Masterthesis

PORTFOLIO PERFORMANCE EVALUATION OF SOUTH AFRICAN MUTUAL FUNDS 2001 - 2006

By

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ABSTRACT

Generating strong alpha returns is the primary objectives of fund managers in the South African mutual fund industry. Given the spectacular growth experienced in the South Africa mutual fund industry in the recent past, performance evaluation has not only become prominent in the financial sector but also is critically important to the future growth and development of the sector. The objective of this paper is to investigate the performance measurement and ranking of mutual funds using risk-adjusted performance measurement methods to determine whether funds outperformed the market benchmark. I investigate whether each performance measure results in significant excess returns during the 2001-2006 period for 15 mutual funds and whether the performance measures identify the same funds as the best-and worst-performing funds. I also use the Treynor and Mazuy (1966) quadratic model for assessing the selectivity and timing ability of fund managers.

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CHAPTER 1: INTRODUCTION

In finance, portfolio performance evaluation is an area of interest not only to investment analysts and fund managers but also to investors alike. In 1952, Markowitz pioneered the idea of Modern Portfolio Theory. He proposed that investors are expected to be compensated for additional risk and provided a framework for measuring risk. Subsequent to the development of the Modern Portfolio Theory and Capital Asset Pricing Model (CAPM), risk has been in the evaluation process of performance (Reilly & Brown, 2006).

Prior to Markowitz, portfolio managers and investors measured the portfolio performance almost solely on a rate of return basis. During this period, portfolio managers and investors knew that risk was a very important variable in determining investment success but they had no single measure or clear way of measuring it (Reilly & Brown, 2006).

A further development which resulted from the pioneering work by Markowitz and Tobin's subsequent extension was that of Sharpe (1964), Linter (1965) and Treynor (1965) who independently developed a theory of equilibrium in capital markets. The rationale of these theories, which are primarily based on one-parameter measures of investment performance, was to replace the then existing two-parameter (return and risk) measures of performance with a single measure which uses market data to combine the two different dimensions of performance into a single measure which adjusts for differences in risk. The single risk-adjusted measure of performance, which is said to be simpler than the combination of risk and return measures, provides a more theoretical and definitive comparison of investments with different returns and risk (Friend & Blume, 1970).

In performance analysis, an evaluator needs to make relevant comparisons. Thus, it is critical that performance must be evaluated on a relative basis; not on absolute basis. The investor has to compare the returns of his or her manager with the returns that would have been obtained had he or she invested in an alternative portfolio with identical risk. The investor must make use of benchmark portfolios to assess the fund manager's performance. Again, the benchmark portfolios must be relevant (similar risk), feasible and known in advance (Reilly & Brown, 2006).

The concept of portfolio performance has, at least, two distinct dimensions: The "insurable risk", born by the holders of the portfolio (Reilly & Brown, 2006), is dependent on the ability of the portfolio manager or security analyst to increase returns on (or minimise risk through "efficient" diversification) the portfolio through the successful prediction of future security prices. Jensen (1967) states that professional managers encounter difficulties when attempting to evaluate performance of a portfolio in these two dimensions, because this predominantly lacks a thorough understanding of the nature and measure of risk.

In the very same manner, when the subject of evaluation concerns the investment manager, as an investor, one needs to establish an evaluation system that will provide the necessary feedback in order to determine whether the investment generates the predetermined utility. Further to that, the investor will need to determine whether the portfolio manager's achievement can be considered as good or bad when compared to a certain benchmark and whether the investment manager's achievement was due to luck or skill.

The issue of evaluation, therefore, gravitates towards two central questions. The first question which the investor needs to address is performance. "What is good or poor performance?" "Where is the line in between "the benchmark" and "what to take as the benchmark".

Empirical studies on mutual fund performance have made remarkable and inspirational contributions to the understanding of this particular investment sector. The profitability of mutual funds, which are characterized by professional management, is of interest to proponents and opponents of the market efficiency theory. The market efficiency theory assumes that rational and irrational traders are unable to make abnormal profits consistently by using the same information in an efficient market. Derived from this hypothesis, the literature mainly focuses on some controversial issues of fund performance such as whether mutual funds outperform the market, whether fund managers have superior timing and selecting abilities, whether active management adds value, whether funds perform persistently and whether actively managed funds outperform the index funds (Abdel-Kader & Yuan Qing; 2007).

There are a number of portfolio performance measurements techniques that exist today although I also apply the Treynor ratio (Treynor, 1965) and Modigliani-Modigliani measure (1997). Traditionally, the two popular indices (performance measures) are the Jensen' alpha

(Jensen, 1968) and the Sharpe index (Sharpe, 1966) with their origins based on the Capital Asset Pricing Model (CAPM) and Modern Portfolio Theory (MPT) respectively. However, over the years, a number of researchers and academic scholars have examined these measures and show that these indices, though these have proven to potentially be very useful, have a number of shortcomings which we will highlight in the literature (Murthi, Choi & Desai, 1997). The Treynor and Mazuy (1966) quadratic model is used for assessing the selectivity and timing ability of fund managers.

1.1 Purpose of Study

The objective of this paper is to measure the performance of 15 South African domestic mutual funds as well as investigate the management skills of South African managers. We will, therefore, carry out an empirical investigation of the performance of mutual funds from January 2001 to December 2006, where I will attempt to:

1. Rank the mutual funds based on the different performance measures;

2. Investigate whether the mutual fund managers were able to beat the market; and

3. Evaluate separately market timing performance and stock selectivity of a sample of mutual funds with particular emphasis on the market timing ability of the investment managers.

I trust that my work will provide further insight of the above portfolio measures.

1.2 Significance of Study

The study will be of value to potential to investors, whether as individuals, corporations or financial institutions, as they are always interested in evaluating the performance of their investments. More often that not, potential investors have to decide on a fund investment without any knowledge of the private information of the fund manager. It will help investors to decide on a fund investment with minimal knowledge of the private information of the fund managers. The performance measures will also aid investors, especially individual investors,

to overcome their information handicap and to direct their money to a fund manager, based on this insight. .

Investors managing their own portfolios should evaluate their performance, as should those individuals who pay one or several professional money managers to make these decisions for them. In the latter case, it is important for the individuals to determine whether the realised investment performance justifies the additional costs of engaging professional management (Reilly & Brown; 2006).

1.3 Structure

This paper is organized in seven chapters. In chapter two, a general description of mutual funds and their function in the financial markets is presented. Chapter three represents the literature review of the theories that will be used to complete the empirical examination. Chapter four presents the databases and mutual funds which will be analyzed in this study. Chapter five presents the results obtained from the theory as presented and used in chapter three. In chapter six, a conclusion and recommendations are given on future studies within this sector.

CHAPTER 2: MUTUAL FUND INDUSTRY IN SOUTH AFRICA

2.1 Mutual Fund Basics

A mutual fund is a collective investment that enables you to pool your money with other investors who have similar investment objectives, such as long-term growth, high current income or stability of principal. Experienced investment managers or advisors invest this pool of money in different assets in financial markets. This includes a wide range of local and international shares or equities (companies listed on a stock exchange), bonds, property, money market instruments and their derivatives. The total value of the pool of invested money is split into equal portions called participatory interests of units. When you invest in mutual funds, you buy a share of the units of the total fund. The unit price, also known as the net asset value (NAV), is dependent on the market value of the instruments in which the pool of money is invested and therefore rises and falls. It is calculated daily[1].

Mutual funds are divided into two categories: closed-end and open-end. Closed-end funds have a limited number of shares. If you want to purchase a piece of the fund, you have to purchase an existing share. Open-end funds have an unlimited number of shares. If you want to purchase a piece of the fund, the fund creates a new share and sells it to you. There are significantly more open-end funds than there are closed-end funds.

There is a wide range of collective investment funds offered in South Africa. These are both rand and foreign currency based, catering for a myriad of investor needs. These funds include funds that generate income to capital growth in the medium to long term (three to five years and longer). Units should be held for these periods in order to reap the full benefit of the investment and to sustain any market ups and downs.

The four main popular advantages of mutual funds are:

Diversification: A single mutual fund can hold securities from hundreds or even thousands of issuers, far more than most investors could afford on their own. This diversification sharply reduces the risk of a serious loss due to problems in a particular company or industry.

[1] www.aci.co.za

Professional management: Few investors have the time or expertise to manage their personal investments every day, to efficiently reinvest interest or dividend income, or to investigate the thousands of securities available in the financial markets. They prefer to rely on a mutual fund's investment adviser. With access to extensive research, market information, and skilled securities traders, the adviser decides which securities to buy and sell for the fund.

Liquidity: Shares in a mutual fund can be bought and sold any business day, so investors have easy access to their money. While many individual securities can also be bought and sold readily, others aren't widely traded.

Convenience: Mutual funds offer services that make investing easier. Fund shares can be bought or sold by mail, telephone, or the Internet, so you can easily move your money from one fund to another as your financial needs change. Most major fund companies offer extensive recordkeeping services to help you track your transactions, complete your tax returns, and follow your funds' performance.

From a South African context, mutual funds offer something which is almost impossible for ordinary individuals – blue chip shares which are the main commodity traded by the Johannesburg Stock Exchange (JSE). This allows ordinary individuals to participate in the financial markets which can help improve socio-economic conditions within the country. The JSE represents the main sectors of the South African economy such as gold, other mining, mining houses and industry. The mutual funds represent each of these four sectors in their units. A fifth sector – liquid assets and cash - completes the contents of a mutual fund portfolio. Collective investments such as mutual funds are the most accessible, flexible, protected, regulated and transparent long-term savings vehicles.

Fluctuations in mutual funds are often not severe. Shares that show a stable or better performance cushion the drop in the price of other shares. This scenario is likely to exist in the case with the general mutual fund. This is because general mutual funds exhibit risk levels that are lower than in the specialist mutual fund, and these funds are exposed to more sectors than any other type of fund.

2.2 The Efficient Market Hypothesis

The Efficient Market Hypothesis (EMH), popularly known as the Random Walk theory (RMT), is the proposition that prices on traded assets, for example, stocks, bonds or property, already reflect all known information and therefore are unbiased because these reflect the collective beliefs of all investors about future prospects[2]. The theory deals with one of the most fundamental and exciting issues in finance – why prices change in security markets and how those changes take place. It has very important implications for investors as well as financial managers (Clarke, Jandik & Mandelker; 3).

Many investors try to identify securities that are undervalued and which are expected to increase in value in the future. Of particular interest to investors are those shares, which are expected to increase more than others. Many of these investors, including investment managers, believe that, through the use of a variety of forecasting and valuation techniques, they are able to select securities that will outperform the market. Obviously, any edge that an investor possesses can be translated into substantial profits. However, the EMH asserts that none of these techniques are effective (effectiveness is determined as the advantage or excess gained after transaction and research costs) and that no one can predictably outperform the market.

The efficient market hypothesis predicts that market prices should incorporate all available information at any point in time. There are, however, different forms of information that influence security values. Consequently, the form of efficiency is usually defined as weak, semi-strong or strong.

The **weak-form** of the efficient market hypothesis asserts that the current price fully incorporates information contained in the past history of prices only, that is, nobody can detect mis-priced securities and "beat" the market by analyzing past prices. Thus, one should not be able to profit from using that "everybody else knows". However, many financial analysts attempt to generate profits by studying exactly what this hypothesis asserts if of no (?) value – past stock price series and trading volume data. This technique is called technical analysis.

[2] http://en.wikipedia.org/wiki/Efficient_market_hypothesis

The **semi-strong-form** of the market efficiency hypothesis suggests that the current price fully incorporates all publicly available information. Public information includes not only past prices, but also data reported in a company's financial statements, for example.

The assertion behind the semi-strong market efficiency is still that one should not be able to profit using something that "everybody else knows". New information becomes available only randomly, and there should be no reason to expect any systematic movement in stock returns.

The strong-form of the market efficiency hypothesis states that the current price fully incorporates all existing public and private (also known as inside information) information. The main difference between the semi-strong and strong-form efficiency hypothesis is that, in the latter case, nobody should be able to systematically generate profits, even if trading on information not publicly known at the time

The rationale for the strong-form market efficiency is that the market anticipates, in an unbiased manner, future developments and, therefore, the stock price may have incorporated the information and evaluated in a much more objective and informative way than the insiders. Unsurprisingly though, there is evidence that empirical research in finance is inconsistent with the strong-form of the EMH (unsure what you mean here).

Passive management accepts all forms of the EMH, that is, the concept accepts the premise that the market is so efficient that it is nearly impossible to construct a portfolio superior to the market portfolio. Portfolio managers who totally reject the EMH use fundamental as well as technical analysis as the basis for developing their active investment strategies (Andresen, 2000).

The paradox that arises with the efficient markets hypothesis is that if there aren't investors who do not believe in the efficient market hypothesis, efficient markets cannot exist. If information is free for all participants in the market, then none of the participants have an incentive to gather information. But if no one gathers information, the market price cannot reflect the information. This problem can be overcome if the cost of gathering information (supporting a squad of analysts) is the same as the excess return generated through their analysis (Aldrian, 2000),

2.3 Fund Management

Fund management may refer to all forms of institutional investment as well as investment management for private investors. A fund manager can choose between two management styles, namely passive or active management. Though there exists a fine line between passive and active management, we will attempt to make a clear definition between the two terms.

2.3.1 Passive Management

Passive management (also called passive investing) is a financial strategy in which a fund manager makes as few portfolio decisions as possible, in order to minimize transaction costs, including the incidence of capital gains tax[3]. The simplest case of passive management is the index fund, which is designed to replicate "exactly" a well defined index of common stock. One of the reasons for investing in index funds is scepticism regarding the superior performance of mutual fund over time. Secondly, the lack of active management results in lower fees. However, fees will always reduce the return to the investor, relative to the index (Daphu, 2000).

2.3.2 Active Management

Active management (also called active investing) refers to a portfolio management strategy where the manager makes specific investments with the goal of outperforming a benchmark index. Active portfolio managers attempt to construct a risky portfolio that maximizes the reward-to-variability ratio. Therefore, profit seeking investment mangers will exploit market efficiencies by purchasing securities that are undervalued, and/or (less frequently), short selling those that are overvalued[4].

