Do mutual fund managers beat the market? Evidence from the Johannesburg Stock Exchange

by

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DECLARATION

I, Thembumenzi Phinda Kunene, student no. 448925, declare that the research work reported in this dissertation is my own, except where otherwise indicated and acknowledged. It is submitted in partial fulfilment for the Master of Management in Finance and Investment degree at the University of the Witwatersrand. This has not been submitted before for any degree or diploma in any other university or institution for a similar qualification.

_____ DATE: _____

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Table of Contents

ABSTRACT

South Africa has been mirroring the global increase in investments made in mutual funds. This rise in assets managed by mutual fund managers has been coupled with rising curiosity among investors, as to whether fund managers are able to outperform the market. The rising curiosity of investors has been translated into a wide debate in literature documented since the early days of Treynor (1965), Sharpe (1966) and Jensen (1968), and most recently Bradfield and Swartz (2001) and Nana (2012).

This study adds to the existing literature by using top ten performing equity unit trusts in South Africa. In particular, three questions are asked; (a) are there any fund characteristics that influence fund performance? (b) is there evidence of persistence in performance of funds? (c) do mutual fund managers beat the market?

Regression analysis and Jensen's CAPM model are employed to answer the three questions. The results of this study are therefore three fold. Firstly, it is found that fund risk, find size and fund age have no effect on mutual fund performance. Secondly, evidence of weak short-term persistence is found, since for all of the funds under investigation persistence does not happen regularly. Lastly, and more importantly, the top ten performing equity unit trusts over the decade ranging from January 2006 to December 2015 are able to outperform the market, as represented by the Johannesburg Stock Exchange All Share Index (JSE ALSI). These unit trusts produce superior or abnormal returns which are approximately 0.47% more than that produced by the market. We argue that such marginal outperformance might just be a mere representation of superior skills possessed by the selected fund managers and cannot be extended to the entire South African unit trust industry.

Key words: Mutual Funds, Unit Trusts, JSE ALSI, outperformance, abnormal returns.

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction

The purpose of this study is to provide an evaluation of the performance of mutual funds or "unit trusts", as they are known in South Africa. The study investigates whether mutual funds outperform the market (as depicted by the JSE All Share Index), using data from top ten equity mutual funds in South Africa.

Both individual and institutional investors, like insurers and pension funds, extensively use professional money managers. Worldwide, enormous amount of money is invested in mutual funds or hedge funds. A recent report by the Investment Company Institute (ICI) estimates that the global mutual fund industry has experienced a growth of more than sevenfold in the last decade, with assets under management increasing from $4 trillion in 1993 to $29 trillion in September 2013 (ICI, 2013).

The South African mutual fund industry seems to have been following the global trend. South Africa started with a single equity fund in 1965 (The Sage Fund, with R600 000 assets under management), as confirmed by Knight and Firer (1989). This industry has grown to R1.8 trillion assets under management in June 2015 (ASISA, 2015).

Within the modern asset pricing framework, there have also been a lot of studies focusing on mutual fund returns rather than stock returns. Grinblatt and Titman (1992), Hendricks, Patel and Zeckhauser (1993), Carhart (1997) *inter alia* started the discussion of mutual fund performance persistence. As for the issue whether an average mutual fund manager is able to outperform the passive benchmark before and after fees, the evidences are mixed. Grinblatt and Titman (1992) found that differences in performances between mutual funds over time exist and attributed this persistence to the ability of mutual fund managers to earn abnormal returns. This result was echoed by Hendricks, Patel and Zeckhauser (1993) who found evidence of short-run mutual fund performance persistence. Their findings showed that recent poor performers do significantly worse than standard benchmarks, while those of recent top performer do better. Contrary to these findings, Carhat (1997) found evidence that common factors in

common and investment expenses explain persistence in equity mutual funds' mean and risk-adjusted returns. He further stated that individual funds do not earn higher returns from following the momentum strategy in stocks, as in Jegadeesh and Titman (1993).

This paper aims to investigate whether mutual funds managers in South Africa are able to earn abnormal returns, that is, are fund managers able to beat the market, as represented by the FTSE/JSE All Share Index?

1.2 Overview of the South African Mutual Fund Industry

This section briefly discusses the history and developments of the South African unit trust industry, as published by the Association for Savings and Investment South Africa (ASISA), in September 2015.

The South African collective investment schemes (CIS) industry celebrated its 50th anniversary in 2015. The country's first unit trust portfolio was launched in June 1965 with assets under management of R600 000. Half a century later, at the end of June 2015, the industry offered investors 1 225 unit trust portfolios boasting assets under management of R1.8 trillion.

Leon Campher, the Chief Executive Officer of ASISA makes the observation that in the first 30 years of its existence the industry grew at a very slow pace. From 1965 to 1995, the CIS industry launched only 84 unit trust portfolios and grew assets under management to R27 billion.

"The stock market crash of 1969, exasperated by the global oil crisis in 1973, resulted in a seven year bear market – the longest in the history of South Africa. Not surprisingly, at the time investors therefore preferred interest-bearing investments to equities. This meant there was little appetite for South Africa's newly launched unit trust portfolios," reads a statement made by Camphor on the acknowledgement of 50 years of the unit trusts industry.

ASISA also notes that the South African CIS industry experienced its most significant growth spurt only after South Africa transitioned to a real democracy. After 1994, the new democratically elected Government opened up the economy and introduced free market policies. In addition, the corporate tax rate was halved over the past 20 years, from 55% to 28%. As a result, in the 10 years from 1 July 1995 to the end of June 2005, the number of portfolios increased almost sevenfold to 570 and assets grew to R384 billion. From 1 July 2005 to the end of June 2015, the number of portfolios more than doubled to 1 225, with assets under management at a historic high of R1.8 trillion.

Campher says assets managed by the local CIS industry exceeded the R1-trillion mark for the first time at the end of March 2012. "It was a proud moment when assets under management stood at a record breaking R1.02 trillion at the end of the first quarter 2012, from R996-billion at the end of December 2011." At that point the number of portfolios was 945.

Table 1.1 below shows the growth of the South African CIS industry, as reported by ASISA (September, 2013) for 50 years ending at 30th June 2015.

Table 1.1: South African CIS industry – Growth over 50 years

Date	Assets under Management	Number of Portfolios	Number of CIS Companies
June 1965	R600 000	1	1
June 1975	R353 million	11	11
June 1985	R1.3 billion	13	9
June 1995	R27 billion	84	18
June 2005	R348 billion	570	26
June 2015	R1.8 trillion	1 225	48

Source of data: ASISA media release, September 2015

The media release by ASISA asserts that South Africa's first unit trust portfolio, the South African Growth Equities (SAGE) Fund, was launched on 14 June 1965. The Sage Fund survived a number of mergers and acquisitions and still exists

today. Known as the Momentum Equity Fund, South Africa's oldest unit trust portfolio is now part of the MMI stable.

