number of areas for further study were identified. Active weight, active expense ratio and active alpha are measures that can be calculated with relative ease for any fund. However, for active weight to be truly useful to an investor the relationship between these quantities and fund performance needed

to be explored in greater detail. Furthermore, the costs of South African unit trust funds have not been studied using Miller's techniques and will need further study. Finally, active weight has not been used to study the evolution of active management over time, which will be addressed in this research.

Chapter 3

Research Propositions

This study attempted to establish a link between the level and cost of active fund management and fund performance. In line with the research highlighted in the literature review this was done through the use of research propositions, rather than hypothesis testing. The following research propositions were investigated.

3.1 Proposition 1: Active management and fund returns

3.1.1 Proposition 1A

It is proposed that there is a link between the level of active management and the benchmark adjusted returns of the fund.

3.1.2 Proposition 1B

It is proposed that there is a link between the active alpha and the benchmark adjusted returns of the fund.

3.1.3 Proposition 1C

It is proposed that there is a link between the level of active management and the benchmark adjusted returns of the fund, when taking into account the fund size.

3.2 Proposition 2: Active management over time

3.2.1 Proposition 2A

It is proposed that the level of active management in the market has changed over the study period.

3.2.2 Proposition 2B

It is proposed that the active alpha has changed over the study period.

3.3 Proposition 3: Active management and fund characteristics

3.3.1 Proposition 3A

It is proposed that there is a link between the level of active management and the size of the fund.

3.3.2 Proposition 3B

It is proposed that there is a link between the level of active management and the fees charged by the fund.

3.4 Proposition 4: Active expense ratios

3.4.1 Proposition 4A

It is proposed that there is a link between the active expense ratio and the level of active management of the fund.

3.4.2 Proposition 4B

It is proposed that there is a link between the active expense ratio and the benchmark adjusted returns of the fund.

3.4.3 Proposition 4C

It is proposed that there is a link between the active expense ratio and the active management performance of the fund.

3.5 Proposition 5: Active management and performance persistence

3.5.1 Proposition 5A

It is proposed that there is a link between the level of active management and the prior year returns of a fund.

3.5.2 Proposition 5B

It is proposed that there is a link between the active expense ratio and the prior year returns of a fund.

3.5.3 Proposition 5C

It is proposed that there is a link between the active alpha and the prior year returns of a fund.

Chapter 4

Research Methodology

4.1 Research methodology and research design

The investigation of the research propositions was quantitative and causal by nature. Since the basis of this research was to analyse fund performance and determine the costs of active fund management, the formulas and methodologies developed in the literature was applied to the secondary data which is historical unit trust fund performance data.

A formalized research design was followed to test the research propositions. The study has an ex-post facto design, meaning that historical fund data, that could not be manipulated by the researcher, was used for the analysis. It is also categorised as a longitudinal study, as the performance of funds was analysed over an extended period of time (2002-2011). The performance of unit trust funds was analysed using a statistical study to determine whether generalised characteristics of active fund management could be deduced.

4.2 Method of data analysis

4.2.1 Proposition 1, 3, 4 and 5

The data was analysed using a similar technique to the two dimensional distribution methodology proposed by Cremers and Petajisto(2009) for analysing Active Share. This methodology allowed the exploration of the relationship between the active weight, tracking error and the active alpha and fund performance. For each quarter the funds were sorted into active weight quintiles and then further into either tracking error quintiles, active alpha quintiles or active expense ratio quintiles, depending on the propositions being tested. For each of these 25 fund portfolios, depending on the propositions being tested, the following were calculated: the benchmark adjusted mean returns; the average active weight; the average active expense ratio; or the average active alpha. An example of such an analysis is shown in Table 4.1.

Table 4.1: Example of data analysis for Proposition 1A

	Tracking error quintile						
Active weight quintile	*Low*	*2*	*3*	*4*	*High*	*All*	*High - Low*
High	*a*	*b*	*c*	*d*	*e*	*A*	*e-a*
4	*f*	*g*	*h*	*i*	*j*	*B*	*j-f*
3	*k*	*l*	*m*	*n*	*o*	*C*	*o-k*
2	*p*	*q*	*r*	*s*	*t*	*D*	*t-p*
Low	*u*	*v*	*w*	*x*	*y*	*E*	*y-u*
All	*F*	*G*	*H*	*I*	*J*	*K*	*L*
High - Low	*u-a*	*v-b*	*w-c*	*x-d*	*y-e*	*M*	*N*

4.2.2 Proposition 2:

For each of the quarters of data that was used in this study, the active weight and active alpha was averaged across all the funds in existence at that stage.

4.3 Unit of analysis

Based on the two dimensional analysis described in the previous section and depending on the proposition being tested, the unit of analysis was the benchmark adjusted mean returns, the average active weight, the active alpha, the total expense ratio or the normalised fund size.

4.4 Population of data

The investigation of propositions 1A, 1B, 2A, 2B and 5A was performed on South African Domestic General Equity unit trust fund quarterly total returns data from June 2002 until 31 March 2011. The investigation of propositions 1C, 3A, 3B, 3C, 4A, 4B, 4C and 5B and 5C used fund characteristic data, including the fund size and total expense ratio, based on the data released on 26 June 2011.

4.5 Sampling method and sample size

The data population was screened using the techniques employed by Miller (2007) and Petajisto (2010), which is a judgemental sampling technique Blumberg, Cooper, and Schindler(2008) that excludes non-confirming data bearing the following characteristics:

- Any unit trust fund that is explicitly identified as a fund of funds;
- Any unit trust fund that is not classified as a South African domestic general equity fund;
- Any unit trust fund with only one quarterly return data point.

4.6 Data collection and analysis

The original plan for data collection was to obtain monthly historical unit trust performance data from the South African FundsData Online databases, maintained by Profile Media. However, due to the excessive costs involved with the acquisition of this data a second option was chosen. This entailed using the quarterly historical unit trust performance database of ASISA data maintained by Chris Muller. The variables required for analysis include: the unit trust fund's returns, the returns of the relevant benchmark index funds, the R^2 for the unit trust when compared to a benchmark index. The total expense ratios and fund sizes for the relevant portfolios and the benchmark indexes were retrieved from the ASISA website where this information is available free of charge.

4.7 Limitations

An important characteristic of any fund is the flow of funds into and out of the fund. It was used by Cremers and Petajisto(2009) to analyse Active Share. A similar analysis of active weight on South African funds was not possible due to the unavailability of the historical data.