Despite the efficient market hypothesis, it is clear that markets cannot be perfectly efficient; hence there are reasons to suggest that active management can have effective results (Daphu, 2000).

[3] http://en.wikipedia.org/wiki/Passive_management
[4] http://en.wikipedia.org/wiki/Active_management

Two forms of active management exist, namely market timing (which is based solely on macroeconomic factors) and security selection (which includes microeconomic forecasting). Market timers change the risk of the portfolio according to forecasts of how the market will perform in the future. Treynor and Mazuy (1966) were the first to conduct a study on market timing. Their study, as well as the studies conducted by other academics after their initial work, concluded that the management of mutual funds did not exhibit any market timing ability while the latter studies also showed little evidence of successful market timing.

Investors practicing security selection are betting that the market weights are not held in optimum proportion for each security. Through security selection, the investment manager tries to identify securities whose projected returns will be higher than suggested by the market. By identifying and getting exposure to them, the active manager will realise a higher than market performance if his or her judgment is right. Security selection, like all active strategies, neglects the concept of equilibrium prices on CAPM. There are numerous tests, which can be applied to assess the ability of active managers to detect mis-priced securities on which excess returns can be generated. Excess return is the return realised above that of another fund with the same risk as predicted by CAPM (Aldrian, 2000).

2.2 Selection of an Appropriate Benchmark

The benchmark portfolio is a hypothetical portfolio composed of a selection of securities from various markets in which the fund is permitted to invest. The market is defined by an index or the benchmark. Therefore, an appropriate index must be selected when calculating the beta of a mutual fund. Since this study exclusively includes funds invested in the South African securities (domestic mutual funds), we have chosen the South African Index (JSE) as our benchmark. Beta (systematic risk) measures how much a mutual fund moves in relation to the market.

The use of a benchmark index is of vital importance to fund managers who wish to illustrate performance. Graphic representations of fund performance are often the only way for investors to form an opinion of the fund result. The benchmark index is also the reference point, which fund managers should strive to outperform. There is an incentive for mutual fund managers to choose a low performance benchmark, which is inappropriate from an investors'

point of view. An appropriate benchmark has the same investment structure as the compared mutual fund.

Guidelines (amongst many) for appropriate benchmark selection are:

Ensure the benchmark is unambiguous.

Ensure the benchmark is an investable index.

Ensure the benchmark has a measurable value.

The CAPM benchmark (presented in section 3.3) is the most common proxy for the market portfolio. Amongst academics there are critics of the benchmark, they argue that the model is logically inconsistent since it assumes that all the investors have common beliefs and information and, hence, that any measured abnormal performance can only occur where the market proxy is inefficient. Andresen (2000; 15) states that the consequence of this is that any empirical evidence of abnormal performance by mutual funds leads the researcher to question the use of the usual CAPM market proxies as a performance benchmark.

2.3 Unit Trust in South Africa: A Historical Overview

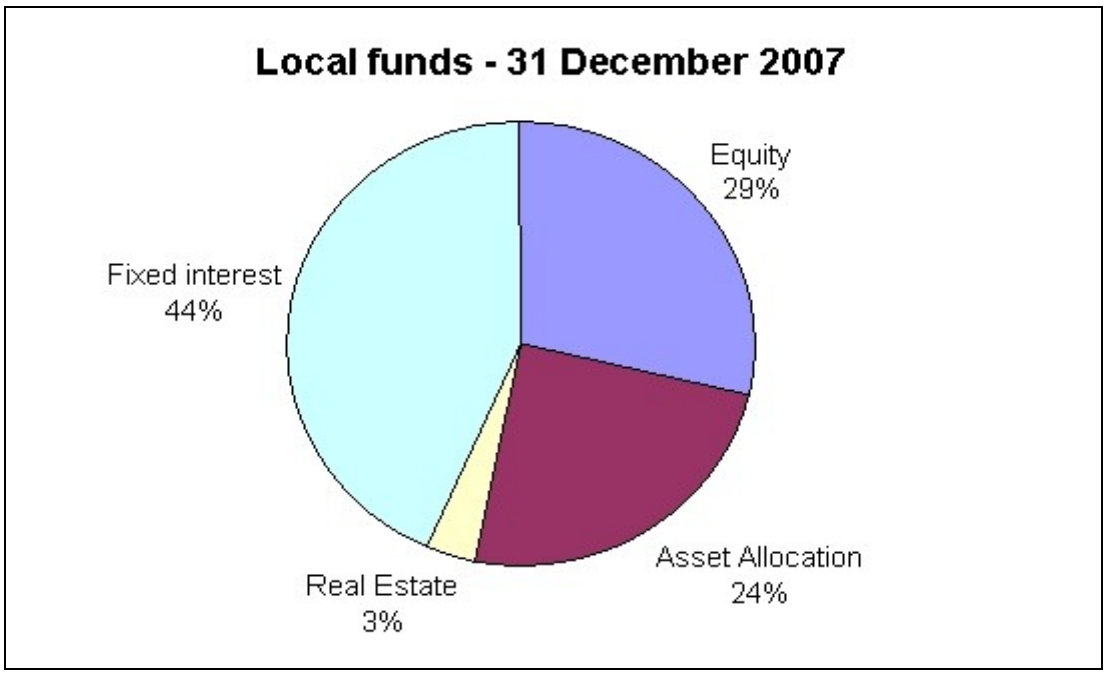
In the international context, the South African industry is still in its infancy, by virtue of size, as well as scope, despite being around for four decades. The first unit trust in South Africa (Sage) was launched on 14 June 1965. The original shareholders in the first fund were Liberty, Nedbank, Industrial Underwriting Ltd, Liberty chairman Donald Gordon, Shill and certain of their friends (Lambrechts, 1995).

The trust was established to offer the man-in-the-street a convenient investment product which could counter inflation and be linked beneficially to life assurance policies for the same purpose. Shill and his colleagues, together with financial authorities, pioneered the unit trust legislation. The result was a uniquely South African product (Lambrechts, 1995).

The South African industry has grown from one trust with initial assets of R600 000 to 11 trusts which managed assets of R381,2 million at the end of 1978 under the control of six management companies. In September 1994, funds with total assets totaling R24,4 billion,

were being managed by 20 management companies. This reflects an annual growth rate in total assets of 29.6% (Lambrechts, 1995) (Meyer-Pretorius & Wolmarans, 2006?). Thirteen years after South Africa entered the global economy, the industry's total assets under management on 31 December 2007 were estimated to be R717,565 billion, of which R653,404 billion is attributed to the domestic industry.

Figure 1: Distribution of Assets in the Domestic Industry



2.4 Classification of the South African Regulated Collective Investment Portfolios

The first tier of classification is as follows:

Domestic Portfolios: These are collective investment portfolios that invest at least 85% of their assets in South African investment markets at all times.

Worldwide Portfolios: These are collective investment portfolios that invest in both South African and foreign markets. There is no minimum set for either domestic or foreign assets.

Foreign Portfolios: These are collective investment portfolios that invest at least 85% of their assets outside South Africa at all times.

Each of these categories is subcategorised into the second tier of classification, namely:

(i) Equity portfolios

(ii) Fixed Interest portfolios

(iii) Real Estate portfolios

(iv) (Asset Allocation portfolios.

2.5 Regulations and Operation

The unit trust industry is well regulated and falls under the jurisdiction of the Financial Services Board. The Unit Trust Act governs the industry and the Act was first drafted in 1947. Amendments do take place, as occurred in 1962, 1981 and again in 1988. The reason for giving this brief discussion of the Act is to demonstrate that the industry has good controls and regulations. While any stock exchange investment contains a certain risk element to the investor, the Act and Trust Deeds safeguards tend to minimize this risk for investors.

The Act contains a number of important provisions such as:

It makes provision for the appointment of a Registrar of Unit Trusts whose role is to oversee the whole unit trust industry in the country.

It contains certain restrictions for a company that wishes to register as a unit trust management company:

Companies must have a paid-up share capital of R2 million.

Companies must also invest in their own funds, either 10% of the value of the portfolio or, with the permission of the Registrar, an amount of R1 million per fund.

It states which securities may be included in the unit portfolio, how to determine both the value of the portfolio and the prices of units on a daily basis.

Section 6 of the Act contains certain provisions, which safeguard the portfolio for investors. Unit trusts may invest in the following concerns:

- A concern with a market capitalization in excess of R2 billion is subject to the condition that the securities of any such concern included in any such unit portfolio shall not exceed 10% of the aggregate of the market value of all the securities included in the unit portfolio and of the value of amounts in cash forming part of the unit portfolio.
- Any concern, subject to the condition that the securities of any such concern included in any such unit portfolio, shall not exceed 5% of the aggregate of the market value. Amounts in cash will form part of the assets pertaining to that unit portfolio.
- A concern with a market capitalization of R2 billion or more and, in any such case, on the condition that the securities of any such class of any such concern included in the relevant unit portfolio shall not exceed 10% of the aggregate amount representing all the securities of such class issued by such concern.

- Each unit portfolio should contain liquid assets with a market value of at least 5% of the value of the fund.

The Act also stipulates which accounts a management company must keep and when and to whom these should be submitted. Advertising is strictly controlled and companies are required to submit all advertising to the Registrar for approval. One of the reasons for this is that the 1969 crash highlighted some seemingly unethical advertising by some of the management companies at the time. The Act also addresses taxation and the qualifications of trustees.

CHAPTER 3: LITERATURE REVIEW

The literature on mutual fund performance is vast with much debate over the methodologies used to measure fund performance. In general, the models used to measure performance in mutual funds are variants of the Capital Asset Pricing Model (CAPM), including models such as the multi-factor models and models involving higher moments of the return generating process, for example. Research documents that fund performance for the same period can vary significantly depending on the model used to measure performance. This section discusses and summarises the main conclusions of the literature on the models used in this paper, namely the CAPM model, the Treynor, Jensen alpha and Sharpe Indices, M^2 measure and Treynor-Mazuy model. Each model is described in detail in the following section.

3.1 Mean-Variance Theory

The mean-variance theory is an important model of investment based on decision theory. The theory is important because it is the simplest model of investment sufficiently robust to be directly useful in applied problems. The simplicity of the mean-variance theory allows us to assume that preferences depend only on the mean and variance of payoff and not on other features; hence we are able to obtain a number of robust results. (Dybvig, 2000; Jacoby, Smimou & Gottesman, 2003; Lu & Zhao, 2005).

The mean-variance theory originated with the work of Markowitz (1952). The theory precedes the derivation of the Capital Asset Pricing Model (CAPM) by Sharpe (1964) and Linter (1965) which is discussed in chapter 3. Markowitz recognized that an investor could reduce his or her investment risk without reducing expected returns by combining assets that are not perfectly correlated. There are other prominent academic scholars who have made valuable and considerable contribution in the development of the mean-variance theory such as Tobin, Sharpe, and Lintner, amongst others.

The mean-variance theory is based on fundamental assumptions such as:

Single-period model

Preferences depend only on the mean and variance payoffs, that is, at a given mean, a lower variance is preferred - similarly, at a given variance, a higher mean is preferred

Price-taking with no taxes and transaction costs

Competitive equilibrium (Lu & Zhao, 2005).

Though the theory is still fondly known as the Modern Portfolio Theory (MPT) by some academic scholars, it should be noted that the theory is no longer the most modern model. Nevertheless, the mean-variance theory continues to be a leading model and is the foundation on which analytical portfolio management is built (Dybvig, 2000). Three measures are based on mean-variance theory. These measures are the result of the academic work of three academic scholars; Treynor (1965), Sharpe (1966) and Jenson (1968). The measures provide the basic models when measuring the performance of mutual funds.

3.1.1 Mean Return of a Portfolio

We assume that the are *n* assets of return r_1, r_2, r_3,..., r_n, and these have expected values (R_1), (R_2), (R_3), (R_n). If we form a portfolio of these *n* using the weights w_i, i = 1, 2, 3,..., *n*. The rate of return, in terms of the individual return of the portfolio, is:

$$R = w_1R_1 + w_2 R_2 + w3R_3 + \ldots + w_n R_n \qquad (1).$$

Therefore, the expected return is computed by taking the weighted sum of individual expected rates of return. Shahid (2007) states that by applying the property of linearity, we can take the expected values on both sides of the equation (1).

Therefore, an expected return is:

$$R = w_1(R_1) + w_2(R_2) + w_3(R_3) + \ldots + w_n(R_n) \qquad (2).$$

3.1.2 Variance of Portfolio Return

Variance is a measure of the dispersion of a random variable. The variance equals the expected value of the squared deviation from the mean. The variance of the return of assets *i*

is denoted by σ_i^2, the variance of the return of the portfolio by σ_P^2 and consequently the covariance of the asset *i* with asset *j* is denoted by σ_{ij}.

Therefore, the variance of the return on the portfolio is represented as:

$$\sigma_P^2 = \sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j \sigma_{ij} \qquad (3)$$

with w_i and w_j representing the proportions invested in securities i and j, remembering that if i=j then we have the variance of the security, σ^2.

3.2 The Efficient Frontier

The Markowitz Portfolio Theory also examines the curve called the efficient frontier. The idea behind this curve is a graphical representation of a set of portfolios that offer the maximum rate of return for any given level of return.