South Africa's second oldest unit trust portfolio – the National Growth Fund – was launched on 15 October 1965. This portfolio was taken over by Sanlam very early in its existence and after a few mergers is today known as the Sanlam Investment Management (SIM) General Equity Fund. One of the country's oldest unit trust funds that never changed hands is the Old Mutual Investors' Fund launched in October 1966.

Performance statistics provided by the respective CIS management companies show that R100 invested in one of these three funds in the month that they were launched would have grown to between R133 311 and R275 756 by the end of August 2015 depending on the fund selected (ASISA,2015). This means that investors who invested R100 into one of these portfolios some 50 years ago and left the money to grow would have benefitted from an annualised return of between 16.1% and 17.6% despite the five significant stock market crashes.

1.3 Problem Statement

The study aims to address the following problem:

The global increase in demand of mutual funds mirrors an increase in consumers' confidence in mutual fund performance. However, whether mutual funds outperform the market remains inconclusive. Grinblatt and Titman (1992) found that differences in performances between mutual funds over time exist and attributed this persistence to the ability of mutual fund managers to earn abnormal returns. Contrary to these findings, Carhat (1997) found evidence that common factors in common and investment expenses explain persistence in equity mutual funds' mean and risk-adjusted returns. He further stated that individual funds do not earn higher returns from following the momentum strategy in stocks, as in Jegadeesh and Titman (1993). If investors are not informed of whether mutual fund managers beat the market or not, investors may waste their monies to professional managers, with the hope of getting higher than the

market future returns. It follows that if managers are unable to beat the market, the best option for investors would be to resort to passive index fund investment.

South African unit trusts have been growing along with the global growth in mutual funds. Investors have two available options to manage their investment portfolios; they can either manage their investments on their own or engage in professional fund management, which is where mutual funds come in. The increase in mutual fund globally is thus an indication of an increasing attraction of professional fund management among investors worldwide. Mutual fund performance then becomes of utmost importance to investors, particularly in making them aware of whether mutual funds perform better than the market. Gruber (1996) provides the reasons for holding mutual funds as customer services, low transaction costs, diversification and professional management.

Globally, portfolio managers are continuously looking for trading strategies to beat the market. In an efficient market, however, such trading strategies will not work. This is the essence of the Efficient Market Hypothesis, as proposed by Fama (1970). It is for this reason that the current study will begin by investigating whether the South African market is efficient. Further, McQueen and Thorley (1999) find that it becomes impossible to apply trading strategies perceived to be capable of beating the market to mutual funds because their prices are set by underlying securities. The authors state that some trading strategies come about only as a result of data mining, such that statistically significant variables are only found by chance.

While passive index funds aim to benchmark the market, active index funds aim to outperform the market through professional management – portfolio selection (Fino and Gallagher, 2002). This paper aims to aid investor making decisions by providing an analysis of the South African mutual fund industry, and investigating whether the top 10 performing unit trust do beat the market. The study further adds to existing literature by trying to identify mutual fund characteristics influencing mutual fund performance in South Africa.

1.4 Objectives of the Study

The main objective of the current study is to provide an analysis of the South African mutual fund performance. This objective will be met by answering the question, 'Do the top 10 Professional Fund Managers outperform the market? The case of the Johannesburg Stock Exchange.'

Prior to addressing the above mentioned objective, the study will begin by answering the following questions, as motivation to the main objective above:

I. Is there persistence in mutual funds' performance in South Africa?

II. Is it possible to find mutual fund characteristics influencing South African mutual fund returns?

III. Do fund managers beat the market?

1.5 Hypothesis

Under the null hypothesis of no performance persistence, no funds are expected to sustainably achieve higher returns than the market, i.e. no funds are expected to outperform/beat the market.

1.6 Significance of the Research

This research is significant because it will serve to aid investors whether investing in active mutual funds is superior to index funds investing. This research will serve as an investment decision making tool to investors in the South African market.

1.7 Mutual fund common terminology

Open-end mutual funds are those funds whose shares are bought and sold on demand at their net asset value (NAV). Investors approach the fund directly for buying shares, and in turn, the fund stands ready to buy back any amount of shares from investors who decide to liquidate their holdings. For these kind of funds, the NAV is calculated at the close of every trading day and is based on the value of the fund's underlying assets (Bankrate, 2014).

Closed-end mutual funds are those mutual funds whose number of shares are fixed and thus only traded between investors on an organised exchange. Since they are similar to stocks, their shares often trade at a discount or premium to their NAV as determined by supply and demand forces (Bankrate, 2014).

An Index is a statistical measure of performance of a group of securities in a security market.

The JSE All Share Index (JSE ALSI):

According to FTSE Russell (2016), "The FTSE/JSE Africa Index Series is designed to represent the performance of South African companies, providing investors with a comprehensive and complementary set of indexes, which measure the performance of the major capital and industry segments of the South African market. The FTSE/JSE All-Share Index represents 99% of the full market capital value i.e. before the application of any investability weightings, of all ordinary securities listed on the main board of the JSE, subject to minimum free-float and liquidity criteria."

Actively Managed Funds vs Passive Funds:

A fund is actively managed if it dedicates an investment team or manager that decides on how to invest the fund's money. This is contrary to passively managed funds which simply tracks a market index and thus does not have a management team which decides on asset allocation.

1.8 Outline of the study

The current chapter served as an overview of the research paper, and provided a background through which the study will proceed. The rest of the paper will proceed as follows:

Chapter 2: Literature review

Chapter 3: Data and Methodology

Chapter 4: Empirical Analysis

Chapter 5: Conclusion and Recommendations

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Literature on portfolio evaluation is massive and dates back to the 1960s, with the classic papers by Treynor (1965), Sharpe (1966), and Jensen (1968). Treynor (1965) was the first to introduce the use of risk-adjusted return measure of performance and asserted that investors want their expected return based on the risk they take when purchasing units of securities. Sharpe (1965) found a lower reward-to-variability ratio than that of the Dow Jones index, for 34 mutual funds in the United States for the period between 1954 and 1963. Jensen (1968) developed further on the works of Sharpe by using the asset pricing model to evaluate the performance of 115 US mutual funds. Jensen (1968) introduced alpha in the context of a single index model as a regression of the market excess return on the fund excess return.