To understand how fund management costs have evolved over time, historical TER data needs to be available. This was not the case, as ASISA only release a snapshot of the TER's of currently available unit trust funds.

Chapter 5

Results

5.1 Sample Description

As was elaborated in Section 4.6, two data sets were constructed for investigating the different propositions. The first data set was constructed using the quarterly unit trust fund performance data from 31 December 2000 until 31 March 2011 for all the Domestic General Equity unit trust funds that was traded on the Johannesburg Stock Exchange. This provided 39 quarters worth of data for all unit trusts that were in existence during that time. Three quarter's information was missing from the data set, namely data for the quarters ending on 30 September 2001, 31 March 2002 and 31 December 2007. The calculated R^2, active weight, active alpha and tracking error from this data set was averaged and fed into the second data set.

The second data set was constructed around the total expense ratio (TER) and fund size data obtained from ASISA. By converting the TER to a quarterly value and combining it with the variables from data set one, the quarterly active expense ratio data for 96 funds was obtained.

5.2 Variable Descriptions

The variables listed in Table 5.1 were calculated using the sample data and used in this chapter.

Table 5.1: Variables calculated for use in this chapter

Variable name	Description
RSQ	R^2 of the linear regression model fit between the returns of the JSE All Share Index and the unit trust fund returns
w_A	active weight of the unit trust fund
$TrErr$	tracking error, defined as the standard deviation of the benchmark adjusted unit trust fund returns
α_A	active alpha of the unit trust fund
α_P	the alpha of the unit trust fund, calculated as the intercept of the linear regression model fit between the returns of the JSE All Share index and the unit trust fund returns
C_A	the active expense ratio of the unit trust fund
C_I	the inactive expense ratio, or cost of investing in an index tracker fund

5.3 Proposition 1: Active management and fund returns

5.3.1 Proposition 1A

For this proposition the link between the level of active management and the benchmark adjusted quarterly returns of a fund was investigated. This was achieved by sorting the benchmark adjusted quarterly fund returns along two axes. Firstly, the fund returns were sorted dependent on the active weight quintile that they fell

into and then according to the tracking error quintile for the fund. This resulted in a 5x5 matrix for which the mean values, t-statistics and number of observations were determined, as shown in Table 5.2.

5.3.2 Proposition 1B

For this proposition the link between the active alpha and the benchmark adjusted returns of the fund was investigated. This was achieved by sorting the benchmark adjusted quarterly fund returns along two axes. Firstly, the fund returns were sorted dependent on the active alpha quintile that they fell into and then according to the tracking error quintile for the fund. This led to a 5x5 matrix for which the mean values, t-statistics and number of observations were determined, as shown in Table 5.3.

5.3.3 Proposition 1C

For this proposition the link between the level of active management and the benchmark adjusted returns of a fund was investigated, taking into account the size of the fund. This was achieved by sorting the benchmark adjusted quarterly fund returns along two axes. Firstly, the fund returns were sorted dependent on the active weight quintile they fell into and then according to the fund size. This produced a 5x5 matrix for which the mean values, t-statistics and number of observations were determined, as shown in Table 5.4.

Table 5.2: Benchmark adjusted quarterly returns, sorted by active weight and tracking error

Active weight quintiles		Tracking error quintiles					
		[0.000207,0.0165]	(0.0165,0.0277]	(0.0277,0.0446]	(0.0446,0.0672]	(0.0672,0.323]	All
[0.0364,0.214]	Mean	0.00175	0.00137	-0.00113	-0.01009		0.000865993
	t-statistic	1.83991	0.50769	-0.24272	-0.62987		0.7249043
	N	197	67	51	10		
(0.214,0.291]	Mean	0.01136	0.00105	-0.00397	-0.01148	-0.00538	-0.000643343
	t-statistic	4.36128	0.42793	-0.99973	-1.77338	-0.25759	-0.3206939
	N	67	104	82	60	12	
(0.291,0.37]	Mean	-0.00377	0.00651	0.00218	0.00277	-0.00792	0.00095523
	t-statistic	-1.14432	1.93427	0.62329	0.49764	-0.69671	0.3850164
	N	45	63	85	87	45	
(0.37,0.524]	Mean	-0.00851	-0.00543	0.00201	0.00759	0.00237	0.000509054
	t-statistic	-3.21791	-1.66664	0.43613	1.13653	0.22226	0.1614983
	N	29	80	71	69	76	
(0.524,0.988]	Mean	-0.02547	-0.02161	-0.00703	-0.00714	0.02508	0.008015206
	t-statistic	-2.51549	-3.17092	-0.90323	-1.26149	1.8237	1.1057936
	N	7	14	37	104	163	

Table 5.3: Benchmark adjusted quarterly returns sorted by the active alpha and tracking error

			Tracking error quintiles					
			[0.000207,0.0165]	(0.0165,0.0277]	(0.0277,0.0446]	(0.0446,0.0672]	(0.0672,0.323]	All
Active alpha quintiles	[3.55e-05,0.00114]	Mean	-0.02205	-0.02971	-0.00785	-0.00436	0.02767	0.007846942
		t-statistic	-2.34249	-4.88367	-1.11264	-0.76858	1.83655	1.0827479
		N	8	19	43	107	148	
	(0.00114,0.00201]	Mean	-0.01081	-0.0026	0.00309	0.00266	0.0042	0.00053978
		t-statistic	-3.74664	-0.86019	0.6746	0.38424	0.39837	0.1686967
		N	31	81	69	63	81	
	(0.00201,0.00287]	Mean	-0.00227	0.00641	0.00293	0.00624	-0.00671	0.002544175
		t-statistic	-0.7277	1.90556	0.87478	1.13809	-0.59253	1.0677575
		N	45	61	90	88	41	
	(0.00287,0.00426]	Mean	0.01152	0.00202	-0.00506	-0.01395	-0.02884	-0.001665475
		t-statistic	4.55502	0.80923	-1.19816	-2.20339	-1.40767	-0.8202886
		N	72	102	78	62	11	
	(0.00426,0.0302]	Mean	0.00156	8.00E-04	-0.00131	-0.01535	0.00033	0.000426719
		t-statistic	1.68804	0.29168	-0.27788	-1.01668	0.03078	0.3515147
		N	189	65	46	10	15	

Table 5.4: Benchmark adjusted quarterly returns sorted by the active weight and fund size