The efficient set theorem states that an investor will choose a portfolio from the set of portfolios that offer:

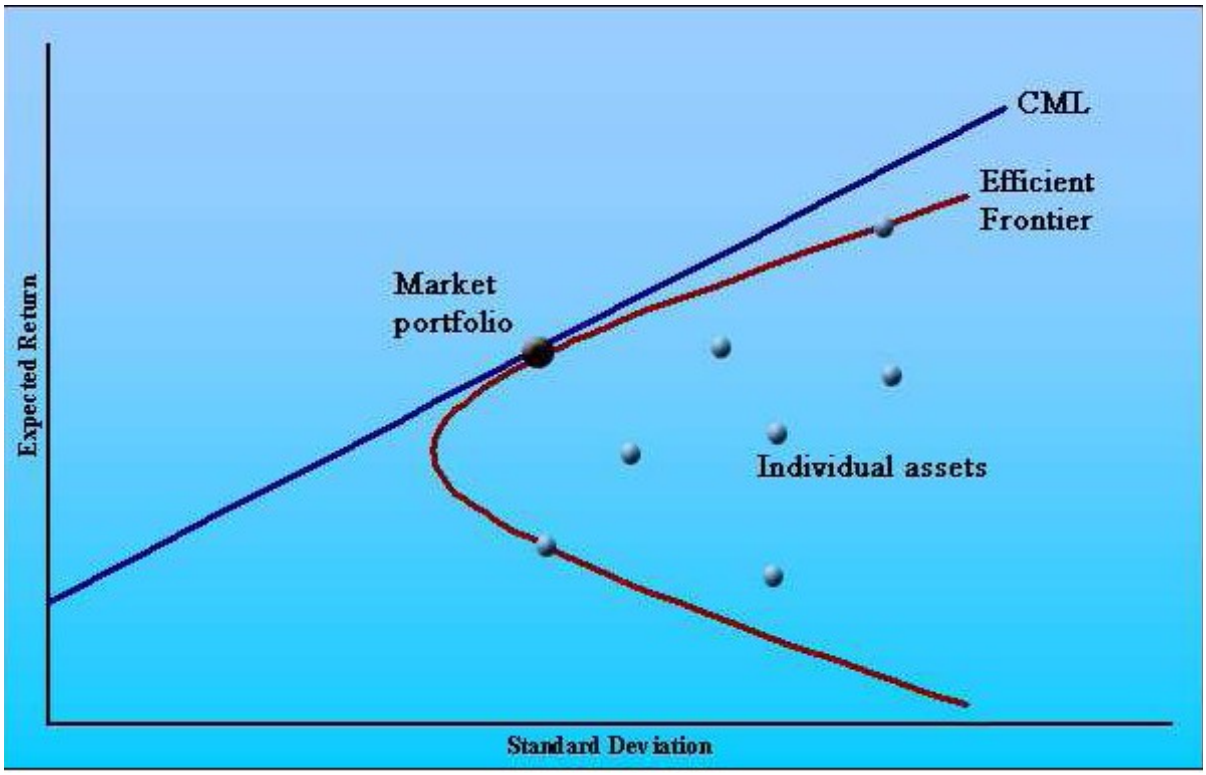
1. Maximum expected return for varying levels of risk, and
2. Minimum risk for varying levels of expected returns.

Therefore, risk averse investors would be only interested in portfolios with the lowest possible risk for any given level of return.

Figure 3.1, below represents the efficient set. Any portfolio above the frontier cannot be achieved. Any portfolios that are below the frontier are dominated by Markowitz efficient portfolios and are said to be inefficient in providing adequate profit based on the risk level. If the universe of risky assets is combined with a risk-free asset, then the *Capital Allocation Line* (CAL) can be drawn. This is the linear line that goes from the risk-free asset through a portfolio of risky assets (assuming that one can borrow *and* lend at the risk-free rate). If this risky portfolio lies on the efficient frontier, then the CAL is referred to as the *Capital Market Line (only when portfolio is the market portfolio)*, CML (figure 3.1 shows this relationship).

The tangency portfolio is then referred to as the market portfolio and is the portfolio with the highest possible Sharpe ratio[5].

Figure 3.1: Graph that shows the CML, the efficient frontier and the market portfolio



Markowitz's work has continued through the development of the capital market theory, whose final product, the Capital Asset Pricing Model (CAPM), has allowed a Markowitz efficient investor to estimate the required rate of return for any risk security.

3.3 Capital Asset Pricing Model

The CAPM, which was introduced by Treynor (1961) while parallel work was also being performed by Sharpe (1964) and Lintner (1965), is an extension of the MPT developed by Markowitz (1952). CAPM is a single factor model, which introduced the notions of systematic and unsystematic (firm specific) risk. It is also a model that provides a theoretical base for the measures such as the Jensen's alpha and Treynor indices (Osipous, 2007).

[5] See 3.4.1 section for definition of the Sharpe Ratio

CAPM defines systematic risk as the market risk that cannot be diversified away, while unsystematic risk is the risk specific to each individual stock or asset and that can be diversified by the investor.

The CAPM basic fundamental assumptions are:

All investors are price takers.

All investors have the same time horizon.

All investors have the same information and interpret it in the same manner (homogeneous expectations).

Markets are "perfect", that is, no transaction costs, no taxes, short selling is allowed, for example.

All investors are risk averse, where risk is measured by variance.

The assumptions of the MPT allow the user to understand how to construct and locate an efficient portfolio (defined as the locus of all convex combinations of any random two portfolios) that will maximize profitability, given the level of risk associated with each asset (Adeyemi, 2006).

The drivers of asset returns in a CAPM model are the covariance between the returns and market returns, and the market risk premium. Thus the CAPM equation is defined as:

Expected security Return = Riskless return + Beta*(Expected Market Risk Premium)

$$R_p = R_F + [R_M - R_F]_p \qquad (4)$$

where

R_p = Expected return on a portfolio (or security)

R_F = is the risk-free-rate

β_p = is the systematic risk computed as:

$$\beta_p = Cov(R_p, R_M) / Var(R_M) \qquad (5)$$

where
Var (R_M) = is the variance of the return of the market, and
Cov(R_p,R_M) = is covariance between the return of the market and the return of the asset.

If the beta-value is higher than 1, it indicates that the asset has a higher risk than the market portfolio. A beta-value of less than 1, indicates that the asset is less risky than the market portfolio. If the beta-value is 1, the asset and the market portfolio are equally risky. The total risk of an asset is the sum of the systematic and non-systematic risk. The systematic or non-diversifiable risk measures the extent to which the asset covariates with market return. The non-systematic or diversifiable risk of an asset is the part of total risk that can be related to asset's covariation with the rest of the market. An investor can eliminate this non-systematic risk by diversifying his or her investments. Portfolio standard deviation (σ) falls as the number of stocks increases but it cannot be reduced to zero.

Superior performance in the CAPM world is measured by "alpha", which is the expected incremental return resulting from managerial information (for example, stock selection or market timing).

This can be represented formally as:

$$\alpha_p = R_P - [R_F + (R_M - R_F)\,\beta_p] \qquad (6)$$

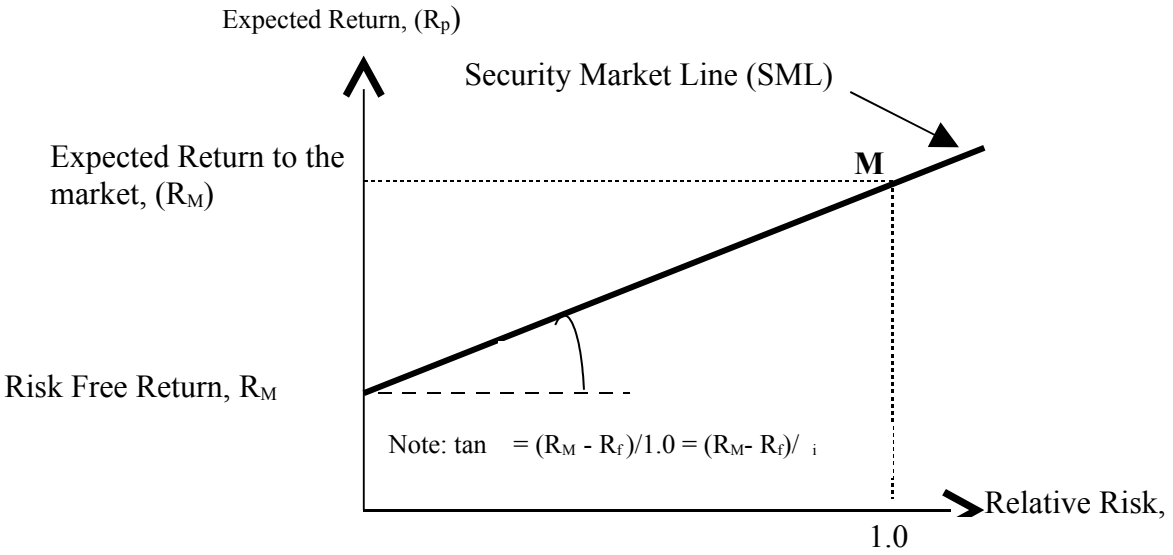
In the CAPM equilibrium, alphas will be zero unless a manager has superior information. A negative alpha indicates underperformance, while a portfolio with positive alpha offers an expected return in excess of its equilibrium risk-adjusted level and indicates superior performance (Leland, 1998; Bodi et.al, 2005; Feibel, 2003).

Despite the decades of attempts to verify or refute the CAPM, the jury is still not out on its legitimacy.. Researchers and academic scholars have focused upon the more interesting issue of whether rates of return depend upon beta (β) and whether the elegant, linear form of the model holds for stocks. Empirical results suggest that real markets typically deviate broadly from the CAPM model. The evidence against the CAPM continues to grow and despite its elegance, most researchers have turned to more complex and powerful models[6].

3.3.1 Security Market Line

The Security Market Line (SML) is essentially a graphical representation of the linear relationship between risk and return of the CAPM formula. The x-axis represents the risk (beta) while the y-axis represents the expected return.

Figure 3: The Security Market Line, Capital Asset Pricing Model



The expected return (R_p) increases linearly as beta (β) increases. The Market Portfolio (M): is the portfolio of all the assets in the market. This market portfolio, by definition, has "average" systematic risk and thus its beta is equal to one. Since all assets should lie on the security market line, so should the market portfolio. Therefore, expected market return (R_M) denotes

[6] http://viking.som.yale.edu/will/finman540/classnotes/class5.html

the expected return on the market portfolio. The line is also extends infinitely to the right, implying that you can borrow infinite amounts to lever up your portfolio.

If a security's combination of risk and expected return is plotted above the SML, then the security is undervalued and the investor can expect a higher return for the inherent risk. Conversely, if this combination plots below the SML, then the security is overvalued and the investor should expect less return for the amount of risk assumed (Shahid, 2007).

3.4 Models for Performance Evaluation

Development in portfolio theory in the early 1960s showed investors how to quantify and measure risk in terms of variability of returns. Prior to this, investors evaluated portfolio performance almost entirely on the basis of the rate of return. Though they were aware of the concept of risk, they had not developed techniques or mathematical tools to measure or quantify it.

Early studies indicated that prior to the work of Markowitz, there was no single measure that combined return and risk. Each of the two factors had to be considered separately. Investigators grouped portfolios into similar risk classes, based on a measure of risk (such as the variance of return) and then compared the rates of return for alternative portfolios directly within these risk classes (Reilly & Brown, 2006).

Today there are a number of performance measures. A common feature is that they measure funds' returns relative to risk, although they differ in how they define and measure risk and, consequently, in how they define risk-adjusted performance. The following measures are used to evaluate the risk-adjusted performance of mutual funds in this study:

- The Sharpe ratio
- The Modigliani-Modigliani measure
- The Jensen's alpha
- The Treynor ratio

– Treynor-Mazuy Total Performance Measure

The most famous models used for the evaluation of mutual fund performance are the Sharpe (1966), Treynor (1965) and Jensen (1968). Over the past four decades, these three indices have been the subject of most scrutiny on the debate of portfolio performance evaluation. These models, including the Appraisal ratio, are based on the CAPM as the asset-pricing model and they measure the relative performance of the portfolios such that portfolios with different risk profiles can be compared meaningfully.

3.4.1 Sharpe Index

In 1966, Sharpe (a Nobel laureate) developed a composite measurement of portfolio performance. The Sharpe index is a measure which can be used to assess the performance of a portfolio in a given time period. His study of performance evaluated 34 mutual funds from 1954 to1963, using the Sharpe ratio as a measure of risk and the Dow-Jones index as a benchmark. His study indicated that most of the mutual funds had a lower reward-to-variability ratio (S_p = 0,633) than the Dow-Jones index (S_{DJ} = 0,67). This empirical result implied that most mutual fund managers performed relatively worse during this period of analysis than they would have done if they simply had invested in the Dow-Jones index and obtained their preferred risk-free rate for borrowing and lending (Sharpe, 1966).

The Sharpe measure divides average portfolio excess return over the sample period by the standard deviation of the portfolio earned in comparison with an alternative investment in the risk-free asset. The denominator is the increment in portfolio volatility compared with the risk-free alternative (Bodi et. al, 2005).

The Sharpe ratio is represented by the following equation:

$$S_p = \frac{R_p - R_f}{\sigma_p} \qquad (7)$$

Where:

R_p = Expected portfolio return

R_p = Risk free rate

σ_p= Portfolio standard deviation

The measure is useful in rankings and of another benchmark portfolio because it can be interpreted as "good" or "bad". The Sharpe measure to a benchmark is:

$$S_M = \frac{R_M - R_F}{\sigma_M} \qquad (8)$$

Therefore, we are able to plot deviations from the market in order to determine price of risk as defined by CML.

If $S_p > S_M$, the asset earns more than the risk premium required by the capital market line, indicating superior performance by the portfolio manager.

If $S_p < S_M$ the asset earns less than the risk premium required by the capital market line, indicating poor performance by the portfolio manager.

Although it is essential to consider fund returns in the context of fund risks, the Sharpe ratio is seen as a blunt instrument to measure risk-adjusted returns. Past returns do not predict future returns. Although relative risks among funds have a good deal of consistency over time, standard deviation is only a rough proxy for a concept as elusive as risk. Despite weaknesses in the Sharpe ratio, it remains the principal instrument used by investment analysts to measure risk-adjusted returns. It presents a more complete picture of fund performance than raw return and can help investors to evaluate the relative success of competing funds following the same broad investment strategies. Perhaps like all statistics, it can be remarkably useful, but only if its limitations are recognised[7].