The academic literature on mutual funds and hedge funds is fairly large and increasing. From an academic perspective, assessing the performance of these investment vehicles is an important test of market efficiency. Persistence patterns in fund performance (i.e. the observation that some professional fund managers systematically outperform others, including passively managed index funds) would be inconsistent with the semi-strong form of the Efficient Market Hypothesis. One of the most authoritative papers in this stream of literature is that of Hendricks, Patel and Zeckhauser (1993). In this study, the authors report that mutual funds that performed well over the past period tend to do so in the near future, and vice versa. While Elton, Gruber and Blake (1996) come to similar findings, Carhart (1997) demonstrates that almost all of this predictability is explained by exposures to common risk factors. After correcting for these risk factors, practically all persistence disappears. Nonetheless, Bollen and Busse (2005) do find persistence in fund performance beyond over shorter periods of time. Their results suggest that a short measurement horizon provides a more precise method of identifying future top performing funds.

Even though empirical evidence does not appear to unambiguously indicate that some fund managers are able to generate superior performance, investors appear to chase

past winners (e.g. see Sirri and Tufano, 1998). While past winning funds are rewarded with large cash inflows, losers are not equally penalized with cash outflows. Studies by among Gruber (1996) and Zheng (1999) report a "smart money" effect; the authors find that funds that receive more money subsequently perform better than those that lose money. Wermers (2003) also concludes that money is smart in chasing winners, but argues that this effect might be a self-fulfilling prophesy.

On the other hand, some authors argue that fund managers exploit return chasing behavior to maximize assets under management. For example, Brown et al. (1996) find that halfway each calendar year, losing fund managers tend to take more portfolio risk to increase the probability to end the year among the winning funds. On the other hand, winning fund managers seem to "lock-in" performance when they are ahead. Brown et al (2001) document similar behavior when they investigate this "tournament-behavior" among CTA's (commodity trading advisors) and hedge funds.

Cooper, Gulen and Rau (2005)provide even more striking evidence of seemingly irrational behavior by mutual fund investors when allocating assets across mutual funds. They find that cash flows to funds increase dramatically when funds change their names to look more like the current "hot" return styles. In fact, this relationship even seems to hold for the funds whose holdings after the name change do not materially reflect the style implied by their new name, and is the strongest among funds with the greatest increases in marketing expenditures (and ironically the lowest subsequent performance).

Asset returns may contain risk premia that compensate investors for bearing a variety of uncertainties in their investment portfolios. Capital Asset Pricing Models (Sharp, 1964; Lintner, 1965; Black, 1972) have been extensively studied and used to test the existence of other risk factors besides the market portfolio. Fama and French (1992, 1993) introduced size and value factors, which started the new and enthusiastic discussions and studies on asset pricing. There have been a plethora of studies investigating the relationship between risk factors (market, value, size, momentum, liquidity, inflation and so on) and the cross-section of stock returns; for example Bodie, Kane and Marcus (2004), Carhart (1997), Ciccotello and Grant (1996), Grinblatt and

Titman (1984), Bauer, Koedijk and Otten (2005), and Berk and Green (2004) to name a few.

Within the modern asset pricing framework, there have also been a lot of studies focusing on mutual fund returns rather than stock returns. Grinblatt and Titman (1992), Hendricks, Patel and Zeckhauser (1993), Carhart (1997) *inter alia* started the discussion of mutual fund performance persistence. As for the issue whether an average mutual fund manager is able to outperform the passive benchmark before and after fees, the evidences are mixed.

Cuthbertson, Nitzsche and O'Sullivan (2006) employ performance based measures and characteristic based measures in their evaluation of US and UK based mutual funds. Performance based measures used in their analysis include factor models such as the unconditional model, the conditional model, market-timing determination models. The authors found that about two to five percent of the funds outperform their benchmark while approximately 20 to forty percent of the funds underperformed the benchmark. Load fees, expenses and turnover were found to impact fund performance. Further, no evidence of market timing was found, with evidence suggesting persistence of past winners and persistence of past losers.

Most recently Nallareddy and Ogneva (2017) embarked on an investigation of a link between accrual quality and systematic risk. The authors find that, against much accepted theoretical literature, poor accrual quality is linked with a large risk premium in the cross section of realized stock returns. The authors argue that previously, premium estimates were biased downwards hence the previous results documented in literature. It is also found that mutual funds are less exposed to deteriorating fundamentals than random stocks possessing the same accrual quality. Further, mutual funds' returns have a high accrual quality premium.

Sherrill, Shirley and Stark (2017) are also among the recent authors join the mutual fund debate. These authors engage in a study to investigate performance of actively managed funds holding passive investments, by ascertaining what exchange-traded

funds (ETFs) positions imply on mutual fund ability. It is found that actively managed funds that invest a large portion of their funds in ETFs perform poorly, as well as possess poor market-timing ability and engage in large cash holdings. On the contrary, determine whether.

This study aims to contribute to existing literature not only by focusing on South African mutual performance, but by also investigating whether there exist certain attributes of mutual fund that influence their returns.

2.2 Persistence in mutual fund performance

Grinblatt and Titman (1992) were among the first to explore whether past performance plays a role in mutual fund performance, since the classic papers by Jensen (1968), Beebower and Bergstrom (1977), and Lehmann and Modest (1987). In this paper, persistence of abnormal returns (outperformance) is investigated using a three-stepwise procedure. Ten-year sample of fund returns is split into two groups of five-year sub-periods, after which abnormal returns of each fund for each of the two sub-periods are calculated. In the final step, to test for the null hypothesis that past performance has no effect on future performance the authors employ a cross-sectional regression of abnormal returns computed from the last five years of data (second sub-group) on abnormal returns computed from the first five years of data (first sub-group). A slope coefficient in this regression represents the relationship between past performance and future performance. Once the tests have been performed, Grinblatt and Titman (1992) conclude that that positive persistence in mutual funds exists, i.e. past performance is positively related to future performance. The authors attribute this persistence in abnormal returns to portfolio managers' skills. These results are consistent with existence of persistent differences in fees and transaction costs across funds, although the authors demonstrate that these are not the only explanation for the results. Moreover, the persistence cannot be attributed to inefficiencies that exist as a result of the benchmark used. The said inefficiencies are related to firm size, dividend yield, past returns, skewness, interest rate sensitivity, or the Capital Asset Pricing Model (CAPM) beta.