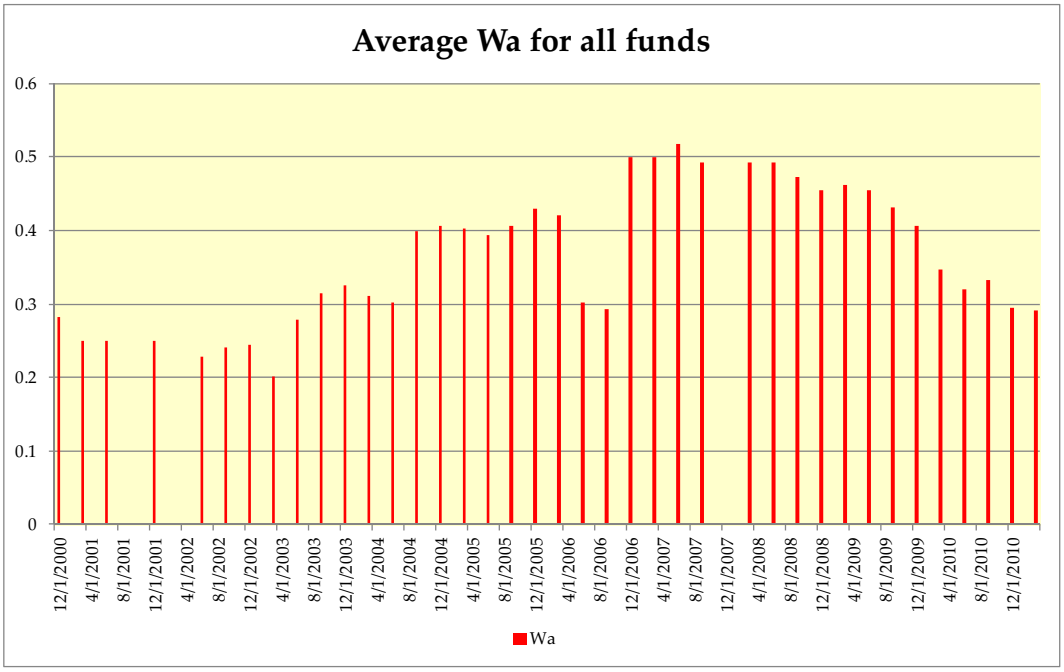
			Fund size quintile					
			[0,0.00221]	(0.00221,0.00495]	(0.00495,0.00994]	(0.00994,0.0249]	(0.0249,1]	All
Active weight quintile	[0.0315,0.158]	Mean	-0.00262	-0.00602	0.00026	0.00156	0.00325	-0.0004008
		t-statistic	-0.84984	-1.20391	0.10773	0.67052	8.70831	-0.3101415
		N	4	3	5	4	4	
	(0.158,0.218]	Mean	0.00111	0.00033	-0.00612	0.00739	0.00943	0.000265
		t-statistic	0.42811	0.12361	-2.19695	NA	1.20926	0.1324112
		N	4	5	6	1	3	
	(0.218,0.287]	Mean	0.00567	0.00515	-0.00596	0.0068	-0.00492	0.002376316
		t-statistic	2.6086	0.69219	-0.58855	4.51342	-1.39942	0.9698535
		N	3	5	2	5	4	
	(0.287,0.377]	Mean	0.01001	0.00287	-0.00238	0.00398	-0.00787	0.002851147
		t-statistic	3.44011	0.97421	-0.38712	1.42807	-0.8369	1.2700424
		N	5	3	2	6	3	
	(0.377,0.444]	Mean	0.01175	0.00408	-0.00412	0.00879	0.00988	0.006238158
		t-statistic	3.15821	1.00216	-0.8651	3.90037	1.44614	2.4864567
		N	4	3	4	3	5	

5.4 Proposition 2: Active management over time

5.4.1 Proposition 2A

For this proposition the level of active management in the market over time was investigated. For each quarter in the study period the level of active management was averaged over all the funds in existence at that time. This provided an indication of the level of active management in the market and these average values are shown in Figure 5.1. The three missing quarters described in Section 5.1 can be seen as gaps in the graph.

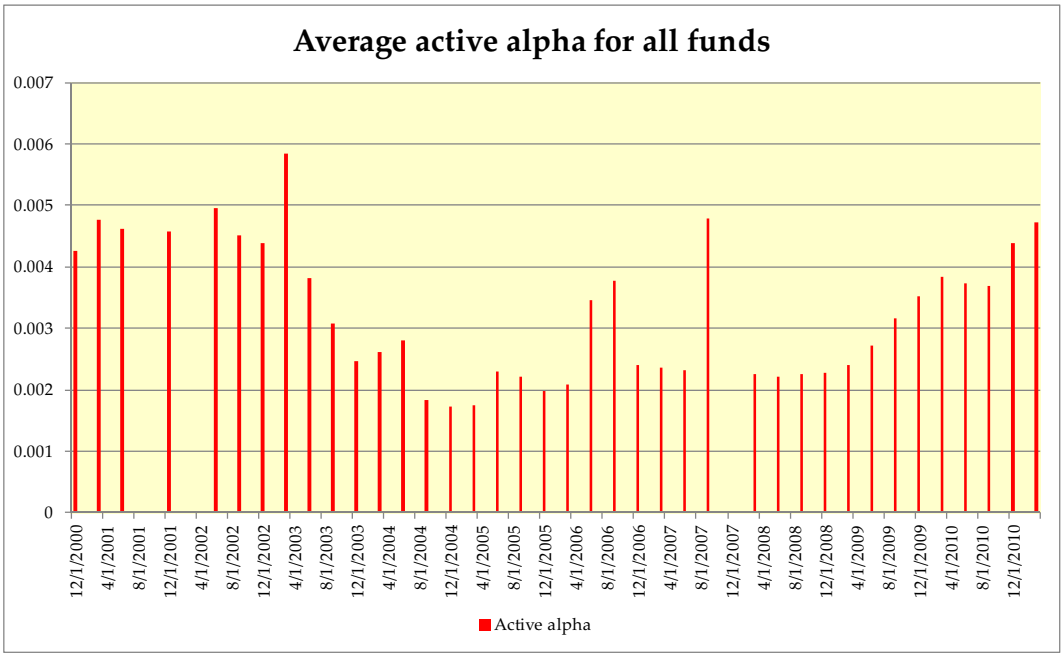
Figure 5.1: Active management over time



5.4.2 Proposition 2B

For this proposition the active management performance in the market over time was investigated. For each quarter in the study period the active alpha was aver-

Figure 5.2: Active alpha over time



aged over all the funds in existence at that time. This provided an indication of the average excess returns produced by active management in the market, as is shown in Figure 5.2.