3.4.2 Modigliani-Modigliani (M^2) Measure

In 1997, Franco and Leah Modigliani developed the risk-adjusted performance measure RAP (often called M-squared) which is now widely accepted in theory and practice (Scholz & Wilkens, 2005). The M^2 measure represents the return a mutual fund would have achieved if it had the same level of risk as the market index (benchmark portfolio). Like the Sharpe ratio, the M^2 focuses on the total volatility as a measure of risk but its risk-adjusted measure of performance has the easier interpretation of a different return relative to the benchmark index.

[7] http://finance.yahoo.com/funds/how_to_choose/article/100579/The_Sharpe_Ratio_Has_Its_Limitations

Since the M^2 is directly related to the Sharpe ratio, the M^2 performance measure can be expressed as:

$$M^2 = R_P{}^* - R_M = (S_P - S_M)\,\sigma_M \qquad (9)$$

where:

S_P = Sharpe ratio of the portfolio

S_M = Benchmark's measure for market portfolio

σ_M = Standard deviation of benchmark's excess returns

Hence, the fund with the highest M-squared, similarly as the fund with the highest Sharpe ratio, is considered to have the highest return for a respective level of risk undertaken. Nevertheless, this method has an advantage over the Sharpe ratio as it is expressed in the percentage term and is therefore more intuitive.

3.4.3 Jensen's Index

Jensen's index (Jensen, 1968) is an index that uses the CAPM model where the sign of index tells us whether a fund manager has outperformed or underperformed a market index. The Jensen measure is more suitable for evaluating a portfolio's performance relative to other portfolios because it is based on systematic risk rather than total risk. The performance index assumes stability in systematic risk. The performance measure also defines abnormal returns as alpha (α). The CAPM decomposes the fund's return into two sources: the return generated from investment style and the excess return generated from the performance factor, which is generally recognized as "manager skill" (Qian, 2006).

Jensen's alpha (α_p) is expressed as:

$$\alpha_p = R_P - [R_F + (R_M - R_F)\,\beta_p] \qquad (10)$$

Where:

α_P = The estimate of the Jensen measure

R_P = Expected total asset (portfolio) return

R_F = Risk–free–rate

β_P = Beta of the asset (portfolio)

R_M = Expected market return

Market $\alpha_M = 0$

The index is given directly by regressing the risk premium of the fund on the risk premium of the market. The index uses the historical data and is defined as the vertical difference between the portfolio and the security market line. The intercept of this model is, α, and is interpreted as the measurement of the fund's ability to outperform or under perform over the market proxy. Thus, the choice of the market index becomes an important issue in this measure because the portfolio performance will be compared with the market portfolio.

The index is the difference between the expected rate of return on the portfolio and what its expected return would be if the portfolio were positioned on the security market line. If the manager were earning a fair return for the given portfolio's systematic risk, then a would be zero. A positive a indicates good or superior performance, a negative or zero alpha values denote under–performance (or inferior) or neutral performance respectively.

This parameter is of particular value in that its sampling distribution is known from least-squares regression theory. This allows inferences to be made regarding the statistical significance of any particular estimate of alpha (Akinjori & Smit, 2003). Hence, Sharpe suggests measuring the statistical significance of the Jensen α_P, since out-performance may be statistically insignificant. This is because evidence of successful stock picking skill is reflected in the intercept (Jensen α_P) where the estimate is positive and significant. The slope coefficient is β_P.

Fama (1972) suggested that a portfolio manager's skill can be partitioned into two distinct components: the forecast of price movements of selected stocks and the forecast of price movements of the whole stock market. The former is known as "security analysis" or "stock picking". The latter is known as "market timing", which refers to a manager's ability to predict future economic conditions and adjust his portfolio's systematic risk accordingly. It was argued that the Jensen Measure in equation (10a) fails to capture the distinction between these two components, which may allow room for biases as the measure ranks portfolio

performance based on absolute size only. The Treynor-Mazuy Measure (see section 3.4.5) attempts to remedy this shortcoming (Chia & Tse; 8).

3.4.4 Treynor Index

In 1965, Treynor's measure was the first composite measure of portfolio performance to include risk. He postulated two components of risk:

1. Risk produced by general market fluctuations; and
2. Risk resulting from unique fluctuations in the portfolio securities.

To identify risk due to market fluctuations, he introduced the characteristics line, which is said to define the relationship between the rates of return for an appropriate market portfolio. He further noted that the characteristics line\s slope measures the relative volatility of the portfolio returns in relation to the returns for the aggregate market (Reilly & Brown, 2006; Shahid, 2007).

The slope of this portfolio possibility line (designated T) is equal to:

$$T_i = \frac{R_i - R_F}{\beta_i} \qquad (11a)$$

Where:
R_i = the average rate of return for portfolio i during a specified time period
R_f = the average rate of return on a risk-free investment during the same period
β_i = the slope of the fund's characteristic line during that time period (this indicates the portfolio's relative volatility).

The numerator identifies the risk premium and the denominator corresponds with the risk of the portfolio. The resulting value represents the portfolio's return per unit risk.[1] A larger *T* value indicates a larger slope and a better portfolio for all investors (regardless of their risk preferences). A higher slope (beta) characterises a portfolio that is more sensitive to market returns and has greater market risk. Deviations from the characteristics line indicate unique returns for the portfolio relative to the market line. These differences arise from the returns on

individual stocks in the portfolio. In a completely diversified portfolio, these unique returns for individual stocks should offset each other. As the correlation of the portfolio with the market increases, unique risk declines and diversification improves (Bodi, et. al, 2007; Reilly & Brown, 2006).

Comparing a portfolio's *T* value to a similar measure for the market portfolio indicates whether the portfolio would plot above the SML. The *T* value for the aggregate market is calculated as follows:

$$T_M = \frac{R_M - R_F}{\beta_M} = R_M - R_F \qquad (11b)$$

In this expression, β_m equals 1.0 (the market's beta) and indicates the slope of the SML. Therefore, if:

$T_i > T_M$, the portfolio (asset) would plot above the SML, indicating superior risk-adjusted performance by the portfolio manager.

$T_i < T_M$, the portfolio (asset) would plot below the SML, indicating poor risk-adjusted performance by the portfolio manager[8].

3.4.5 Treynor-Mazuy Total Performance Measure

Most performance evaluation studies have employed the Jensen (1968) approach where risk-adjusted performance measures the ability of funds to outperform market in security selection only[9]. Performance evaluation models ignore market timing strategies and assume that risk levels for managed funds remain stationary through time, causing the estimate of abnormal return to be downward biased where market timing ability is present[10]. Therefore, the Jensen measure ignores market timing strategies employed by fund managers and does not apportion the quality of information a fund manager holds from the aggressiveness of the investment strategy (Tonks, 2005).

Treynor and Mazuy (1966) argued that if portfolio managers are actively adjusting their portfolios' systematic risk, they would hold larger proportion of the market portfolio when the

[8] http://www.community.investopedia.com/articles/08/performance-measure.asp

[9] See Jensen, 1972; Lee and Rahman, 1990 cited in Gallagher, 1999

[10] See Dyvig and Ross 1985 and Grnblatt and Titman 1989a, cited in Gallagher, 1999

return on the market is high and a smaller proportion when the return on the market is low. Thus, the portfolio return is not linear but a convex function of the market return. Hence, they suggested adding a quadratic term, namely, the square of the market return in the traditional Jensen Measure. Thus; we have the following modified equation (an alternative model is described by Henriksson and Merton):

$$R_P - R_F = \alpha_P + \beta_P[R_M - R_F] + \gamma p[R_M - R_F]^2 + \varepsilon_p \ , \qquad (12)$$

where α_P , β_P, εp are the Treynor-Mazuy (TM) measures defined similarly as the Jensen's measures and γp is the coefficient that measures the fund manager's response to market conditions. Therefore, if γp turns out to be positive, we have evidence of timing ability because this term will make the characteristic line steeper as $[R_M - R_F]$ is larger. Treynor and Mazuy estimated this equation for a number of mutual funds but found little evidence of timing ability.

The Treynor-Mazuy Total Performance Measure can also be expressed as:

$$TM = \alpha_P + \gamma p \, \sigma_M^2 \qquad (12b)$$

where σ_M^2 is the variance of the benchmark portfolio return. A large *TM* score will indicate superior security analysis and market timing ability. Security selection represents the ability of an investment manager to identify mis-priced securities (micro forecasting) and market timing is the ability of portfolio managers to predict market movements (macro forecasting). Successful market timing occurs when portfolio risk is increased in anticipation of market rises.

3.5 Appropriate Measure of Risk

Bodie et al (2005) state that it is essential that a correct (or an appropriate) measure for the task (performance evaluation) is chosen because risk adjustment procedures have implication for performance evaluation.

> The Sharpe ratio and/or M^2 are appropriate performance measures when the portfolio represents the entire investment fund. Therefore, the standard deviation of the portfolio would be an appropriate measure of risk.

Treynor is an appropriate measure for evaluating subsets of securities within a portfolio. It assumes that the subset is part of a well diversified portfolio.

The Jensen's alpha is an appropriate measure for evaluating an actively managed portfolio.

There are limitations encountered with using these measures such as:

All of these measures are associated with two categories of problems: the first is the tendency to negatively rate managers who do not beat the index (benchmark) and the second is the intrinsic problems arising from the assumptions of the CAPM model (Akinjori & Smit, 2003).

The measures are based on historic data and should be used if the user believes that the level of performance will continue into the future.

When the portfolio is active, basic stability requirements are sometimes not met.

Strict and proper caution should be observed (Lu Zhang, 2007).

CHAPTER 4: DATA

This study employs monthly returns, net management fees and characteristics for a total sample of 15 South African mutual funds from January 2001 to December 2006. Appendix A provides the total sample of returns for the period under investigation. The mutual funds included in the sample invest in South African securities, where we considered the most appropriate benchmark to be the Johannesburg Stock Exchange (JSE). The three-month Government Treasury bill (TB) rate is selected as the appropriate risk-free rate.

All information about selected funds and related fund management companies is gathered from the websites of these companies. All return data used in this analysis was obtained from the database of Sanlam Investment Management[11], the Johannesburg Stock Exchange[12] and South African Reserve Bank[13] respectively.

4.1 Rate of Return

There are different methods for calculating the rate of return and adjusting the return for the risk. In this method, the return data is based on end-of-period observations with the return calculated as the difference between the closing net asset value of the fund on the last trading day of the month less the closing net asset value on the last day of the previous month, measured as a percentage of the latter. All return data are net management fees and are adjusted for dividends etc.

Where

$$R_t = \frac{NAV_t + DIST_t - NAV_{t-1}}{NAV_{t-1}} \qquad (13)$$

- R_t: the return in month t,
- NAV_t: the closing net asset value of the fund on the last trading day of the month
- NAV_{t-1}: the closing net asset value on the last day of the previous month (t-1),
- $DIST_t$: eventual capital gains distributions taken during the month.

[11] http://www.sanlam.co.za
[12] http://www.jse.co.za
[13] http://www.reservebank.co.za

Net Asset Value (NAV) is the value of a single mutual fund share, based on the value of the underlying assets of the fund minus its liabilities, divided by the number of shares outstanding.

4.2 Presentation of Mutual Funds

Table 5.1 below presents a detailed overview of the selected mutual funds under investigation. All the information about the funds is obtained from the websites of related fund management as well as the Equinox.co.za website. In addition to Table 5.1, the investment philosophy and profile of each mutual fund is presented in Appendix B. The table below shows which market index is used as a reference index by each mutual fund, the number of observations (Obs.) in the sample used in the calculations, the sample period of each fund, annual management fees and a column indicating the sector risk profile of each mutual fund.

Generally, the fund management fees range from 0% to3.4%. The Kagiso Track (R) is the cheapest fund while the Allan Grey Equity fund is the most expensive because it has a higher range than the other funds in the sample. The management fees will always reduce the return to the investor, relative to the index.

Different fund management companies may develop different risk scales to describe the risk carried by the fund. In this thesis, we apply the risk scale as applied by Equinox. This scale uses a ranking from 1 to 10, where 1 is the lowest risk and 10 is the highest risk.

The scale is interpreted as:

1 to 3: Low risk
4 to 5: Middle risk
6 to 7: Moderate risk
8 to 10: High risk

This sample of South African mutual funds generally has a moderate risk profile. General funds have lower levels of sector risk (lower moderate risk) than other types of sector funds such as: Financial, Growth and Industrial.

Table 4.1 Overview of Mutual Funds in the sample

Fund Name	Type	Total Assets (Rm)	Annual Fees	Sector Risk
Nedgroup Investments Financials	Financial	R166.7m	1.71%	7
Coronation Financial	Financial	R897.2m	1.14%	7
Sanlam Financial Fund	Financial	R147.6m	1.71%	7
Nedgroup Investments Rainmaker	General	R10952.6m	1.6%	6
Futuregrowth Albaraka Equity	General	R1146.2m	1.71%	6
Oasis Crescent Equity	General	R3692.4m	1.71%	6
Allan Grey Equity	General	R17175.2m	0% - 3.42%	6
Investec Equity	General	R5161.2m	1.42%	6
Prudential Equity	General	R870.6m	1.4%	6
Stanlib Capital Growth	Growth	R1041.5m	1.71%	7
RMB Strategic Opportunities	Growth	R344.1m	1.42%	7
Sanlam Growth	Growth	R852.3m	1.71%	7
Old Mutual Industrial	Industrial	R838.1m	1.43%	7
Coronation Industrial	Industrial	R73.6m	1.14%	7
Kagiso Top40 Tracker	Large Cap	R72.8m	0.57%	6

4.3 Descriptive Statistics

Table 5.2 represents the basic statistical characteristics of domestic returns of mutual funds. Comparable statistics are also given for the three-month Treasury Bill (TB's), which is taken as the risk-free rate of interest rate and for the index that measures trading on the Johannesburg Stock Exchange: JSE. The measures for skewness (third centralized distribution moment) and kurtosis (fourth centralized distribution moment) are also reported to determine whether the monthly data is normally distributed.