As an expansion to already rich literature in fund performance, Carhart (1997) controlled for survivor bias and included common-factor and cost-based explanations to mutual fund performance. The author argues that existence of persistence in mutual fund performance cannot be attributed to fund managers' superior skills in selecting stocks. Carhart (1997) uses the CAPM model and his Carhart (1995) 4-factor model to test to evaluate persistence in performance of mutual funds and came to three conclusions. Firstly, there is evidence of persistence of poor performance in mutual funds. Secondly, funds producing high performance in the past year are likely to produce higher than average returns the following year, however, this trends tend to fall in subsequent years. Lastly, Carhart (1997) found a negative relationship between performance and expense ratios, transactions costs, and load fees.

Bollen and Busse (2005) use the four-factor model and two timing models to test for persistence in mutual fund performance. Based on these models, performance persistence of stock selection and market timing abilities of mutual fund managers is investigated in deciles of funds (deciles are based on stock picking and market timing abilities of mutual funds). The results obtained by these authors show that out-performance of the market, or 'superior performance' at the call it is a short run phenomenon. Superior performance is only observable in the short-run when funds are evaluated several times in each year. This is evident because the quarterly abnormal returns (superior returns) ranking of funds disappears when funds are evaluated over a long time. In an effort to address possible misspecification by those who found persistence in superior performance, Bollen and Busse (2005) allow switching strategies by fund managers over time. This follows since the authors note that the strategy followed by mutual fund managers changes overtime and thus unobservable.

In the 2013 SAAA Biennial Conference proceedings, Nana (2012) embarked on an empirical investigation of persistence in performance mutual funds in South Africa over the period from 2001 to 2010. The author achieves this by employing six performance measures which are in turn subjected to three tests of persistence in performance. The six performance tests are Nominal returns, Sharpe ratios, Capital Asset Pricing Model alphas, Fama and French 3 –factor alphas, Carhart 4-factor alphas, and Ferson and Warther conditional alphas, all of which are then subjected to contingency tables, rank

tests and time series regressions. Spearman's Rank Correlations and Chi square tests (coupled with contingency tables) find evidence of some persistence in performance. Performance of this nature, however, is measured in terms of relative performance. Nana (2012) found that when using repeat performance rank tests evidence of mutual fund persistence is found, more so in 'loser' funds than 'winner' funds. Time-series regression analysis gives contrary results in that for the most part, evidence of persistence in performance of unit trusts is not found. In their conclusion, the authors assert that their study was unable to come up with conclusive evidence to support the existence of persistence in the performance of unit trusts in South Africa. Time periods, methodology and performance models all have a bearing on the results found by the authors.

2.3 Is it possible to find mutual fund characteristics influencing mutual fund returns?

In this section, the study seeks to investigate whether one, a priori, can be able to identify characteristics that are able to influence the performance of mutual funds. Each of the characteristics that are addressed in literature are discussed below:

2.3.1 Risk

Beta is a widely accepted measure that accounts for the risk involved in investing in mutual funds. According to Bodie, Kane and Marcus (2004), beta measures the risk associated with a company or securities portfolio (systemic risk) relative to market risk. Market risk has a beta of one, thus a higher than one beta implies higher risk compared to the market. Conversely, a beta of less than one is an indication of lower risk than that of the market (Bodie et al, 2004).

2.3.2 Fund Size

Carhart (1997) found that mutual fund size, as measured by total net asset (TNA) value was insignificantly related to performance of mutual funds.

In a quest to find more about the determinants of the bid/ask spread, Glosten and Harris (1988) devised a two-component based time series model, using data from common stock in the New York Stock Exchange (NYSE). This model split the bid/ask spread into asymmetric information component and transitory component (consisting of inventory costs, specialist monopoly power and clearing costs). This model had already been documented by authors like Niederhoffer and Osborne (1966), Roll (1984), and French and Roll (1986), to name a few. In addition to the already existing model, Glosten and Harris (1988) incorporated an adverse-selection component to their model. They did this to do away with serial correlation which is prevalent in the transitory component of the model. This new estimation model by Glosten and Harris (1988) then ensured that the adverse-selection bid/ask spread component depend on order size, that is, the spread depends on the quantity traded. In their results, the authors found that funds that are large in size tend to trade at more favourable spreads than smaller funds. This can be attributed to larger funds' market position and the large trading volumes they engage in. This in turn can favour large funds' performance compared to funds that are relatively smaller.

Ciccotello and Grant (1996), in their study of the relationship between equity funds performance and size, pointed out that large mutual fund possess the advantage of being in more beneficial positions compared to smaller funds. However, these authors found that while funds that are very successful grow sharply as a result of investors being drawn by good past performance, as the funds grow, they tend to be outperformed by smaller aggressive funds. Ciccotello and Grant (1996) further suggest that investors should pick smaller mutual fund in favour of larger mutual funds, due to the former's aggressive growth opportunities.

Chen, Hong, Huang and Kubik (2004) also investigated whether mutual fund size has an effect on fund performance. The authors investigate this relationship by concentrating on actively managed funds using mutual fund data spanning from 1962 to 1999 which was retrieved from the Center for Research in Security Prises (CRSP). Chen et al (2004) aim to aid investors by determining whether economies of scale play a role in fund performance, an area which the authors feel has not been researched enough. A cross-

sectional variation method is employed to find the effect of lagged fund size and fund performance. In their study Chen et al (2004) acknowledge that fund size is most likely to be correlated with other fund characteristics, thus lagged fund size is regressed together with these other fund characteristics. This study revealed the strong evidence of existence of diseconomies of scale in that large funds tend to underperform, i.e. mutual funds' performance was found to be negatively related with its lagged size (as represented by its asset under management). This inverse relationship, as explained by Chen et al (2004), is as a result of the "liquid hypothesis' which can be simply understood to imply that large funds are most likely to be exposed to large trading costs associated with their tendency to pick illiquid stocks which are more pricey. Thus, smaller funds which invest all their funds in the best stocks tend to perform better. To summarize their findings the authors state that, "To the best of our knowledge, we are the first to find strong evidence that fund size erodes performance." These findings were consistent with those of Perold and Salomon (1991).

It is apparent that inconclusive results exist in the study of the impact of mutual fund size to its performance. This is most clearly shown in the study by Grinblatt and Titman (1984), who found evidence of superior performance in gross returns in smaller asset-size quantiles of mutual funds. However, net of expenses, returns in the same smaller asset-size quantiles become the same as those returns from larger quantile funds. Thus, the authors find mixed evidences. These findings then motivate further investigation of the effect of fund size on mutual fund performance, which the current study seeks to carry out in the South African environment.