5.5 Proposition 3: Active management and fund characteristics

5.5.1 Proposition 3A

For this proposition the link between the level of active management and the size of the fund was investigated. This was done using the fund size data from data set two in conjunction with the average levels of active management. The normalised fund sizes were then sorted into the active weight quintiles first and then into the tracking error quintiles, to produce the table of average normalised

fund sizes in Table 5.5.

5.5.2 Proposition 3B

For this proposition the link between the level of active management of a fund and the fees charged by the fund was investigated. This was done using the total expense ratio data from data set two and the average level of active management (w_A). The total expense ratios for these funds were sorted between the active weight quintiles and the tracking error quintiles, producing Table 5.6.

5.6 Proposition 4: Active expense ratios

5.6.1 Proposition 4A

For this proposition the link between active expense ratio and level of active management was investigated. Using the total expense ratio data from data set two the active expense ratios for these funds was calculated. The average level of active management (w_A) and tracking error for the previous 36 months were calculated for these funds. This mean active weight was sorted between the active expense ratio quintiles and the tracking error quintiles, resulting in Table 5.7.

5.6.2 Proposition 4B

For this proposition the link between active expense ratio and fund returns was investigated. Using the total expense ratio data from data set two the active expense ratios for these funds was calculated. The average level of active management (w_A) and the benchmark adjusted quarterly fund returns were calculated

Table 5.5: Normalised fund size sorted by active weight and tracking error

			Tracking error quintiles					
			[0.00596,0.0235]	(0.0235,0.0322]	(0.0322,0.0412]	(0.0412,0.0802]	(0.0802,0.123]	All
Active weight quintiles	[0.0315,0.158]	Mean	0.01876	0.00936	0.00262			0.01607203
		t-statistic	2.45124	3.70554				2.764263
		N	15	4	1			
	(0.158,0.218]	Mean	0.02293	0.01105	0.00478	0.00827		0.01336765
		t-statistic	2.61169	1.42101	1.24666	NA		2.619296
		N	5	11	2	1		
	(0.218,0.287]	Mean		0.09367	0.04303	0.01499		0.05074098
		t-statistic		1.85021	1.53579	5.92674		2.3175
		N		4	13	2		
	(0.287,0.377]	Mean			0.0129	0.09287	0.006	0.07109838
		t-statistic			2.02566	1.31261	1.2413	1.358611
		N			3	14	2	
	(0.377,0.444]	Mean				0.02937	0.03443	0.03389498
		t-statistic				1.24321	2.43342	2.658214
		N				2	17	

Table 5.6: Total expense ratios, sorted by active weight and tracking error

			Tracking error quintiles					
			[0.00596,0.0235]	(0.0235,0.0322]	(0.0322,0.0412]	(0.0412,0.0802]	(0.0802,0.123]	All
Active weight quintiles	[0.0315,0.158]	Mean	0.0042	0.00478	0.00445			0.004329282
		t-statistic	6.16048	19.78417				8.462211
		N	15	4	1			
	(0.158,0.218]	Mean	0.00512	0.0048	0.00407	0.0058		0.004863535
		t-statistic	9.02035	6.17702	4.85173			10.257137
		N	5	11	2	1		
	(0.218,0.287]	Mean		0.00469	0.00445	0.0051		0.004571688
		t-statistic		4.3206	8.42588	6.37018		10.931912
		N		4	13	2		
	(0.287,0.377]	Mean			0.00444	0.00372	0.00396	0.003856051
		t-statistic			3.77407	9.42748	4.0605	11.302372
		N			3	14	2	
	(0.377,0.444]	Mean				0.00275	0.00403	0.00389213
		t-statistic				1	6.913	6.852933
		N				2	17	

Table 5.7: Active weights, sorted by active expense ratio and tracking error

Active expense ratio quintiles		Tracking error quintiles [0.00596,0.0235]	(0.0235,0.0322]	(0.0322,0.0412]	(0.0412,0.0802]	(0.0802,0.123]	All
[-0.00694,0.00679]	Mean	0.12851	0.21422	0.2908	0.36249	0.39423	0.3048048
	t-statistic	10.27737	46.84471	40.17826	19.76923	51.67003	12.528445
	N	4	2	2	5	7	
(0.00679,0.012]	Mean		0.20422	0.24827	0.31991	0.3905	0.3210299
	t-statistic			18.70725	20.39145	68.09125	20.903147
	N		1	4	8	6	
(0.012,0.0166]	Mean	0.1746	0.19969	0.2377	0.31585	0.40493	0.293527
	t-statistic		64.22137	12.82376	17.12164	40.79037	13.988659
	N	1	3	6	3	6	
(0.0166,0.0228]	Mean	0.15893	0.21856	0.23443	0.28665		0.2181867
	t-statistic	6.58859	21.51694	11.77959	14.06567		18.221816
	N	4	7	6	2		
(0.0228,0.108]	Mean	0.09537	0.14318	0.22174	0.17405		0.1212605
	t-statistic	6.98187	5.90826				9.058657
	N	11	6	1	1		

for these funds,. These returns were sorted between the active expense ratio quintiles and the tracking error quintiles, resulting in Table 5.8.

5.6.3 Proposition 4C

For this proposition the link between active expense ratio and active management performance was investigated. Using the total expense ratio data from data set two the active expense ratio for these funds was calculated. The average active management performance (α_A) and the mean quarterly fund returns were calculated. The mean active alpha for the funds was sorted between the active expense ratio quintiles and the tracking error quintiles producing Table 5.9.

5.7 Proposition 5: Active management and performance persistence

5.7.1 Proposition 5A

For this proposition the link between the level of active management and the prior year's returns of a fund was investigated. For all the funds the previous twelve month's returns were averaged and used to determine the prior year performance quintile. The funds were sorted according to the active weight quintile first and then according to the prior year performance quintile, producing the 5x5 matrix in Table 5.10.