All the funds (except the Sanlam Growth Fund) outperformed the benchmark on a simple total return basis although the higher returns were not associated with higher standard deviations.

Only the Kagiso Top40 Tracker fund has a standard deviation higher than the market standard deviation (although not associated with a higher simple total return basis in comparison to other funds). The reason may be attributed to the fund's investment strategy and philosophy.

Nine of the 15 mutual funds exhibit negative skewness while only seven of the funds exhibit positive skewness. The Nedgroup Inv Rainmaker fund was the only fund with a skewness of zero. Behavioral finance studies have found that, in general, investors interpret investment returns, exhibiting positive skewness, as attractive since it indicates that there is a greater probability of very high returns. Fund returns for funds that exhibit negative skewness indicate that there are negative return outliners in the fund's data set.

All the fund returns (except the Coronation Financial, Sanlam Financial and Sanlam Growth) exhibit negative kurtosis, which characterizes a relatively flat distribution in fund returns. Positive kurtosis, on the other hand, is an indication of relative peakedness in the distribution fund returns.

The Jarque-Bera (JB) tests on the data indicate that the normality hypothesis cannot be accepted for all of the funds.[14] In this test, we are interested in whether the combined skewness and kurtosis statistics indicate normal or abnormal distribution of returns.

Table 4.2: Statistical Characteristics of Monthly Domestic Returns of Mutual Funds

[14] The Jacque-Bera statistic has a χ^2 distribution with two degrees of freedom. Its critical values at the 5% and 1% confidence levels are 5.991 and 9.210, respectively. Therefore, the normality hypothesis is rejected when the Jacque-Bera statistic has a higher value than the corresponding critical value at the respective confidence level (Bera & Jarque; 1987).

Fund Name	Min	Max	Mean	Standard Deviation	Kurtosis	Skewness	Jarque - Bera Test
Nedgroup Inv Financials R	-9,302 %	14,818 %	0,820 %	4,972 %	-0,099	0,131	29,023
Coronation Financial A	-10,497 %	16,588 %	0,901 %	5,038 %	0,352	0,219	21,604
Sanlam Financial	-11,057 %	19,928 %	0,816 %	5,334 %	1,079	0,348	12,526
Nedgroup Inv Rainmaker A	-6,672 %	10,628 %	1,849 %	4,173 %	-0,352	0,000	33,699
Futuregrowth Albaraka Equity	-6,702 %	11,032 %	1,703 %	3,941 %	-0,509	0,218	37,513
Oasis Crescent Equity	-7,112 %	9,902 %	1,567 %	3,577 %	-0,471	0,021	36,157
Allan Gray Equity A	-8,052 %	13,112 %	1,711 %	4,315 %	-0,425	0,053	35,215
Investec Equity R	-10,094 %	9,637 %	1,587 %	4,532 %	-0,328	-0,360	34,778
Prudential Equity A	-9,584 %	9,827 %	1,387 %	4,629 %	-0,275	-0,326	33,456
STANLIB Capital Growth R	-9,588 %	11,777 %	1,216 %	4,730 %	-0,057	-0,246	28,762
RMB Strategic Opportunities R	-10,434 %	10,582 %	0,870 %	4,591 %	-0,320	-0,167	33,394
Sanlam Growth R	-14,248 %	10,452 %	0,696 %	4,687 %	0,925	-0,639	17,817
Old Mutual Industrial A	-6,926 %	10,031 %	1,486 %	4,161 %	-0,743	-0,091	42,134
Coronation Industrial	-7,166 %	10,252 %	1,539 %	4,282 %	-0,668	-0,143	40,612
Kagiso Top 40 Tracker	-14,274 %	13,592 %	1,033 %	5,658 %	-0,198	-0,187	31,097
JSE	-15,119 %	12,294 %	0,707 %	5,422 %	0,122	-0,405	26,825
Risk-free (TB's)	0,797 %	0,842 %	0,816 %	0,015 %	-1,202	0,435	55,233

4.4 Diagnostic Procedures

The use of the Ordinary Least Squares (OLS) method in estimating the regression model requires satisfying certain assumptions. Davidson and MacKinnon (1993: 327) argue that serial correlation (successive residuals are correlated) is very often found in models estimated using time-series data. Similarly Thomas (1997: 296) and Dougherty (2002) insist that autocorrelation problem is mostly likely to occur when estimating models using time series data.

4.4.1 Autocorrelation

There are number of ways of detecting autocorrelation. Autocorrelation could be detected by plotting the residuals from the fitted line against time or through the use of the Durbin-Watson statistic as an official statistical test to confirm the patterns of the residual plots (Studenmund; 2006).

In the detection of autocorrelation problem, I used the Durbin-Watson statistic although it may be inconclusive. This result is common as many authors such as Thomas (1997) document the presence of the inconclusive result as one of the disadvantages of Durbin-Watson statistic.

The Durbin Watson (d) statistic is defined as [15]:

$$d = \frac{\sum(\hat{u}_t - \hat{u}_{t-1})^2}{\sum \hat{u}_t^2}$$

Table 4.3: Error Variable Diagnosing by the Market Model

Fund Name	Durbin-Watson	Conclusion see footnote: 14
Nedgroup Investments Financials	1,76	Inconclusive
Coronation Financial	1,83	No positive serial Correlation
Sanlam Financial Fund	1,80	No positive serial Correlation
Nedgroup Investments Rainmaker	1,63	Inconclusive
Futuregrowth Albaraka Equity	2,04	No positive serial Correlation
Oasis Crescent Equity	2,15	No positive serial Correlation
Allan Grey Equity	1,78	No positive serial Correlation
Investec Equity	1,78	No positive serial Correlation
Prudential Equity	1,73	Inconclusive
Stanlib Capital Growth	1,51	Inconclusive
RMB Strategic Opportunities	1,59	Inconclusive
Sanlam Growth	1,39	Inconclusive
Old Mutual Industrial	1,22	Inconclusive
Coronation Industrial	1,30	Inconclusive
Kagiso Top40 Tracker	1,72	Inconclusive

From table 5.3, we can observe from the values of the Durbin-Watson test for first order serial correlation that the null hypothesis (H_0: $\rho \leq 0$) is true for six of the funds while for nine of the funds, the result is inconclusive. All values of the Durbin-Watson test lie between 1,22 and 2,15.

[15] Compare (d) to Durban-Watson test bounds: If d > upper bound (d_u), conclude no correlation. If d < lower bound (d_L), conclude positive correlation. If d id between the two bounds, conclude that the test is inconclusive.

4.4.2 Testing for Heteroskedasticity

Heteroskedasticity is a violation of OLS assumption, which states that the observations of the error term are drawn from a distribution that has a constant variance. To test for Heteroskedasticity I plot, the residual variables against the predicted values of the dependent variable. No sign of Heteroskedasticity was observed or detected; henceforth I conclude that the requirement of homoskedasticity is fulfilled.

CHAPTER 5: EMPIRICAL ANALYSIS

5.1 CAPM Estimated Regression Model

Table 6.1 below presents the results obtained from the estimation of the CAPM model (equation 4). The table includes risk-adjusted–excess return (α_p), the systematic risk (β_p) and their respective p-value[16] statistics. We have also included the Coefficient of determination (R^2)[17].

The p-values help to investigate the statistical significance of the (α_p) and (β_p) respectively.

Table 5.1: Estimation of regression coefficients based on the CAPM model

Fund Name	α_p	P-value	β_p	P-value β	R^2
Nedgroup Investments Financials	0,0042	0,3716	0,5629	0,0000*^	0,3769
Coronation Financial	0,0047	0,3048	0,6054	0,0000*^	0,4245
Sanlam Financial Fund	0,0039	0,4439	0,6093	0,0000*^	0,3836
Nedgroup Investments Rainmaker	0,0138*^	0,0000	0,6582	0,0000*^	0,7314
Futuregrowth Albaraka Equity	0,0128*^	0,0000	0,6000	0,0000*^	0,6814
Oasis Crescent Equity	0,0116*^	0,0000	0,5829	0,0000*^	0,7805
Allan Grey Equity	0,0124*^	0,0000	0,6710	0,0000*^	0,7109
Investec Equity	0,0104*^	0,0000	0,7683	0,0000*^	0,8450
Prudential Equity	0,0084*^	0,0008	0,7684	0,0000*^	0,8103
Stanlib Capital Growth	0,0072^	0,0355	0,7029	0,0000*^	0,6492
RMB Strategic Opportunities	0,0034^	0,1889	0,7486	0,0000*^	0,7818
Sanlam Growth	0,0020	0,5424	0,7012	0,0000*^	0,6581
Old Mutual Industrial	0,0114*^	0,0042	0,4852	0,0000*^	0,3999
Coronation Industrial	0,0116*^	0,0030	0,5323	0,0000*^	0,4543
Kagiso Top40 Tracker	0,0030*^	0,0001	1,0380	0,0000*^	0,9895

* Significantly different from zero at 1% significance level
^ Significantly different from zero at 5% significance level

All the funds exhibit positive alpha values thus indicating that the funds outperformed the market. Nedgroup Investment Rainmaker fund generated the highest alpha (α_p = 0,0138) while Sanlam Growth Fund (α_p = 0,0020) generated the lowest alpha value. Both funds were statistically significant at both 1% and 5% significance level.

[16] A p-value is a probability, so it runs from 0 to 1. It tells us the lowest level of significance at which we could reject the null hypothesis (assuming that the estimate is in the expected direction). A small p-value cast doubt on the null hypothesis, so to reject a null hypothesis we need a low p-value (Studenmund, 2006)
[17] A statistical measure that represents the percentage of a fund or security's movements that can be explained by movements in a benchmark index.

Although all the funds have positive alpha values, only nine of the funds' alphas are statistically significant 1% while only 11 are statistically significant at 5% significance levels. Six of the funds (Coronation Investment Financials, Nedgroup Investment Financials, Sanlam Financials, RMB Strategic Opportunities and Sanlam Growth) generated positive non-significant alphas at both levels.

A positive alpha is an indication that a fund manager outperformed the market and as a whole, 60% of the funds selected have statistically significant positive alphas at 1%. This result strengthens the hypothesis that fund managers systematically manage to outperform the market.

All the coefficients (beta) are statistically significantly different from zero, both at the 1% and 5% significance levels. The betas of funds are also relatively similar in terms of similar risk-class classification as well as being relatively high, possibly indicating that the funds' returns do vary closely enough with the market returns, thus vindicating the selection and suitability of the chosen benchmark.

The Kagiso Top40 Tracker fund (which has a moderate risk-profile ranking) is an index fund, and is the only fund that has a marginally higher beta value than the market beta. This could be attributed to the funds aim and philosophy which is, to track the movements and replicate the performance of the JSE/FTSE Africa Top40 index by investing in the correct ratios, weightings and proportions of the top 40 shares. The Old Mutual Industrial generated the lowest systematic risk although it claims to have a moderate risk-profile ranking.

The coefficient of determination, R^2, equals the fraction of a fund's volatility which is attributed to market movements. The coefficients can be expressed as a measurement of a fund's degree of diversification. A high R^2 indicates that the mutual fund is well diversified and that the non-systematic risk is low.

Kagiso Top40 Tracker fund has a $R^2 = 99\%$ due to the fund being an index fund. This indicates that 99% of the fund's total risk is market-related and the remaining 1% is the proportion of risk associated with the events specific to the fund itself, rather than the market.

On the whole, the R^2 is relatively high for the funds I have selected for the analysis. R^2 varies from 37,69% to 99% across the different funds. We could, therefore, conclude that systematic risk is the dominant component, especially for "Type": General, Growth and Large Cap funds. Fund "Type": Financial and Industrial exhibit R^2 values below 50%. Therefore, in this case, the non-systematic risk component had a relatively dominant role.

5.2 Performance Evaluation of Mutual Funds

I present the results of the different performance measures for the South African mutual funds with the JSE as the benchmark. The fund with the highest ratio is ranked as the highest fund performer comparative to other funds and thus has been the most successful fund based on the particular performance measure. The fund/s that generate a higher ratio than the benchmark ratio are said to have out performed the market index and conversely those that do not are said to have underperformed relative to the market index.

5.2.1 Sharpe Ratio

Table 5.2, tabulates the funds performance evaluation results based on the Sharpe ratio as a performance measure (Equation 7) and their respective rankings.

Table 5.2: Sharpe Ratio Performance Evaluation

FUND NAME	Sharpe Ratio: Fund	Ranking
Nedgroup Investments Financials	0,165	13
Coronation Financial	0,179	12
Sanlam Financial Fund	0,153	14
Nedgroup Investments Rainmaker	0,443	1
Futuregrowth Albaraka Equity	0,432	3
Oasis Crescent Equity	0,438	2
Allan Grey Equity	0,397	4
Investec Equity	0,350	7
Prudential Equity	0,300	8
Stanlib Capital Growth	0,257	9
RMB Strategic Opportunities	0,189	10
Sanlam Growth	0,149	15
Old Mutual Industrial	0,357	6
Coronation Industrial	0,359	5
Kagiso Top40 Tracker	0,183	11
MARKET INDEX	0,130	16
No. of Funds Beat Market		15

All the funds under analysis generated positive Sharpe ratios and as well as outperforming the benchmark index. The top three performing funds are Nedgroup Investments Rainmaker (1), Oasis Crescent Equity (2) and Futuregrowth Albaraka Equity (3) with Sharpe ratio of (0,443), (0,438) and (0,432) respectively. The worst performing funds are Nedgroup Investment Financial (13), Sanlam Financial Fund (14) and Sanlam Growth (15) despite outperforming the benchmark index. Interestingly, two of the worst performing funds, according to this measure, are from the same fund management company.

5.2.2 Modigliani-Modigliani measure (M^2)

Table 5.3 tabulates the funds performance evaluation results based on the M^2 as a performance measure (Equation 9b) and their respective rankings.