2.3.3 Fees

Elton, Gruber, Das and Hlavka (1993) assert that since load cost of purchasing mutual funds is not a deductible item in calculating fund returns, load cost funds need higher superior returns (alpha) in order to be attractive to investors. However, the results obtained by the authors show that load cost funds turn out to have lower alphas, irregardless of the index model used. Thus, no evidence of compensation in the form of higher returns exists for load cost funds.

Contrary to the widely publicised claim by load funds that their fund managers are more highly skilled and lower investment expenses compared to no load funds, Carhart (1997) found the existence of a significant negative relationship between maximum load fees and mutual fund performance. This implies that an increase in load fees leads to a decrease in excess or 'abnormal' returns.

Grinblatt and Titman (1984) found that after fees are taken into account, funds with abnormal returns before deduction of fees then fail to possess indication of superior performance. These authors found evidence of superior performance in gross returns in smaller asset-size quantiles of mutual funds. However, net of expenses, returns in the same smaller asset-size quantiles become the same as those returns from larger quantile funds. Thus, the authors found mixed evidences.

2.3.4 Fund Turnover

On testing for the effect of fund turnover on abnormal returns, Carhart (1997) found that mutual funds fail to recover their investment costs through high abnormal returns, since the author defined turnover coefficient to represent net costs of trading. This was evidenced by the negative relationship that was found to exist between performance and fund turnover.

The results found by Carhart (1997) were the same as those obtained by Elton et al (1993) who used a three index model (which comprised of turnover, expense ratios and load costs). At the 5 percent significant level of a two-tailed test, Elton et al (1993) found that managers fail to obtain high enough returns to offset increased turnover. This was evidenced by the existence of an inverse relationship between fund performance and turnover.

2.3.5 Expense Ratios

Results found by Carhart (1997) reveal that expense ratios are negatively related to performance, meaning that increasing total expenses have a decreasing effect on

abnormal returns. This in turn implies that mutual funds are unable to recover their investment costs by achieving higher abnormal returns.

After employing a three index model, Elton et al (1993) found a negative relationship between fund performance and expenses. This means that the higher the expenses, the poorer the performance of the fund. The authors further asserted that mutual fund managers fail to produce great performance that is enough to offset the high fees.

To summarize his findings on the effect of expense rations on performance, Sharpe (1966) said, "The results tend to support the cynics: good performance is associated with low expense ratios."

2.3.6 Fund Age

Bauer, Koedijk and Otten (2005) investigate the effect of fund age on performance using ethical mutual funds, which have been on the rise in recent years. The authors compared outperformance (as determined by alpha) of ethical versus conventional mutual funds, and found that ethical funds significantly underperform as opposed to conventional ones during their first four years. Thereafter, ethical funds tend to slightly outperform conventional funds. The authors attribute this result to a learning curve in which the newer ethical funds make mistakes, thus trailing the already established older conventional funds. Moreover, the eventual outperformance of conventional funds by ethical mutual funds, according to Bauer et al (2005) could be as a result of newly launched ethical funds which could have learned from the mistakes of previous ones. Bauer et al (2005) found that smaller funds tend to underperform mainly due to their exposure to movements in the markets (i.e. market risk), since they invest in relatively fewer stocks.

Gregory et al (2007) adds to the work by Bauer et al (2005) by reiterating the existence of a learning period in returning mutual funds. These authors thus found that younger funds perform worse compared to their older counterparts. It can therefore be implied that mature funds tend to outperform younger funds. On the hand, Otten and Bams

(2001) found the existence of a negative relationship between fund performance and fund age.

The conflicting results thus demonstrate the need for further investigation of the impact of fund age on fund performance, which the current study investigates using the South African environment.

2.4 Outperformance evaluation models

Sharpe (1966) extended the work of Treynor (1965) by using 34 US open-ended funds and introduced the concept of the reward-to-variability ratio, which is a negative of that originally introduced by Treynor. Sharpe (1966) found that the average reward-to-variability of the funds in the sample was relatively smaller that of the Dow Jones Industrial Average, implying that most funds performed poorly compared to the Dow Jones benchmark. The author argues that grossly speaking the average mutual fund manager is able to select a portfolio at least as good as the Dow Jones, however, after expenses are deducted, shareholders' returns are reduced below the return of the Dow Jones Industrial average.

Berk and Green (2004) speak of the puzzle that most literature has documented that mutual fund managers are unable to produce superior performance and that past performance does not persist, and yet mutual fund investors continue to seek performance. The authors devise a model that combines 3 elements, namely: the competitive provision of capital by mutual fund investors, a differential ability to produce superior returns across all mutual fund managers but there exists decreasing returns to scale in employing the said abilities, and lastly using past returns to learn about the managerial ability. This model of active portfolio management and fund flows then serves as a benchmark against which observed characteristics such as returns, cash flows and outperformance are evaluated. The model developed by Berk and Green (2004) serves as a rational form which then provides empirical regularities which the authors claim previous literature has documented as investor irregularities or agency costs existing between managers and investors. For instance, the authors find that fund managers are unable to outperform certain benchmarks not because of lack of skill but

this is due to the existence of decreasing returns of managers when exercising their superior skills on the competitively supplied funds by investors. Further, the non-existence of evidence of persistence in mutual fund performance is as a result of the competitive provision of capital by mutual fund investors, in contrast with previous literature which interpret this to imply that chasing performance is not optimal since differential ability across managers is not rewarded. Thus, performance is not persistent since investors make rational decisions by using mutual funds' past performance and consequently chase performance.

Lehman and Modest (1987) concluded that choosing what constitutes normal performance is vital in the performance evaluation of mutual funds. This became apparent when the authors discovered that Jensen and Treynor-Black appraisal ratio measures are sensitive to the method employed to come up with the Arbitrage Pricing Theory (APT) benchmark. When ranking the funds, Lehman and Modest (1987) found that rankings were less sensitive to common systematic risk sources perceived to impinge on security returns. Moreover, the authors stressed the vitality of being able to identify the appropriate model for risk and expected return. This is important since the authors found the existence of clearly visible differences between performance measures implied by the APM model versus those implied by APT benchmarks.

The widely used and well documented by previous literature performance measures possess very little ability to detect 'abnormal' or 'superior' performance of large magnitudes such as 3 percent per year (Kothari and Warner, 2001). This is particularly true for those funds whose style differs from those of the value-weighted market portfolio. The authors thus conclude that the known standard performance measures can be considered as unreliable which in turn implies that they can draw the wrong inferences.