Table 5.8: Benchmark adjusted quarterly returns, sorted by active expense ratio and tracking error

		Tracking error quintiles					
		[0.00596,0.0235]	(0.0235,0.0322]	(0.0322,0.0412]	(0.0412,0.0802]	(0.0802,0.123]	All
Active expense ratio quintiles							
[-0.00694,0.00679]	Mean	-0.00136	-0.00609	0.00413	0.00454	0.00564	0.0026415
	t-statistic	-0.47913	-0.78988	0.59254	0.4549	1.67102	0.9271144
	N	4	2	2	5	7	
(0.00679,0.012]	Mean		-0.00906	-0.0012	0.00288	0.00509	0.002088421
	t-statistic			-0.23648	0.71352	1.71125	0.9330297
	N		1	4	8	6	
(0.012,0.0166]	Mean	0.0138	-0.00608	-0.00163	0.00419	0.00462	0.001370884
	t-statistic		-1.37724	-0.37207	1.04684	1.85605	0.6685655
	N	1	3	6	3	6	
(0.0166,0.0228]	Mean	2.00E-05	0.00426	0.00323	0.00796		0.003434105
	t-statistic	0.01156	1.17049	0.79852	12.54331		1.8481408
	N	4	7	6	2		
(0.0228,0.108]	Mean	0.00325	0.00061	0.0063	-0.0147		0.001634789
	t-statistic	1.39632	0.40441				0.9610431
	N	11	6	1	1		

Table 5.9: Active alpha, sorted by active expense ratio and tracking error

		Tracking error quintile					
		[0.00596,0.0235]	(0.0235,0.0322]	(0.0322,0.0412]	(0.0412,0.0802]	(0.0802,0.123]	All
Active expense ratio [-0.00694,0.00679]	Mean	0.00756	0.00324	0.00247	0.00153	0.00078	0.0027362
	t-statistic	4.40375	41.87852	14.49515	7.1952	6.10981	4.152739
	N	4	2	2	5	7	
(0.00679,0.012]	Mean		0.00737	0.00259	0.00191	0.00097	0.002009869
	t-statistic			11.34625	7.79823	8.51603	5.675695
	N		1	3	8	6	
(0.012,0.0166]	Mean	0.00484	0.00311	0.0025	0.00223	0.00109	0.002232753
	t-statistic	NA	5.94481	6.99902	9.34441	7.76082	8.472208
	N	1	3	6	3	6	
(0.0166,0.0228]	Mean	0.00652	0.00361	0.00279	0.00239		0.003688382
	t-statistic	8.88284	23.46191	22.95341	54.54671		10.763712
	N	3	7	6	2		
(0.0228,0.108]	Mean	0.01022	0.00407	0.00308	0.00152		0.007525447
	t-statistic	5.56457	9.92941				5.66681
	N	9	4	1	1		

Table 5.10: Benchmark adjusted quarterly returns, sorted by active weight versus prior year performance

			Prior year performance quintiles					
			[-0.51,-0.0562]	(-0.0562,-0.0073]	(-0.0073,0.0191]	(0.0191,0.0675]	(0.0675,0.604]	All
Active weight quintiles	[0.0364,0.214]	Mean	-0.02251	-0.01114	0.00233	0.0072	0.03312	0.000855993
		t-statistic	-3.57108	-6.36767	2.31483	2.41622	9.76802	0.7249043
		N	18	85	132	64	26	
	(0.214,0.291]	Mean	-0.02697	-0.01635	-0.00141	0.00687	0.0341	-0.000643343
		t-statistic	-5.96543	-4.71398	-0.64344	1.60625	6.13573	-0.3206939
		N	43	74	86	69	53	
	(0.291,0.37]	Mean	-0.01942	-0.02388	-0.00109	0.00363	0.03955	0.00095523
		t-statistic	-3.37989	-5.17819	-0.27295	0.84364	6.83088	0.3850164
		N	51	62	76	70	66	
	(0.37,0.524]	Mean	-0.03554	-0.0079	0.00403	0.02182	0.04797	0.000509054
		t-statistic	-8.21007	-2.16196	0.64676	3.38147	4.14185	0.1614983
		N	87	81	47	60	50	
	(0.524,0.988]	Mean	-0.02678	0.00089	0.01597	0.00674	0.04612	0.008015206
		t-statistic	-5.40935	0.0981	1.3439	0.59292	2.29358	1.1057936
		N	113	38	27	41	106	

5.7.2 Proposition 5B

For this proposition the link between the active expense ratio and the prior year's returns of a fund was investigated. For all the funds the previous twelve month's returns were averaged and used to determine the prior year performance quintile. The active expense ratio was calculated based on the total expense ratios of the funds. The benchmark adjusted quarterly fund returns were sorted according to the active expense ratio quintile and then according to the prior year performance quintile, producing the 5x5 matrix shown in Table 5.11.

5.7.3 Proposition 5C

For this proposition the link between the active alpha and the prior year's returns of a fund was investigated. For all the funds the previous twelve month's returns were averaged and used to determine the prior year performance quintile. The benchmark adjusted quarterly fund returns were sorted according to the active alpha quintile and then according to the prior year performance quintile, producing the 5x5 matrix shown in Table 5.12.

Table 5.11: Benchmark adjusted quarterly returns, sorted by active expense ratio versus prior year performance

Active expense ratio quintiles		Prior year performance quintile					
		[-0.0598,-0.0183]	(-0.0183,-0.00439]	(-0.00439,0.00469]	(0.00469,0.0152]	(0.0152,0.0309]	All
[-0.00694,0.00679]	Mean	0.00406	-0.00077	0.00249	0.00047	0.01008	0.0026415
	t-statistic	0.55036	-0.16821	2.86207	0.11229	14.1049	0.9271144
	N	7	4	2	5	2	
(0.00679,0.012]	Mean	0.00057	-0.00095	-0.0074		0.01046	0.002088421
	t-statistic	0.12812	-0.20962	-0.86949		3.97054	0.9330297
	N	6	4	2		5	
(0.012,0.0166]	Mean	0.00296	0.00523	-0.00193	0.00036	0.00138	0.001370884
	t-statistic	0.77357	1.35844	-0.27918	0.15245	0.22088	0.6685655
	N	6	2	4	4	3	
(0.0166,0.0228]	Mean		-0.00038	0.00145	0.00824	0.00794	0.003434105
	t-statistic		-0.08927	2.19708	1.7709	3.25825	1.8481408
	N		5	5	5	3	
(0.0228,0.108]	Mean		0.00309	-0.00201	0.00773	0.00261	0.001634789
	t-statistic		1.09098	-0.64218	1.8461	2.24957	0.9610431
	N		3	5	4	6	

Table 5.12: Benchmark adjusted quarterly returns, sorted by active alpha and prior year returns