Table 5.3: M^2 Performance Evaluation

FUND NAME	M^2	Ranking
Nedgroup Investments Financials	0,639	13
Coronation Financial	0,894	12
Sanlam Financial Fund	0,420	14
Nedgroup Investments Rainmaker	5,767	1
Futuregrowth Albaraka Equity	5,564	3
Oasis Crescent Equity	5,676	2
Allan Grey Equity	4,909	4
Investec Equity	4,056	7
Prudential Equity	3,124	8
Stanlib Capital Growth	2,337	9
RMB Strategic Opportunities	1,090	10
Sanlam Growth	0,337	15
Old Mutual Industrial	4,185	6
Coronation Industrial	4,223	5
Kagiso Top40 Tracker	0,963	11

The M^2 measure generates the same results as the Sharpe ratio described above. Nedgroup Investments Rainmaker (1), Oasis Crescent Equity (2) and Futuregrowth Albaraka Equity (3) are the best performing funds according to the measure while Nedgroup Investment Financial (13), Sanlam Financial Fund (14) and Sanlam Growth (15) are the worst performing funds.

5.2.3 Jensen Alpha

Table 5.4 tabulates the funds performance evaluation results based on the Jensen Alpha as a performance measure (Equation 10b) and their respective rankings.

Table 5.4: Jensen Alpha Performance Evaluation

Fund Name	Jensen Alpha	P-Value αp	Ranking
Nedgroup Investments Financials	0,42 %	0,3716	11
Coronation Financial	0,47 %	0,3048	10
Sanlam Financial Fund	0,39 %	0,4439	12
Nedgroup Investments Rainmaker	1,38 %	0,0000	1
Futuregrowth Albaraka Equity	1,28 %	0,0000	2
Oasis Crescent Equity	1,16 %	0,0000	5
Allan Grey Equity	1,24 %	0,0000	3
Investec Equity	1,04 %	0,0000	7
Prudential Equity	0,84 %	0,0008	8
Stanlib Capital Growth	0,72 %	0,0355	9
RMB Strategic Opportunities	0,34 %	0,1889	13
Sanlam Growth	0,20 %	0,5424	15
Old Mutual Industrial	1,14 %	0,0042	6
Coronation Industrial	1,16 %	0,0030	4
Kagiso Top40 Tracker	0,30 %	0,0001	14
No. of Significant Alphas (1%)	9		
No. of Significant Alphas (5%)	10		
No. of Funds Beat Market	15		

Nine of the funds generate statistically positive significant alphas at a 1% significance level, while ten funds generate positive significant alphas at 5% significance level. Nedgroup Investments Rainmaker Fund emerges as the highest ranking fund based on the Jensen's alpha. The worst performing fund according to this measure is the Sanlam Growth fund. It exhibits a statistically insignificant alpha both at 1% and 5% respectively.

5.2.4 Treynor Ratio

Table 5.5 tabulates the funds performance evaluation results based on the Treynor ratio as a performance measure (equation 11a) and their respective rankings.

Table 5.5: Treynor Ratio Performance Evaluation

Fund Name	Average Excess Return	β_p	Treynor Measure	Ranking
Nedgroup Investments Financials	0,82 %	0,5629	1,46 %	11
Coronation Financial	0,90 %	0,6054	1,49 %	10
Sanlam Financial Fund	0,82 %	0,6093	1,34 %	12
Nedgroup Investments Rainmaker	1,85 %	0,6582	2,81 %	4
Futuregrowth Albaraka Equity	1,70 %	0,6000	2,84 %	3
Oasis Crescent Equity	1,57 %	0,5829	2,69 %	5
Allan Grey Equity	1,71 %	0,6710	2,55 %	6
Investec Equity	1,59 %	0,7683	2,07 %	7
Prudential Equity	1,39 %	0,7684	1,81 %	8
Stanlib Capital Growth	1,22 %	0,7029	1,73 %	9
RMB Strategic Opportunities	0,87 %	0,7486	1,16 %	13
Sanlam Growth	0,70 %	0,7012	0,99 %	15
Old Mutual Industrial	1,49 %	0,4852	3,06 %	1
Coronation Industrial	1,54 %	0,5323	2,89 %	2
Kagiso Top40 Tracker	1,03 %	1,0380	1,00 %	14
MARKET INDEX	0,71%	1	0,71 %	16
No. of Funds Beat Market				15

Based on the result of the Treynor measure, the Old Mutual Industrial fund is the best performing fund while Kagiso Top40 Tracker and Sanlam Growth Funds continue to occupy the worst performing fund spot rankings. All the funds outperform the market index.

5.2.5 Treynor-Mazuy Estimated Regression Model

I now turn my attention to the Treynor and Mazuy (equation 12a) approach to correct for market timing ability on the part of fund managers. The original Jensen technique made no allowance for market timing abilities of fund managers, that is, when fund managers change the composition of their portfolio on the basis of expected market movements. When portfolio managers expect the market portfolio to rise in value, they may switch from government treasury bonds into equities and/or they may invest in higher beta stocks. When they expect the market to fall, they will undertake the reverse strategy: sell high beta stocks and move into "defensive" stocks. If managers successfully engage in market timing, then returns to the fund will be high when the market is high and also relatively high when the market is low (Tonks, 2005).

Table 5.6 below reports the market timing and security selection components of fund performance, using the Treynor-Mazuy approach. Risk-adjusted performance, due to security selection (α_p), is expressed in percentage per month and market timing estimates are represented in (γ_p). A test of market timing is a significant value of γ_p in regression equation (12a), for the single factor model.

Table 5.6: Performance Evaluation using Treynor-Mazuy Model

FUND NAME	α_p	P-Value α_p	β_p	γ_p	P-Value γ_p
Nedgroup Investments Financials	0,0067	0,2623	0,5571	-0,8117	0,4932
Coronation Financial	0,0085	0,1431	0,5964	-1,2425	0,2802
Sanlam Financial Fund	0,0070	0,2678	0,6017	-1,0515	0,4051
Nedgroup Investments Rainmaker	0,0119	0,0004	0,6627	0,6315	0,3324
Futuregrowth Albaraka Equity	0,0074	0,0004	0,6131	1,8055	0,3324
Oasis Crescent Equity	0,0065	0,0064	0,5951	1,6799	0,0005
Allan Grey Equity	0,0087	0,0133	0,6799	1,2294	0,0763
Investec Equity	0,0107	0,0002	0,7677	-0,0876	0,8709
Prudential Equity	0,0086	0,0063	0,7681	-0,0411	0,9462
Stanlib Capital Growth	0,0090	0,0355	0,6985	-0,6101	0,4706
RMB Strategic Opportunities	0,0024	0,4680	0,7511	0,3510	0,5878
Sanlam Growth	0,0042	0,3081	0,6959	-0,7358	0,3731
Old Mutual Industrial	0,0102	0,0397	0,4883	0,4223	0,6645
Coronation Industrial	0,0117	0,0170	0,5323	-0,0095	0,9921
Kagiso Top40 Tracker	0,0008	0,2976	1,0433	0,7352	0,0000
No. of Coeffs > 0	15		15	7	
No. of Signif-Coeffs at 1%		5			2
No. of Signif-Coeffs at 5%		9			2

All the funds generated positive alpha values although some were marginally greater than zero. Five funds exhibit positive and significant security selection estimate at the 1% significance level, while 11 funds were positively-significant at the 5% significance level.

Focusing at the 1% significance level, only Oasis Crescent Equity fund exhibits significantly positive selectivity skill as well as statistically positive market timing. This fund displays the classical evidence of true significant positive market timing and selectivity skill at the total portfolio level. However, Investec Equity and Prudential Equity funds also display significantly positive selectivity skill, recording statistically insignificant negative market timing coefficients, indicating that the gains attributable to stock selection were in part eroded

due to poor timing decisions. The Nedgroup Investments Rainmaker and Futuregrowth Albaraka Equity funds record statistically insignificant positive market timing coefficients. The Kagiso Top40 Tracker has statistically significant positive market timing ability. However, it generates a statistically insignificant selectivity skill.

There are nine funds that exhibit significant positive alphas at the 5% significance level as opposed to the five funds obtained at the 1% significance level. The five funds are Allan Grey Equity, Stanlib Capital Growth, Old Mutual Industrial and Coronation Industrial funds. However, the Oasis Crescent Equity fund remains the only fund that exhibits statistically significant positive selectivity skill and market timing simultaneously. Therefore, the empirical results derived from the Treynor-Mazuy model do not support the hypothesis that funds collectively have security selection or market timing skill at the total fund level.

According to the TM equation (12b), Nedgroup Investments Rainmaker (1), Coronation Industrial (2) and Investec Equity (3) are the best performing funds respectively. While, Sanlam Growth (12), RMB Strategic Opportunities and Kagiso Top40 Tracker (15) are the worst performing funds.

5.3 Summary Ranking of Performance Measures

Table 6.7 below tabulates the ranking results of four portfolio performance measures in this analysis. Equation (12b) is applied to generate the Treynor-Mazuy ranking.

Table 5.7: Summary Rankings based on performance measures

Fund Name	Sharpe Ratio / M^2	Jensen Alpha	Treynor Measure	Treynor-Mazuy (TM)
Nedgroup Investments Financials	13	11	11	11
Coronation Financial	12	10	10	8
Sanlam Financial Fund	14	12	12	10
Nedgroup Investments Rainmaker	1	1	4	1
Futuregrowth Albaraka Equity	3	2	3	9
Oasis Crescent Equity	2	5	5	12
Allan Grey Equity	4	3	6	6
Investec Equity	7	7	7	3
Prudential Equity	8	8	8	7
Stanlib Capital Growth	9	9	9	5
RMB Strategic Opportunities	10	13	13	14
Sanlam Growth	15	15	15	13
Old Mutual Industrial	6	6	1	4
Coronation Industrial	5	4	2	2
Kagiso Top40 Tracker	11	14	14	15

Based on the summary of these performance measures, the best performing funds are Nedgroup Investments Rainmaker (achieved four first place rankings), Futuregrowth Albaraka Equity, Oasis Crescent and Allan Grey Equity funds respectively. However, Futuregrowth Albaraka Equity and Oasis Crescent generate poor results according to the Treynor-Mazuy (equation 12b).

The Sharpe ratio and the M^2 measures generated exactly the same results. While the following funds; Investec Equity (7), Prudential Equity (8), Stanlib Capital Growth (9) and Sanlam Growth (15) obtained exact rank positions from four performance measures, thus indicating consistency between the different performance measures. Sanlam Growth fund consistently obtained a poor rank position across all performance measures.

5.4 Correlation between the performance measurements

In this section, I tested for correlation between the performance measurements. High correlation values indicate strong similarity in ranking output between the different

performance measurements, while low or negative correlation values indicate a moderate to strong differences between the performance measurements

Table 5.8: Correlation of performance measures

	Sharpe Ratio / M2	Jensen Alpha	Treynor Measure	Treynor-Mazuy (TM)
Sharpe Ratio / M^2	1			
Jensen Alpha	0.925	1		
Treynor Measure	0.846	0.914	1	
Treynor-Mazuy (TM)	0.539	0.712	0.732	1

From Table 5.8, the following is deduced: the Sharpe Ratio/M^2 is perfectly correlated with one another. This is because both performance measures have identical ranking outputs.

The Jensen Alpha is highly positively correlated with the Sharpe Ratio/M^2 and the Treynor Measure with correlation coefficient values of 0.925 and 0.914 respectively. This indicates that the ranking outcome from these performance measurements differed little from each other. A relatively low positive correlation coefficient is observed when the TM measure is compared to other performance measures. The lowest correlation coefficient value is obtained between the TM measure and the Sharpe Ratio/M^2, thus indicating the ranking outcome differed significantly from each other.

CHAPTER 6: CONCLUSION

The ranking of mutual funds, according to different mutual fund performance evaluation measures, is an interesting research topic since it could ultimately and seriously affect the compensation received by mutual fund managers, particularly if fund managers choose the performance model which is used to evaluate their fund's performance and if they can choose the funds their mutual fund is ranked against.

The objectives of this study were threefold. First, excess returns of fifteen sample funds with at least six years of available monthly returns over the 2001 to 2006 period were investigated, based on five different mutual fund performance measures. The risk-adjusted performance gives some insights into South African mutual fund performance relative to the market portfolio. The five risk-adjusted performance measures utilised are the Sharpe Ratio, the M^2 measure, the Jensen's alpha, the Treynor Ratio and the Treynor-Mazuy model (TM).

Second, funds are ranked according to each performance measure and the correlation of the ranking across the five performance measures was investigated.

Third, this paper also evaluates the market timing and security selection of portfolio managers. The selectivity and timing ability of fund managers were evaluated in order to explain whether superior skills exist when portfolios are under professional management. Significant superior selectivity would bring abnormal returns to investors while significant market timing generates capital appreciation for investors when the prices of the holding assets fluctuate unconventionally. Meanwhile, the Efficient Market Hypothesis (EMH) is logically challenged when superior selectivity and timing ability are found since individuals are not equally informed and some information can be used to make abnormal returns.

Based on the empirical findings reported in this paper, the following are the main conclusions:

Firstly, South African mutual funds are above average, outperforming the market if one considers the performance of the nine funds which generated significant positive alpha values at the 5% significance level.

Secondly, fund managers performed fairly well in risk-adjusted returns and have maintained "somewhat" well diversified portfolios. The analysis also indicates that fund managers can make excess returns above the risk-free rate in the medium and long-term. Thus, the South African mutual fund industry is an ideal investment for small investors seeking sufficient diversification.

Thirdly, the Sharpe ratio and M^2 provide the same conclusion in terms of risk-adjusted performance in this case.

Fourthly, for a few funds, the composite performance of Sharpe, Treynor and Jensen does indicate identical ranking. However, this does not hold true for a majority of the funds. This is an indication that the funds are not completely diversified because we know that completely diversified portfolios will have a similar ranking based on the composite performance measurements. Therefore, it means that there is some degree of unsystematic risk that fund managers can eliminate through a diversification strategy.

Fifthly, little superior selectivity and timing ability are supported in this paper when the Treynor-Mazuy quadratic model is employed. Only Oasis Crescent Equity fund exhibits significant positive selectivity skill and market timing. There are cases where both positive stock selectivity and market timing were generated but neither one was found to be significant. Therefore, these findings are consistent with the efficient market hypothesis.