Jensen (1968) derived the popular risk-return measure of portfolio performance range widely referred to as "Jensen's Alpha" from Jensen (1967). The author restricts performance to the ability of a mutual fund manager to earn superior returns through selecting securities whose prices he correctly predicts will be higher than what can be expected for the level of risk prevalent in his portfolio. The author then used 115 open

end US mutual funds and compared their performance against the "random selection buy and hold policy". A superior ability by the mutual fund manager to successfully forecast security prices would be reflected by a positive Jensen's alpha. The converse is true. A zero intercept (alpha) is interpreted to represent a random selection buy and hold policy. The negative alpha that was obtained implies that on average the open end mutual funds were unable to accurately predict future security prices such that net of expenses and management fees, the funds perform better that the random hold and buy strategy (Jensen, 1968). Thus, it would seem investors in these funds would be better off randomly selecting and holding securities. Jensen (1968) found the above conclusions to be true even when gross returns of funds were considered.

CHAPTER 3: DATA AND METHODOLOGY

3.1 Selection Process

3.1.1 Selection of mutual funds to be investigated

As the title of the research study implies (i.e. Do portfolio managers beat the market? Evidence from the JSE.), mutual funds under investigation are automatically selected by virtue of being top 10 equity performers in the Johannesburg Stock exchange, as published by Morning Star South Africa. These are then benchmarked against the JSE All Share Index, which represents the securities market in South Africa. As already indicated in the problem statement, the purpose of selecting top performing mutual funds is to ascertain whether these perform better than the JSE All Share Index, or whether investors are better of just passively managing their portfolios through indexing. Based on this criterion, the following ten funds (in descending order) are selected for investigation under the current study:

- SIM Industrial Fund R
- Coronation Industrial Fund
- 36ONE MET Flexible Opportunity Fund A
- Stanlib Industrial Fund R
- Investec Property Equity Fund A
- Catalyst SA Property Equity PSG Fund
- Stanlib Multi Manager Property Fund B1
- Rezco Value Trend Fund A
- Stanlib Property Fund A
- Nedgroup Investments Entrepreneur Fund R

It is noted here that the top performers are largely specialist funds, as evidenced by four funds investing in real estate and three funds investing in industrials.

3.1.2 Data Collection

Bloomberg is the main data source that was easily accessible for data collection purposes. Other sources include Morning Star and I-net Bridge. The data consists of monthly prices of the selected 10 mutual funds spanning for a period of 10 years from January 2006 to December 2015. The data is then converted to monthly compounded returns for analysis purposes. The Johannesburg Stock Exchange All Share Index monthly prices are also collected and converted into monthly compounded returns. The 3 month Treasury Bill rate is collected and used as the risk free rate.

3.1.3 Selection of an appropriate benchmark

According to FTSE Russell (2016), "The FTSE/JSE Africa Index Series is designed to represent the performance of South African companies, providing investors with a comprehensive and complementary set of indexes, which measure the performance of the major capital and industry segments of the South African market." Beta provides a measure of how much a mutual fund moves in relation to the market (Bodie et al, 2003). An Index represents the market. Thus, careful care should be exercised when selectin an appropriate benchmark. Since this study includes equity funds that are completely domiciled in South Africa, the JSE All Share Index will be selected to represent the South African market.

3.2 Fund Profiles

In this section a brief description of the funds under investigation will be given, together with their respective objectives. Further, graphs detailing months compounded returns for each fund will be presented.

As a general observation, it will be apparent from the graphs that all funds have fluctuating returns, presenting evidence of both positive and negative returns throughout the period ranging from January 2006 to December 2015. Moreover, it is important to note that for all ten funds, there is evidence of negative performance

between the years 2007 and 2008. This suggests that all funds were negatively affected by the global 2007/2008 financial crisis.

3.2.1 SIM Industrial Fund R

This fund is an open-end South African incorporated fund. It focuses on capital growth which is achieved through investments in selected shares in the industrial sector. As a result, the SIM Industrial Fund R is mostly suited for investors requiring larger exposure to industrial shares.

Figure 3.1 below shows monthly compounded returns of the SIM Industrial Fund R for the period January 2005 to December 2015.

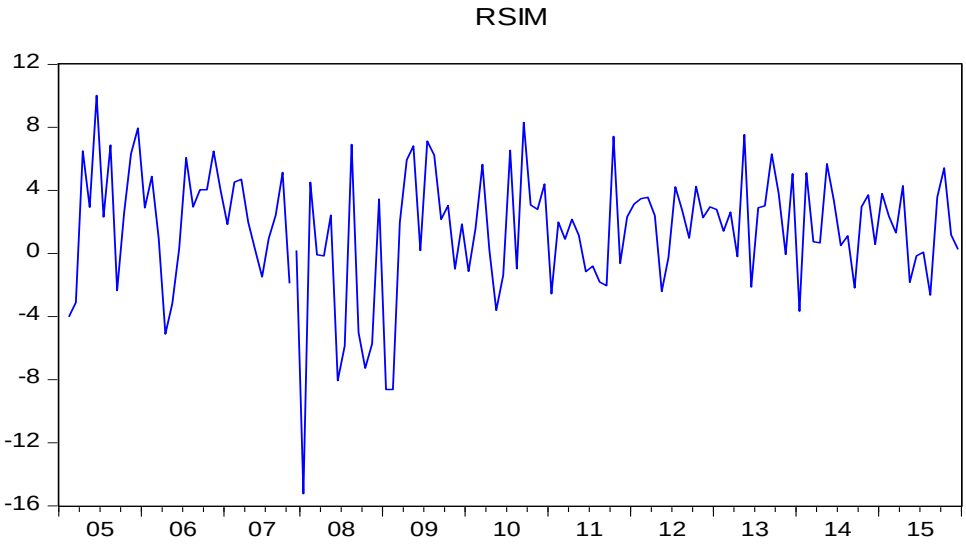

Figure 3.1: Monthly compounded returns of SIM Industrial Fund R

Source of data: Bloomberg

3.2.2 Coronation Industrial Fund

Incorporated in South Africa, Coronation Industrial Fund is a sector-specific fund that invests in a broad range of industrial shares with the aim of achieving long-term capital growth. As a return objective, the fund aims to outperform the FTSE/JSE Industrial Index.

Figure 3.2 below shows monthly compounded returns of the Coronation Industrial Fund for the period January 2005 to December 2015.