		Prior year return quintiles					
		[-0.0598,-0.0183]	(-0.0183,-0.00439]	(-0.00439,0.00469]	(0.00469,0.0152]	(0.0152,0.0309]	All
Active alpha quintiles [0.000447,0.00122]	Mean	0.00865	0.00037	-0.0159	0.00484	-0.00395	0.004994444
	t-statistic	2.56555	0.05938				1.7576198
	N	12	3	1	1	1	
(0.00122,0.00216]	Mean	-0.00775	0.00964	-0.021	0.00176	0.01302	-0.001415833
	t-statistic	-1.9588	17.21429		1.36434	4.38911	-0.4980741
	N	7	2	1	2	3	
(0.00216,0.00305]	Mean		-0.00023	0.00442	0.00854	0.00834	0.005862322
	t-statistic		-0.04357	1.13172	2.86389	4.10594	3.1221601
	N		4	3	7	4	
(0.00305,0.00438]	Mean		0.001	0.0025	-0.00151	0.00425	0.001678056
	t-statistic		0.60404	1.76708	-0.20225	1.42674	0.9275446
	N		5	4	4	5	
(0.00438,0.0238]	Mean		-0.00338	-0.00013	0.00313	0.00556	0.001273
	t-statistic		-0.88722	-0.08516	5.3104	2.43438	0.9496432
	N		4	6	3	5	

Chapter 6

Discussion of Results

6.1 Proposition 1: Active management and fund returns

6.1.1 Proposition 1A

The objective of this proposition was to determine the relationship between the level of active management and the benchmark adjusted returns of a fund. Cremers and Petajisto (2009) and Petajisto (2010) found that higher levels of active management (Active Share $>$ 60%) leads to improved performance in the form of higher fund returns.

It was expected that higher levels of active management, as measured using active weight, would show higher returns for the funds managed as was the case for Active Share. It was found that funds in the highest active weight quintile showed higher mean benchmark adjusted quarterly returns, as is shown in the

"All"-column of Table 5.2. The highest mean benchmark adjusted quarterly returns were achieved by funds that occupied the highest active weight quintile as well as the highest tracking error quintile. This showed that active management on it's own will not provide excess returns – the fund manager will have to accept a certain level of risk. Outside this combination of highest active weight and tracking error, the excess returns degrade very quickly, a result that is similar to what was found for Active Share (Cremers & Petajisto, 2009).

6.1.2 Proposition 1B

The objective of this proposition was to determine the relationship between active alpha and the benchmark adjusted returns of a fund. As was reported in Section 6.1.1, the highest benchmark adjusted quarterly returns were found for funds with high levels of active management. Table 5.3 shows that high levels of active alpha do not necessarily translate into higher benchmark adjusted returns. In fact, the highest mean benchmark adjusted returns were achieved by funds occupying the lowest active alpha quintile and the highest tracking error quintile – once again demonstrating the importance of accepting risk for reward. The "All"-column of Table 5.3 reinforces the finding that increasing active alpha does not seem to relate to increased fund performance.

6.1.3 Proposition 1C

This proposition investigated the relationship between the level of active management and the benchmark adjusted returns of the fund, taking into account the fund size. Cremers and Petajisto (2009) and Petajisto (2010) found that fund size is negatively correlated with active management. They found that for funds above

a certain size the level of active management remains almost constant. They attributed this to fund managers increasing the size of their existing positions in the market, rather than exploring new investments. The expectation was to find that smaller funds would have a higher level of active management.

The results in Table 5.4 illustrated that this was indeed the case for South African funds, when using active weight to analyse the level of active fund management. The table shows that the highest mean benchmark adjusted quarterly returns were achieved by funds in the lowest fund size quintile. However, all is not lost for investors in large unit trust funds as funds in highest fund size quintile also demonstrated excess returns as long as the levels of active management was high. Furthermore, the "All"-column in Table 5.4 reinforced the results reported in Section 6.1.1: increased levels of active weight showed increased performance across all fund sizes.

6.2 Proposition 2: Active management over time

6.2.1 Proposition 2A

The objective of this proposition was to study the levels of active management over time. Cremers and Petajisto(2009) found that active management in the US mutual fund industry was reducing. Muller and Ward(2011) found similar results for the South African market. The expectation was to find similar results in this study, when using active weight as the measure of active fund management. It was found that the average active weight in South African funds reached a peak of approximately 50% in 2007 and has been decreasing ever since (Figure 5.1).

6.2.2 Proposition 2B

The objective of this proposition was to study the active alpha over time. The average active alpha in the South African market declined from levels of 0.4256% in 2000 to 0.1756% at the end of 2004 (Figure 5.2). It improved to 0.04779% towards the end of 2007 but returned to low levels during the financial crisis of 2008, with increases only achieved during 2010.

6.3 Proposition 3: Active management and fund characteristics

6.3.1 Proposition 3A

The objective of this proposition was to study the link between the levels of active management and the size of the fund. Table 5.5 shows that the funds in the highest active weight quintile are relatively small, confirming the finding of Cremers and Petajisto (2009) that fund size is negatively correlated with active management – also for the South African market.

As can be seen from the "All"-column in Table 5.5, small funds are also found in the lowest active weight quintile, which shows that small funds can also have low levels of active management. Investors should investigate the levels of active management being practised by the fund, rather than assume that small funds are more active.

6.3.2 Proposition 3B

The objective of this proposition was to study the link between the level of active management and overall fund fees. Cremers and Petajisto (2009) and Petajisto (2010) found that funds with a higher Active Share on average exhibit higher total expense ratios. It was expected to find similar results in this study.

It was found that overall fund fees for South African funds are fairly similar, irrespective of the levels of active management being practised. In Table 5.6 the "All"-column shows that the mean TER's across all the active weight quintiles are approximately 0.4%, with a slightly lower mean TER for the two highest active weight quintiles. The highest mean TER's were found for funds in the second lowest active weight quintile and the lowest tracking error quintile, illustrating that fund fees in South Africa is not related to the level of active management or the risk profile of the fund.

6.4 Proposition 4: Active expense ratios

6.4.1 Proposition 4A

The objective of this proposition was to study the link between the active expense ratio (C_A) and level of active management (w_A). This was done to test the assertion by the fund management industry that more active funds are exposed to greater costs. Miller (2007) did not explicitly study the link between these two variables, but did list the active expense ratio and level of active management for a number of American large cap mutual funds showing that fees for these funds differ greatly.