Due to the limited availability of South African mutual fund data and the roughness of the data edition provided by the database, the findings of this paper are subject to statistical restrictions. The sample, employed in this paper, is small relative to the South Africa mutual fund industry (which consists of over 500 mutual funds) and the horizon of the time series is not long enough to capture the real characteristics of the observations. However, as an independent empirical study on the performance of South African mutual funds, it provides some specific insights of the fund management market which are attractive to international and local investors but lacks spontaneity for analysis from independent sectors. Future research could explore the sensitivity of the performance measure

to a broader choice of models and benchmarks, particularly those that interrogate superior separation of selectivity of market timing.

CHAPTER 7: REFERENCES

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APPENDIX A: DATA

South Africa UT - Retail	Date	MRKT Excess	Nedgroup Inv Financials R	Coronation Financial A	Sanlam Financial	Nedgroup Inv Rainmaker A	Futuregrowth Albaraka Equity	Oasis Crescent Equity	Allan Gray Equity A	Investec Equity R	Prudential Equity A	STANLIB Capital Growth R	RMB Strategic Opportunities R	Sanlam Growth R	Old Mutual Industrial A	Coronation Industrial	Kagis Top 4 Tracke
30/11/06	29/12/06	3.14%	7.25%	7.13%	6.24%	4.52%	2.49%	3.72%	6.08%	4.30%	5.31%	4.94%	5.51%	4.75%	6.22%	6.63%	3.24%
31/10/06	30/11/06	1.78%	2.78%	2.82%	1.98%	2.47%	2.66%	1.65%	4.45%	3.09%	3.90%	3.17%	2.73%	5.75%	4.27%	6.36%	1.24%
29/09/06	31/10/06	3.40%	5.61%	6.75%	4.73%	3.14%	2.31%	4.99%	3.69%	3.71%	5.32%	3.70%	2.62%	5.36%	4.73%	7.09%	3.30%
31/08/06	29/09/06	1.09%	0.21%	0.87%	2.08%	1.46%	0.52%	1.50%	2.59%	1.09%	0.01%	2.14%	4.06%	1.74%	1.48%	1.59%	1.55%
31/07/06	31/08/06	4.18%	3.58%	0.64%	5.11%	3.98%	4.17%	4.47%	2.73%	5.03%	4.10%	3.94%	3.38%	5.10%	2.46%	2.87%	4.47%
30/06/06	31/07/06	-2.48%	1.81%	2.13%	0.78%	-1.31%	-3.26%	-0.95%	-1.32%	-2.36%	-0.93%	-0.05%	-1.22%	1.06%	0.93%	1.08%	-2.74%
31/05/06	30/06/06	2.41%	-4.77%	-5.15%	-5.09%	-0.18%	4.30%	2.15%	2.19%	0.06%	-1.77%	-2.33%	-1.53%	-3.80%	-6.32%	-4.50%	3.96%
28/04/06	31/05/06	-3.53%	-7.13%	-6.76%	-6.18%	-3.47%	-4.36%	-2.40%	-3.50%	-4.90%	-4.02%	-5.90%	-4.10%	-4.40%	-5.49%	-5.33%	-3.06%
31/03/06	28/04/06	2.98%	-0.62%	-0.37%	0.02%	2.19%	1.27%	1.62%	0.01%	2.20%	1.50%	1.04%	1.13%	0.33%	-0.98%	1.18%	3.69%
28/02/06	31/03/06	5.63%	1.69%	2.89%	0.61%	4.01%	4.94%	4.30%	5.82%	4.88%	4.99%	3.98%	3.42%	4.18%	2.98%	1.36%	6.00%
31/01/06	28/02/06	-4.20%	0.84%	-0.20%	0.87%	0.25%	-2.75%	-1.59%	-3.06%	-3.29%	1.18%	-0.03%	-0.95%	0.10%	1.74%	0.43%	-5.05%
30/12/05	31/01/06	7.92%	8.43%	6.21%	8.18%	7.37%	8.95%	6.34%	8.02%	8.61%	8.47%	11.60%	8.04%	8.22%	7.16%	7.49%	8.85%
30/11/05	30/12/05	6.79%	9.53%	8.75%	7.32%	5.35%	3.79%	4.37%	7.45%	8.69%	6.43%	5.92%	6.99%	5.07%	6.27%	6.42%	7.19%
31/10/05	30/11/05	1.26%	4.45%	2.34%	3.99%	2.35%	2.72%	2.80%	5.62%	2.01%	2.48%	2.39%	1.62%	2.50%	2.21%	0.66%	1.12%
30/09/05	31/10/05	-3.46%	-3.96%	-2.26%	-3.31%	-3.00%	-1.30%	-2.05%	-4.23%	-4.01%	-3.28%	-0.73%	-2.99%	-2.42%	-3.39%	-2.21%	-2.96%
31/08/05	30/09/05	8.26%	2.30%	1.24%	2.31%	3.21%	8.87%	6.46%	10.29%	7.61%	6.25%	3.08%	5.28%	3.47%	2.33%	2.67%	9.52%
29/07/05	31/08/05	0.97%	-0.39%	-0.28%	-1.37%	1.20%	0.75%	0.80%	0.44%	1.12%	1.59%	1.88%	-0.29%	1.33%	0.02%	1.75%	0.82%
30/06/05	29/07/05	5.95%	8.68%	7.77%	8.84%	9.12%	4.72%	5.77%	5.82%	7.17%	9.25%	10.09%	7.21%	7.57%	10.03%	9.76%	6.23%
31/05/05	30/06/05	1.83%	0.70%	2.22%	0.22%	1.36%	0.57%	1.01%	2.20%	2.62%	0.24%	0.03%	0.19%	1.35%	1.52%	2.15%	1.96%
29/04/05	31/05/05	8.55%	2.22%	1.74%	4.30%	6.34%	6.82%	5.52%	8.99%	5.92%	4.91%	4.04%	6.32%	5.54%	5.11%	6.02%	9.66%
31/03/05	29/04/05	-6.54%	-1.75%	-1.71%	-2.38%	-3.90%	-4.35%	-4.51%	-4.43%	-4.03%	-2.89%	-3.98%	-3.79%	-3.74%	-3.28%	-3.28%	-6.71%
28/02/05	31/03/05	-2.13%	-3.10%	-2.83%	-2.35%	-2.12%	-1.37%	-1.59%	-2.86%	-4.17%	-3.82%	-3.08%	-2.41%	-2.74%	-2.46%	-2.12%	-1.25%
31/01/05	28/02/05	4.36%	2.28%	2.72%	2.01%	2.66%	2.66%	2.46%	3.59%	3.45%	2.93%	3.01%	0.63%	0.67%	0.08%	-0.65%	4.98%
31/12/04	31/01/05	0.31%	-0.64%	-0.50%	0.56%	-0.05%	0.23%	0.07%	0.14%	-1.27%	0.43%	0.69%	-0.05%	0.14%	0.48%	0.46%	0.48%
30/11/04	31/12/04	0.52%	6.02%	6.13%	6.48%	3.53%	0.32%	2.06%	2.27%	3.71%	3.41%	2.16%	4.94%	2.13%	4.14%	4.19%	0.52%
29/10/04	30/11/04	6.12%	8.36%	7.42%	8.01%	8.34%	4.22%	5.29%	5.25%	9.64%	9.83%	11.78%	8.18%	7.63%	9.37%	8.92%	5.43%
30/09/04	29/10/04	-1.71%	3.87%	2.46%	2.80%	6.93%	5.02%	3.99%	1.93%	3.77%	4.12%	6.33%	4.35%	5.22%	6.21%	6.93%	-2.37%

31/08/04	30/09/04	4.44%	10.17%	11.04%	9.00%	4.23%	1.82%	1.38%	5.53%	6.49%	5.80%	6.03%	6.31%	5.27%	6.48%	6.05%	4.76%
30/07/04	31/08/04	7.16%	4.54%	4.70%	5.22%	5.93%	6.82%	5.58%	7.03%	5.09%	5.65%	7.77%	5.74%	5.16%	4.38%	4.39%	8.50%
30/06/04	30/07/04	1.12%	-1.31%	-0.44%	-1.55%	-0.63%	-0.50%	-0.85%	-1.40%	1.19%	0.36%	-2.79%	-2.51%	-0.56%	-0.07%	0.85%	1.49%
31/05/04	30/06/04	-3.78%	1.52%	0.66%	0.28%	1.01%	-0.52%	-0.83%	-2.26%	0.46%	1.75%	1.62%	-0.08%	-0.66%	1.52%	-0.60%	-4.08%
30/04/04	31/05/04	-0.54%	0.40%	1.10%	-2.78%	-1.10%	-1.63%	-4.41%	-0.88%	-0.45%	-0.24%	-3.67%	-2.20%	-1.41%	-1.67%	-2.39%	-0.03%
31/03/04	30/04/04	-3.72%	0.27%	0.30%	1.04%	-0.59%	-1.32%	2.41%	-3.66%	-2.22%	-1.79%	-1.58%	-1.34%	-0.99%	1.05%	1.76%	-3.26%
27/02/04	31/03/04	-2.69%	-0.07%	-2.21%	-4.30%	0.71%	0.16%	-0.39%	0.68%	1.62%	1.25%	-0.30%	-0.61%	0.36%	3.23%	2.43%	-2.79%
30/01/04	27/02/04	-0.38%	0.58%	0.62%	0.45%	0.42%	0.00%	-1.80%	-3.17%	0.38%	0.36%	-1.47%	-1.08%	-0.98%	0.45%	-3.13%	-0.28%
31/12/03	30/01/04	3.55%	1.75%	5.35%	3.73%	2.77%	1.10%	2.44%	3.45%	1.22%	1.35%	3.71%	1.70%	0.94%	-0.59%	5.20%	4.13%
28/11/03	31/12/03	5.73%	4.72%	5.27%	4.30%	6.84%	6.84%	5.82%	5.44%	5.66%	6.34%	6.16%	5.70%	6.23%	5.79%	4.45%	6.05%
31/10/03	28/11/03	-1.17%	1.65%	1.68%	0.25%	1.44%	-1.44%	-0.70%	1.50%	4.02%	2.76%	4.32%	1.66%	0.81%	3.03%	5.51%	-1.67%
30/09/03	31/10/03	8.18%	8.26%	9.28%	7.49%	6.46%	6.12%	7.74%	6.24%	8.42%	8.23%	7.27%	7.65%	8.91%	8.39%	5.49%	9.26%
29/08/03	30/09/03	-4.13%	-2.35%	-2.88%	-3.54%	-0.24%	-1.75%	-1.91%	-1.36%	-1.70%	-1.72%	-1.43%	-1.97%	-3.23%	1.21%	-0.33%	-4.13%
31/07/03	29/08/03	3.80%	-3.02%	-1.92%	-1.99%	4.47%	8.35%	3.18%	5.48%	3.53%	2.07%	3.56%	-0.52%	1.26%	2.26%	1.60%	4.24%
30/06/03	31/07/03	4.50%	3.42%	4.76%	2.74%	4.47%	3.33%	4.25%	3.77%	4.10%	4.78%	5.84%	4.61%	2.82%	6.80%	3.38%	4.59%
30/05/03	30/06/03	-3.34%	1.48%	2.37%	2.36%	3.63%	-2.11%	-1.23%	-1.25%	2.67%	0.78%	1.42%	-1.15%	0.46%	4.04%	1.04%	-4.02%
30/04/03	30/05/03	12.29%	5.15%	7.34%	6.74%	8.75%	11.03%	9.90%	13.11%	7.48%	9.76%	8.26%	10.58%	10.45%	9.20%	10.25%	13.59%
31/03/03	30/04/03	-3.07%	5.78%	3.58%	5.60%	-1.86%	-3.34%	-3.26%	-1.41%	2.43%	-0.73%	1.58%	1.33%	-0.79%	1.50%	0.77%	-2.44%
28/02/03	31/03/03	-9.83%	-9.30%	-8.44%	-9.14%	-6.30%	-6.70%	-7.11%	-8.05%	-5.44%	-8.38%	-8.60%	-7.87%	-7.02%	-6.09%	-7.03%	-9.20%
31/01/03	28/02/03	-5.45%	-3.67%	-4.17%	-6.53%	-6.67%	-4.00%	-4.20%	-5.24%	-5.95%	-6.02%	-4.52%	-4.85%	-3.02%	-4.42%	-3.76%	-4.97%
31/12/02	31/01/03	-6.14%	-2.94%	-2.63%	-3.07%	-3.85%	-3.05%	-2.52%	-2.92%	-4.04%	-3.53%	-3.79%	-4.63%	-3.67%	-3.66%	-1.85%	-6.13%
29/11/02	31/12/02	-3.88%	-7.82%	-4.87%	-5.15%	0.36%	-0.64%	-1.83%	1.02%	-3.28%	-3.75%	-3.65%	-6.40%	-3.90%	-3.38%	-3.00%	-3.98%
31/10/02	29/11/02	1.14%	6.06%	5.85%	5.37%	3.52%	2.32%	2.20%	5.10%	2.22%	3.21%	3.15%	2.06%	3.98%	4.96%	7.25%	1.03%
30/09/02	31/10/02	-1.79%	2.55%	1.95%	4.44%	3.35%	5.37%	1.78%	0.45%	0.58%	-0.86%	2.73%	-0.78%	0.65%	0.41%	5.35%	-1.91%
30/08/02	30/09/02	-3.05%	-3.68%	-4.17%	-0.99%	1.67%	-2.65%	1.38%	1.48%	-1.07%	-0.22%	-0.93%	-2.41%	-0.25%	-1.44%	-2.48%	-2.72%
31/07/02	30/08/02	3.80%	-2.92%	-1.77%	-3.07%	3.03%	0.82%	2.15%	1.56%	3.16%	0.17%	1.13%	1.29%	0.90%	1.53%	-0.47%	4.58%
28/06/02	31/07/02	-15.12%	-7.47%	-8.55%	-7.60%	-5.96%	-1.97%	-2.83%	-3.65%	-10.09%	-9.58%	-8.17%	-10.43%	-7.48%	-3.34%	-5.15%	-14.27%
31/05/02	28/06/02	-5.97%	-4.38%	-5.11%	-5.38%	-3.70%	-1.32%	-1.84%	-5.45%	-3.35%	-6.06%	-4.71%	-3.76%	-4.21%	-2.71%	-1.15%	-6.05%
30/04/02	31/05/02	0.87%	-2.07%	-2.09%	0.43%	0.96%	3.06%	2.25%	7.91%	0.34%	1.91%	1.23%	-0.89%	0.94%	6.46%	4.26%	0.46%
29/03/02	30/04/02	-0.09%	14.82%	16.59%	19.93%	3.98%	3.94%	0.98%	4.50%	1.36%	4.66%	6.49%	3.68%	3.94%	5.16%	3.80%	-0.44%
28/02/02	29/03/02	0.40%	-4.37%	-3.84%	-5.97%	-0.44%	1.32%	2.78%	2.62%	1.77%	-0.07%	-2.41%	-2.48%	-1.10%	-1.77%	-0.38%	1.25%
31/01/02	28/02/02	3.92%	-5.11%	-5.78%	-6.79%	-0.89%	3.23%	1.87%	0.44%	4.29%	1.76%	1.08%	-0.92%	-2.03%	-3.13%	-2.55%	4.92%
31/12/01	31/01/02	-1.28%	-7.71%	-5.47%	-6.59%	-1.02%	-2.37%	-1.91%	-3.33%	-3.04%	-5.09%	-4.38%	-4.03%	-4.75%	-5.04%	-6.59%	-1.65%
30/11/01	31/12/01	8.48%	5.47%	4.13%	2.80%	10.63%	2.29%	8.34%	2.92%	9.11%	8.55%	3.70%	6.68%	-0.40%	-1.69%	-1.26%	10.77%
31/10/01	30/11/01	9.17%	1.47%	-0.43%	0.91%	10.53%	7.60%	8.50%	3.62%	8.93%	6.66%	5.77%	9.46%	3.02%	5.41%	7.83%	9.66%