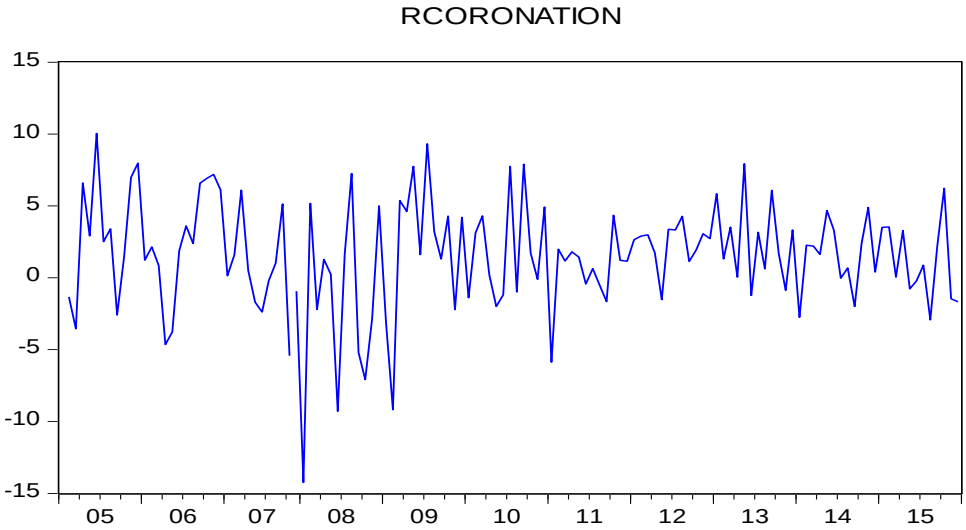

Figure 3.2: Monthly compounded returns of Coronation Industrial Fund

Source of data: Bloomberg

3.2.3 36ONE MET Flexible Opportunity Fund A

This is an open end fund that has been incorporated in South Africa. 36ONE MET Flexible Opportunity Fund's main objective is providing long term capital that is reasonably high. It does this by investing in a variety of equity securities and non-equity securities, as well as those assets that are in liquid form.

Figure 3.3 below shows monthly compounded returns of the 36ONE MET Flexible Opportunity Fund A for the period January 2005 to December 2015.

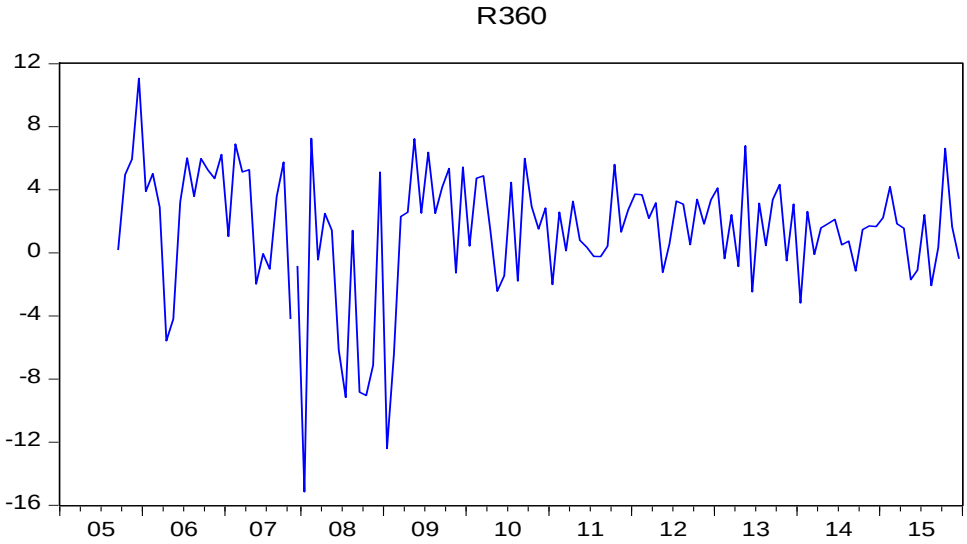

Figure 3.3: Monthly compounded returns of 36ONE MET Flexible Opportunity Fund A

Source of data: Bloomberg

3.2.4 Stanlib Industrial Fund R

This fund is incorporated in South Africa with the aim of achieving capital growth as well as income generation over the long run. Stanlib Industrial Fund R invests its fund on ordinary shares from approved exchanges' industry sectors and at times in other securities (including non-equity securities and preference shares).

Figure 3.4 below shows monthly compounded returns of the Stanlib Industrial Fund R for the period January 2005 to December 2015.

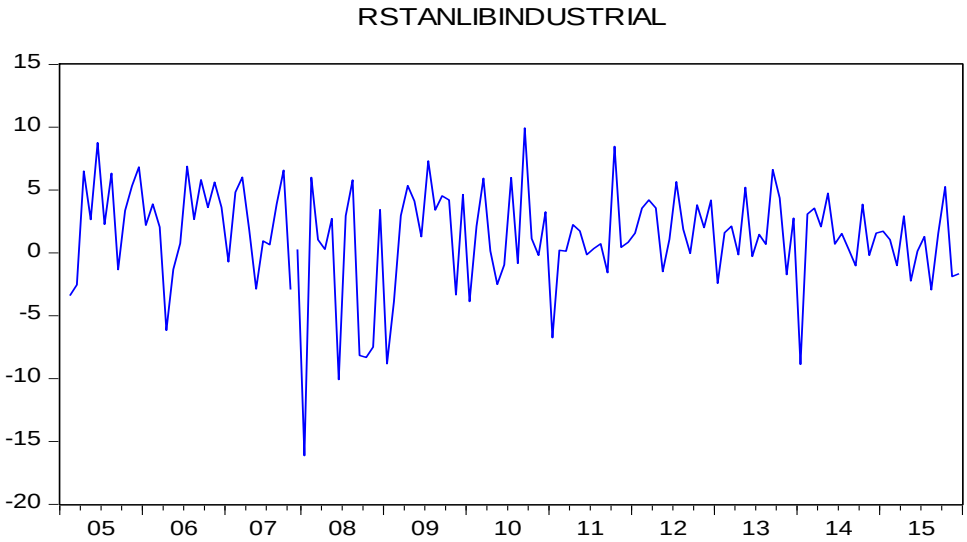

Figure 3.4: Monthly compounded returns of Stanlib Industrial Fund R

Source of data: Bloomberg

3.2.5 Investec Property Equity Fund A

Investec Property Equity Fund A is a South African open end fund. It aims to realise long-term capital appreciation. Further, the fund's target is to beat the SA Listed Property Index, over a period of three years.

Figure 3.5 below shows monthly compounded returns of the Coronation Industrial Fund for the period January 2005 to December 2015.