This research found that for South African funds, the funds in the highest quintile of active expense ratio have the lowest mean active weight (Table 5.7), refuting the notion that higher levels of active management will extract greater cost. The "All"-column in Table 5.7 shows that the two lowest active expense ratio quintiles contain the funds with the highest mean active weights of approximately 40%.

6.4.2 Proposition 4B

The objective of this proposition was to study the link between active expense ratio (C_A) and fund returns. Miller (2007) did not explicitly study the link between these two variables, but did list the active expense ratio and the fund returns for a number of American large cap mutual funds showing that fees differed greatly for funds with different levels of returns.

This research found that South African funds with the highest active expense ratio do not exhibit the best performance. The "All"-column in Table 5.8 shows that the most expensive funds only provide mean benchmark adjusted returns of 0.16%, much lower than the 0.34% returned by funds in the lower active expense ratio quintile. In fact, the mean returns of 0.26% returned by funds in the lowest active expense ratio illustrates that an investor does not necessarily pay for performance.

6.4.3 Proposition 4C

The objective of the proposition was to study the link between the active expense ratio (C_A) and active management performance (α_A). In deriving these two entities, Miller (2007) did not study the link between them. He only reported the active expense ratio and active alpha for a number of large cap American mutual

funds. Some of the funds listed by Miller showed a large negative value for active alpha. On average these funds showed a negative active alpha and in one case the active alpha was as large as -22.71%.

The results of this research (Table 5.9), show that South African funds in the highest active expense ratio quintile have the highest mean active alpha. In fact, the "All"-column in Table 5.9 shows that for increasing active expense ratio the mean active alpha improves. This might seem in contradiction to the results from the previous section, however one has to remember that the overall fund performance is not just dependent on active alpha, but it is also dependent on the active weight. If the active weight is low, the good performance indicated by the active alpha will be diluted in the overall fund results.

6.5 Proposition 5: Active management and performance persistence

6.5.1 Proposition 5A

The objective of this proposition was to study the link between the level of active management and prior year returns of a fund. Cremers and Petajisto (2009) found that funds with a higher Active Share on average exhibited greater performance persistence. They attributed this to the greater skill of the fund managers, an attribute that is carried over to the latest quarter.

The expectation was that similar results will be observed between active weight and the previous 12 month's performance for South African funds. This was indeed the case with the highest benchmark adjusted quarterly fund returns reported for funds that fell in the highest prior year performance quintile and the

highest active level quintile (Table 5.10). The "All"-column in the table shows that increasing active weight leads to increasingly greater mean benchmark adjusted returns. An important aspect to take into account is that it seems that persistence is a stronger determinant of performance than active weight. The lowest active weight quintile in the highest prior year performance quintile exhibited mean returns of 3.312% whereas funds in the next highest active weight quintile only delivered 0.674% returns.

6.5.2 Proposition 5B

The objective of this proposition was to study the link between the active expense ratio and prior year returns. The results of this study showed that persistence is a strong determinant of performance – the highest returns were found for funds in the highest prior year performance quintile, irrespective of the active expense ratio (Table 5.11). In fact the highest benchmark adjusted quarterly returns were found in the two lowest active expense ratio quintiles. The results for this proposition seem to reinforce the results of Proposition 4B, that a high active expense ratio does not necessarily translate to better fund performance.

6.5.3 Proposition 5C

The objective of this proposition was to study the link between the active alpha and prior year returns. This study found that a high active alpha did not necessarily convert to high benchmark adjusted fund returns, especially when taking into consideration prior year fund returns (Table 5.12). As shown by the "All"-column in Table 5.12, the highest mean benchmark adjusted quarterly fund returns were achieved in the middle active alpha quintile. The South African unit trust funds

in this quintile achieved performance of 0.5862%, which was much higher than the 0.1273% achieved in the highest active alpha quintile.

Chapter 7

Conclusions

7.1 Significant findings

Active weight was developed as a way to quantify the costs associated with active management by Miller (2007). This study provided evidence to show that active weight can be used beyond its initial definition to study the performance of active fund management. This is based on the finding that higher active weight correlates with higher fund performance. As was observed by Cremers and Petajisto (2009) for Active Share it seems as if a threshold effect exists: only funds with active weight above a certain level demonstrates the excess returns. Active weight also proved its usefulness as a tool to measure active management by confirming the well held belief that smaller funds tend to be more actively managed. More importantly, as was demonstrated in Proposition 5, high levels of active weight tied to stocks with positive momentum seem to predict excess returns.

Active weight also allows one to study the level of active management on the market and the key finding was that even though active management has been

decreasing amongst the domestic general equity unit trusts on the JSE it has been on the increase of recent.

Active expense ratio was used in this study to quantify the costs associated with active management in South African unit trusts, once the performance of a fund is decomposed into an active and passive component. The key finding of the research was that a high active expense ratio is not correlated with excess returns.

Active alpha was developed to show returns associated with active management, under the active/passive decomposition described above. The key finding of the research is that active alpha is negatively correlated with South African fund management performance. In fact, active alpha only seems positively correlated with the active expense ratio. This could indicate a characteristic of South African fund managers and is an aspect that will require further study.

7.2 Implications of the significant findings

Active weight is easy to calculate for any fund using publicly available data and is a tool that can be used by institutional and retail investors to have a better understanding of the investments available to them.

The fund management industry in SA should increase their disclosure, especially around fund management costs. Without such disclosure consumers will not be able to make informed investment decisions. Should the industry not act on this aspect the South African financial regulators will be forced to take action.

The lack of positive active alpha for South African unit trust funds is an indictment to the fund management community in SA and will need to be addressed to ensure that they maintain the ability to attract customers and remain competitive in a global market.

7.3 Recommendations for future research

As was evident from the t-statistic values in Chapter 5, the data sets used for this research have certain limitations. To be able to make more general findings regarding active weight a data set spanning at least ten years containing monthly returns data for South African unit trust funds will be required.

Prior year performance persistence seemed to dominate the results supporting Proposition 5. This could indicate the strength of momentum effects but one will only really be able to answer that if the chosen benchmark for analysis can account for such momentum effects. This suggests the need for using Carhart alpha's (both in over performance and under performance) as the performance benchmark in future studies.

When determining the level of active management on the JSE as a whole, domestic general equity unit trusts were used as a proxy for the market. This might not be a valid assumption and will need further investigation.

Bibliography

Alpert, B. & Rekenthaler, J. (2011). *Global Fund Investor Experience 2011*. Morningstar.

Amihud, Y. & Goyenko, R. (2011). Mutual fund's R^2 as predictor of performance. *Working paper*.