28/09/01	31/10/01	4.19%	-0.54%	0.62%	-0.59%	-0.21%	2.45%	2.93%	-0.66%	5.12%	2.14%	1.51%	5.83%	-0.03%	4.81%	1.79%	5.52%
31/08/01	28/09/01	-10.87%	-8.77%	-10.50%	-11.06%	-6.17%	-5.45%	-4.20%	-4.80%	-8.25%	-9.05%	-9.31%	-9.99%	-11.88%	-4.06%	-6.33%	-10.30
31/07/01	31/08/01	4.04%	0.02%	1.28%	0.78%	3.83%	7.20%	5.51%	4.91%	3.41%	3.68%	1.08%	3.01%	1.97%	4.55%	3.74%	4.37%
29/06/01	31/07/01	-8.29%	-3.50%	-4.45%	-3.59%	-3.77%	-3.17%	-1.87%	-2.94%	-3.61%	-5.46%	-4.57%	-4.06%	-6.62%	-0.40%	-0.91%	-8.64%
31/05/01	29/06/01	-2.62%	3.44%	2.76%	4.16%	2.59%	3.10%	-0.01%	3.51%	-0.42%	-0.39%	2.18%	0.56%	1.93%	4.82%	3.94%	-3.22%
30/04/01	31/05/01	3.66%	2.08%	2.42%	4.09%	5.22%	5.22%	3.68%	3.32%	4.45%	3.75%	4.98%	3.29%	4.51%	-0.64%	4.52%	3.68%
30/03/01	30/04/01	8.74%	5.48%	6.89%	6.76%	7.08%	5.80%	5.62%	6.56%	7.35%	8.30%	3.64%	5.86%	6.49%	2.73%	3.48%	10.05%
28/02/01	30/03/01	-10.79%	-5.47%	-6.81%	-7.77%	-5.71%	-1.40%	-3.07%	-5.21%	-8.27%	-7.75%	-9.59%	-6.89%	-14.25%	-5.44%	-5.33%	-9.47%
31/01/01	28/02/01	-1.47%	-6.27%	-6.20%	-5.91%	-1.48%	3.77%	2.47%	1.61%	-1.65%	-2.09%	-7.54%	-5.07%	-9.02%	-6.93%	-7.17%	-0.99%
29/12/00	31/01/01	7.75%	2.46%	4.87%	6.51%	10.05%	9.95%	6.21%	6.90%	5.61%	6.68%	4.93%	3.25%	5.27%	5.49%	5.59%	8.03%

APPENDIX B: Fund Information

NedGroup Inv Financials R

Fund Manager: Kokkie Kooyman

Objectives: The Nedgroup Investments Financials Fund aims to provide capital growth over the longer term for the more aggressive and risk-tolerant investor.

Benchmark: Unit trust mean (Financial Sector)

Universe: The fund manager is mandated to nvest in the shares of financial services companies, including banks, insurance companies, brokerage firms and related investments.

Other: Before the Nedcor Retail Investments merger, this fund was called the FTNIB Selected Financial Opportunities Fund. New investments should take place in the A class of this fund.

Coronation Financial A

Fund Manager: Neville Chester

Objectives: This fund is a specialised investment that exclusively focuses on the financial services industry. The investment objective of the fund is to gain steady, long term capital growth.

Benchmark: FTSE/ JSE Africa Financial Index

Universe: The fund manager invests in local and international, listed companies with a significant portion of their current or potential earnings being derived from financial services. This fund has no capacity for offshore exposure.

Sanlam Financial

Fund Manager: Eduardo DAlmeida

Objectives: The Sanlam Financial Fund aims to achieve capital appreciation by investing in well-researched shares in the financial services sector. The fund manager can also invest 15% of the portfolio in foreign markets.

Benchmark: FTSE/ JSE Financial Index

Universe: Financial Services companies include banks, insurance companies, brokerage firms and other related investments where the nature of the activities is predominantly financial. Up to 20% of the value of the unit portfolio may be invested in other portfolios.

Other: The assets of the Sanlam Multi-Services Fund (formerly the Sanlam Financial & Services Trust Fund) were merged with the Sanlam Financial Fund with effect from May 2nd, 2003.

NedGroup Inv Rainmaker A

Fund Manager: Tim Allsop

Objective: The Nedgroup Investments Rainmaker fund seeks to follow an investment policy which will aim to achieve superior medium-to long-term capital growth through careful stock selection and exposure to selected themes within the equity market, both locally and abroad.

Benchmark: Unit Trust Mean (General equity sector)

Universe: Securities will be in financially sound companies and may be either large, medium or small cap stocks, selected predominantly from all sectors of the JSE, also allowing for offshore investments as legislation permits.

Does your fund invest offshore? No

Preferred Liquidity Level: Our view is that investors come to us for equity exposure, we do not look to second guess their decision. Our equity exposure ranges between 85% and 100%.

Future Growth Albaraka Equity

Fund Manager: Saliegh Salaam

Objectives: This fund provides investors with cost effective access to a broad spectrum of JSE listed investments. It is a well-balanced equity portfolio designed to provide medium to long-term capital growth at a moderate level of risk.

Benchmark: FTSE/ JSE All Share Index.

Universe: Investments in an Islamic Fund are bought on the understanding that the return is dependent on the profit or loss of the fund and therefore cannot be guaranteed. In addition, the amounts pooled together must be invested in companies acceptable to Shari'ah Law. It is therefore not permissible to acquire the shares of companies involved in liquor, pork, gambling, pornography or financial institutions. Similarly, companies that pay interest on borrowings of deposit their surplus in interest bearing accounts are not strictly Shari'ah compliant. However, such Shari'ah compliant companies are rarely found in today's stockmarkets. For this reason, the fund has an advisory board to assist and advise on Shari'ah compliance consisting of the following: Justice(Ret.) Mufti Mohammed Taqi Usmani, Dr Imran Ashraf Usmani, M S Omar, Mufti Zubair Bayat

Oasis Crescent Equity

Fund Manager: Adam Ebrahim & Michael Swingler)

Objectives: This fund is a medium to high-risk investment vehicle with a primary objective of protecting capital. The secondary objective of the fund is to grow capital based on stock selection criteria.

Benchmark: Dow Jones Islamic Market Index

Universe: The fund manager is mandated to invest on both local (85%) and international (15%) stock exchanges. The fund is managed in accordance with Sharie'ah Law, which requires an analysis of the underlying investments' core business activity and source of revenue to ensure that these activities are acceptable. The fund does not invest in companies that manufacture or market alcohol, pork, pornography, gambling, insurance or other financial services as well as companies that are highly geared. The following individuals advise the Crescent Equity Fund on Shari'ah investments: Shaykh Yusef DeLorenzo, Dr Dayd Bakar, Shaykh Nizam Yaquby and Mr Shaheen Ebrahim.

Allan Gray Equity A

Fund Manager: D. Govender, A. Lapping, D. Artus, I. Liddle, Orbis Investment Management Limited

Objectives and benchmark: The objective of the fund is to earn a higher total rate of return than that of the average of the South African equity market as represented by the All Share index, including income, without assuming greater risk.

Universe: The fund invests in equities offering superior fundamental value. The fund manager's experience is that equity investing based on this "value approach" offers not only higher returns over the long term, but also less risk of loss. Superior value is determined by comparing the price of the share to its intrinsic or underlying value. The investment approach is long-term in nature and as such the Fund does not actively participate in short-term trading.

Does the fund invest offshore? No

Preferred liquidity level: We believe that if someone invests in an equity fund they want to be exposed to equities, we therefore would tend to keep the fund close to fully invested most of the time

Investec Equity R

Fund Manager: G. Daniels

Objectives and benchmark: The objective of the fund is to earn a higher total rate of return than that of the average of the South African equity market as represented by the All Share index, including income, without assuming greater risk.

Universe: The fund invests in equities offering superior fundamental value. The fund manager's experience is that equity investing based on this "value approach" offers not only higher returns over the long term, but also less risk of loss. Superior value is determined by comparing the price of the share to its intrinsic or underlying value. The investment approach is long-term in nature and as such the Fund does not actively participate in short-term trading.

Does the fund invest offshore? No

Preferred liquidity level: We believe that if someone invests in an equity fund they want to be exposed to equities, we therefore would tend to keep the fund close to fully invested most of the time

Prudential Equity A

Fund Manager: G. Quin

Objective: The fund will seek to provide broadly based exposure to shares that offer value and medium to long term growth. Shares that offer value are those that are undervalued relative to their sector, earnings potential and growth potential.

Benchmark: All Share Index

Fund strategy: The fund aims to stay fully invested (subject to legislative constraints).

Does your fund invest offshore? We can invest offshore if we wish. However for this to happen w would need a situation where we believe both the JSE and the Rand is expensive.

Preferred Liquidity Level: The fund manager aims to keep the fund fully invested 93% to 100% of the time.

Other: There is an incentive based fee. 10% of the fund's outperformance of the All Share Index provided that the nominal return is greater than zero.

Stanlib Capital Growth

Fund Manager: R. Middleton

Objectives: The Stanlib Capital Growth Fund's primary objective is to achieve medium to long term capital growth. The generation of income is secondary to the maximising capital growth.

Benchmark: FSTE/ JSE All Share Index

Universe: The fund manager can invest in any company on the JSE, excluding investments in the mining sector. The fund manager will seek out 'growth' companies. These are companies whose earnings are on or anticipated to enter a strong and sustainable upward trend, typically trading on higher than average price to earnings ratios.

Other: New investors should invest in the "A" class of this fund. However, investors who wish to transfer investments from an "R" class investment have access to the "R" class of this fund. Investors looking for a longer performance history for this fund should refer to the R class of this fund.

RMB Strategic Opportunities R

Fund Manager: A. Vincent

Objectives: The RMB Strategic Opportunities Fund aims to offer investors outstanding growth potential over the longer term.

Benchmark: The benchmark of the fund is the average performance of other funds in the same sector.

Please note: With effect from July 1st 2004, new investors should invest lump sum and debit orders in the A class of the fund.(RSOA) The R class will be open to existing debit orders.

Sanlam Growth

Fund Manager: J. de Bruijn

Objectives: The fund seeks maximum capital appreciation as their primary investment objective through predominantly investing in growth shares.

Benchmark: FTSE/ JSE All Share Index

Universe: The fund manager is mandated to invest across the spectrum of the JSE. The fund has a higher risk profile than those who normally invest in a general equity fund. The fund can also invest in foreign markets.

Old Mutual Industrial

Fund Manager: S. Minnaar

Objectives: The fund aims to offer superior returns over the medium to longer term. It achieves this by selectively investing in a focused portfolio of listed industrial companies. The fund aims to achieve its performance objective through well researched and superior share selection

Benchmark: Category Average

Universe: The Fund may invest in all JSE-listed industrial companies. The fund manager may not invest offshore.

Coronation Industrial

Fund Manger: D. Kotze & K. Leinberger

Objective: The Coronation Industrial Fund is a specialist growth fund which follows an investment objective of capital growth and income

Benchmark: FTSE/ JSE Financials Index

Universe: The fund is mandated to invest in companies that are listed in the Industrial sector of the Johannesburg or other Stock Exchanges. This fund has no capacity for offshore exposure.

Kagiso Top40 Tracker

Fund Manager: G. Wood

Objectives: The Kagiso Top 40 Tracker Fund is a specialist equity fund which is designed to replicate the performance of the top 40 shares of the JSE /FTSE Africa Index over time. The share portfolio is a selection of financially sound ordinary shares as indicated in the All Share Index.

Benchmark: JSE/ FTSE Africa Top 40

Universe: The fund manager aims to track the movements and replicate the performance of the JSE / FSTE Africa Top 40 index over time by investing in the correct ratios, weightings and proportions of the top 40 shares. The fund manager also uses derivatives to take advantage of undervalued shares and uses efficient trading strategies to minimise fund costs. This fund has no capacity for offshore exposure.