Ang, A., Goetzmann, W., & Schaefer, S. (2009). Evaluation of active management of the Norwegian Government Pension Fund - Global.

ASISA (2011). ASISA Annual Review 2010. Retrieved from http://www.asisa.co.za/downloads/publications/2010/ASISA

Bartens, R. & Hassan, S. (2010). Value, size and momentum portfolios in real time: the cross section of South African stocks. *Australian Journal of Management*, 35(2), 181–202.

Bhattacharya, U. & Galpin, N. (2009). The global rise of the value-weighted portfolio. *Journal of Financial and Quantitative Analysis*, 12, 23–45.

Blumberg, B., Cooper, D., & Schindler, P. (2008). *Business Research Methods*. McGraw-Hill.

Bodie, Z., Kane, A., & Marcus, A. (2011). *Investments and Portfolio Management: Global Edition*. New York: McGraw-Hill/Irwin, 9th edition.

Bogle, J. C. (1999). *Common Sense on Mutual Funds*. New York: John Wiley & Sons.

Bogle, J. C. (2005). The relentless rules of humble arithmetic. *Financial Analysts Journal*, 61(6), 22.

Cameron, B. (2011). Costs: full truth still not told. *Personal Finance*.

Carhart, M. (1997). On persistence in mutual fund performance. *The Journal of Finance*, 52(1), 57–82.

Collinson, P. (2010). Index tracking funds trump manager returns. *The Guardian*.

Collinson, P. (2011). Fund management price war on the horizon. *The Guardian*.

Cremers, K. & Petajisto, A. (2009). How active is your fund manager? A new measure that predicts performance. *The Review of Financial Studies*, 22(9), 3329–3365.

Cremers, M., Ferreira, M., Matos, P., & Starks, L. (2011). The mutual fund industry worldwide: Explicit and closet indexing, fees, and performance.

Daniel, K., Grinblatt, M., Titman, S., & Wermers, R. (1997). Measuring mutual fund performance with characteristic-based benchmarks. *The Journal of Finance*, 52(3), 1035–1058.

Davis, J. (2010). Reveal the true cost of the croupier's take. *Financial Times*.

Dow Jones (2011). Dow Jones history.

Fama, E. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, 25(2), 383–417.

Fama, E. & French, K. (2010). Luck versus skill in the cross-section of mutual fund returns. *The Journal of Finance*, 65(5), 1915–1947.

Grinold, R. & Kahn, R. (1999). *Active Portfolio Management*. New York: McGraw-Hill, 2nd edition.

Hendricks, D., Patel, J., & Zeckhauser, R. (1993). Hot hands in mutual funds: Short-run persistence of relative performance, 1974-1988. *The Journal of Finance*, 48(1), 93–130.

ICI (2011). *2011 Investment Company Fact Book*. Investment Company Institute, 51st edition.

Investonline (2011). About unit trusts. Retrieved from http://www.investonline.co.za/about-unit-trusts.php.

Investopedia (2011). Mutual funds: Introduction. Retrieved from http://www.investopedia.com/university/mutualfunds/.

Jegadeesh, N. & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance*, 48(1), 65–91.

Jensen, M. (1968). The performance of mutual funds in the period 1945-1964. *The Journal of Finance*, 23(2), 389–416.

Kok, L. (2006). Anyone remember the boom times of 1965, when unit trusts were launched? Retrieved from http://www.equinox.co.za/article_1682.html.

Kosowski, R. A. T., Wermers, R., & White, H. (2006). Can mutual fund "stars" really pick stocks? New evidence from a bootstrap analysis. *The Journal of Finance*, 61(6), 2551–2595.

Malkiel, B. (2003). Passive investment strategies and efficient markets. *European Financial Management*, 1(1), 1–10.

Markowitz, H. (1952). Portfolio selection. *The Journal of Finance*, 7(1), 77–91.

McWhinney, J. E. (2009). A brief history of the mutual fund. Retrieved from http://www.investopedia.com/articles/mutualfund/05/MFHistory.asp.

Meyer-Pretorius, M. & Wolmarans, H. (2006). The unit trust industry in South Africa from 1965 to june 2005: are investors better off? *Meditari Accountancy Research*, 14(1), 49–67.

MFS Investment Management (2011). America's first mutual fund: a guide for long term investment. Retrieved from https://www.mfs.com.

Miller, R. (2007). Measuring the true cost of active management by mutual funds. *Journal of Investment Management*, 5(1), 29–49.

Muller, C. & Ward, M. (2011). Active management in South Africa. *Investment Analysts Journal*, (74), 19–28.

Office of Investor Education and Advocacy (2007). Mutual funds: A guide for investors. 100 F Street, NE Washington, DC 20549-0213.

Passive aggressive (2010). *The Economist*. Retrieved from http://www.economist.com/node/15453041.

Petajisto, A. (2010). Active share and mutual fund performance.

Philips, C. B. & Ambrosio, F. J. (2007). The case for indexing. Retrieved from https://institutional.vanguard.com/iip/pdf/Case_Indexing.pdf.

Richards, D. (2010). Martijn Cremers on active management. Retrieved from http://www.advisorperspective.com/.

Ross, A. (2011). Now active funds carry a passive price. *Financial Times*.

Securities and Exchange Commission (2007). Unit investment trusts (UITs). Retrieved from http://www.sec.gov/answers/uit.htm.

Securities and Exchange Commission (2010). Mutual funds. Retrieved from http://www.sec.gov/answers/mutfund.htm.

Sharpe, W. (1966). Mutual fund performance. *The Journal of Business*, 39(1), 119–138.

Sharpe, W. (1991). The arithmetic of active management. *Financial Analysts Journal*, 1, 7–9.

Stokes, G. (2010). Investment fees can be reduced. *Mail & Guardian*.

Wermers, R. (2000). Mutual fund performance: An empirical decomposition into stock-picking talent, style, transaction costs, and expenses. *The Journal of Finance*, 55(4), 1655–1695.

Wessels, D. & Krige, J. (2005a). Active versus passive investing I: The South African experience. *Studies in Economics and Econometrics*, 29(2), 1–33.

Wessels, D. & Krige, J. (2005b). Active versus passive investing II: Towards an optimal combination solution. *Studies in Economics and Econometrics*, 29(2), 35–53.

Wierzycka, M. (1996). Passive fund management in South Africa. In *Actuarial Society of South Africa, Convention Papers 1996*.