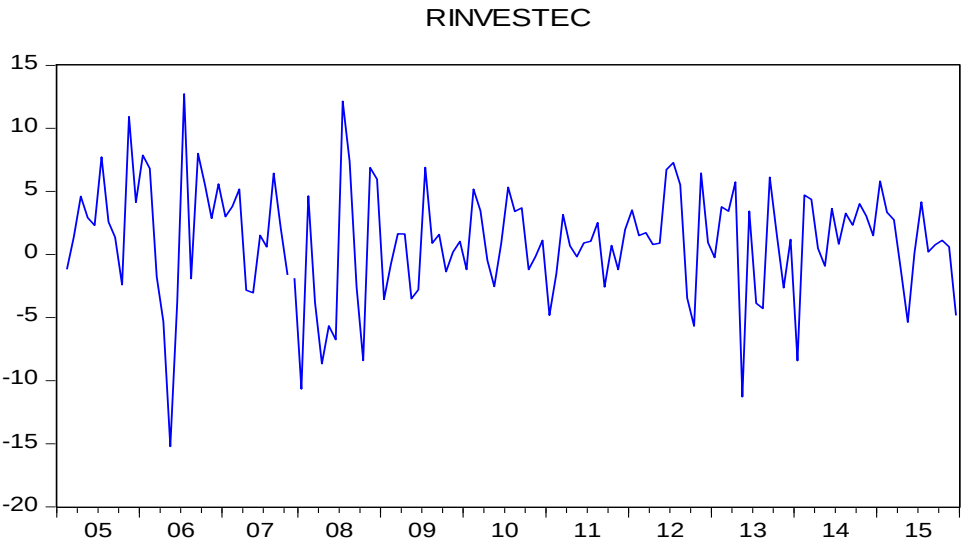

Figure 3.5: Monthly compounded returns of Investec Property Equity Fund A

Source of data: Bloomberg

3.2.6 Catalyst SA Property Equity

This unit trust is incorporated in South Africa and an open end fund. This fund has a medium to longer-term investment horizon, and offers a return that is above that provided by the South African domestic property equity markets.

Figure 3.6 below shows monthly compounded returns of the Catalyst SA Property Equity for the period January 2005 to December 2015.

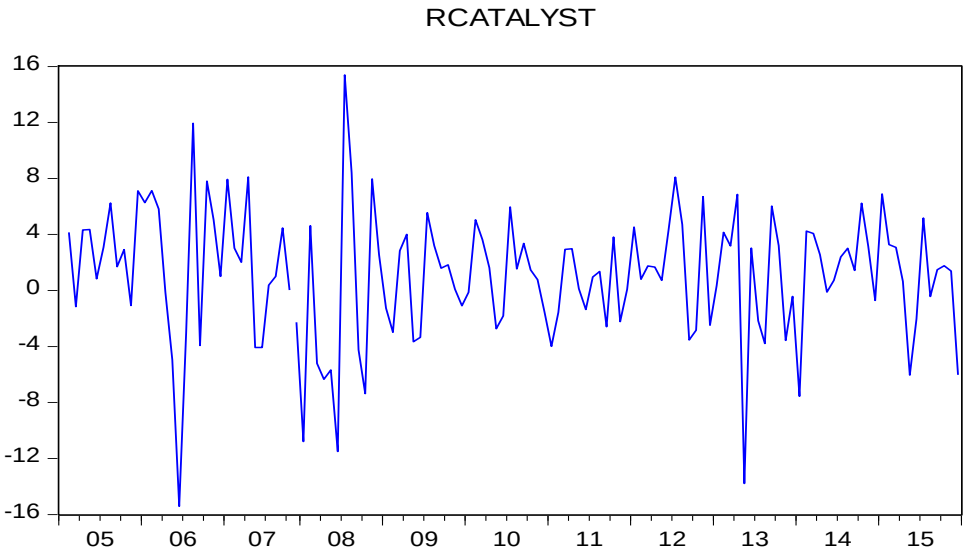

Figure 3.6: Monthly compounded returns of Catalyst SA Property Equity

Source of data: Bloomberg

3.2.7 Stanlib Multi Manager Property Fund B1

This unit trust has been incorporated in South Africa with the objective of providing capital growth and income for investors through making investments in the property sector.

Figure 3.7 below shows monthly compounded returns of the Stanlib Multi Manager Property Fund B1 for the period January 2005 to December 2015.

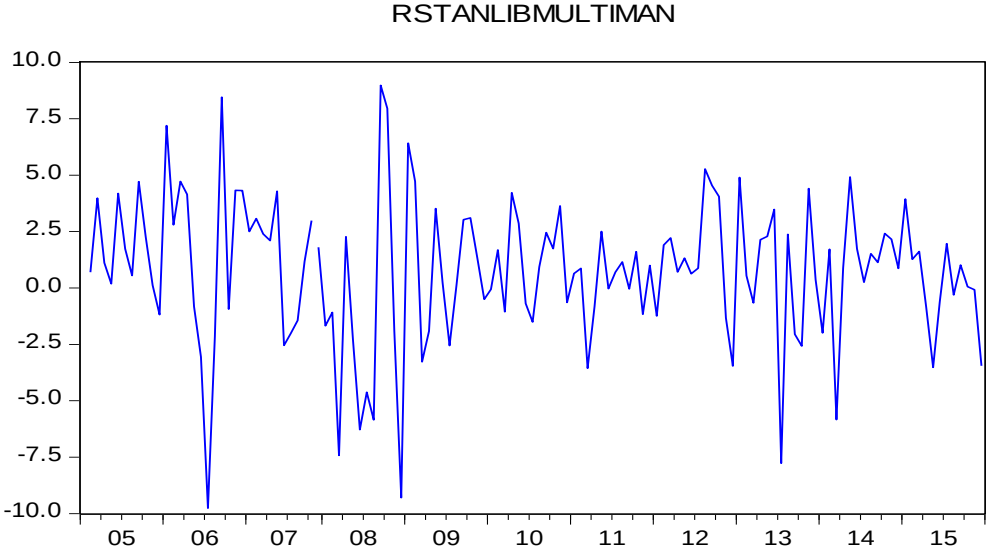

Figure 3.7: Monthly compounded returns of Stanlib Multi Manager Property Fund B1

Source of data: Bloomberg

3.2.8 Rezco Value Trend Fund A

This South African incorporated fund aims at outperforming the South African equity market in the long-term, while minimising exposure to greater risk. The fund provides investors with good returns by preserving capital and creating wealth.

Figure 3.8 below shows monthly compounded returns of the Rezco Value Trend Fund A for the period January 2005 to December 2015.

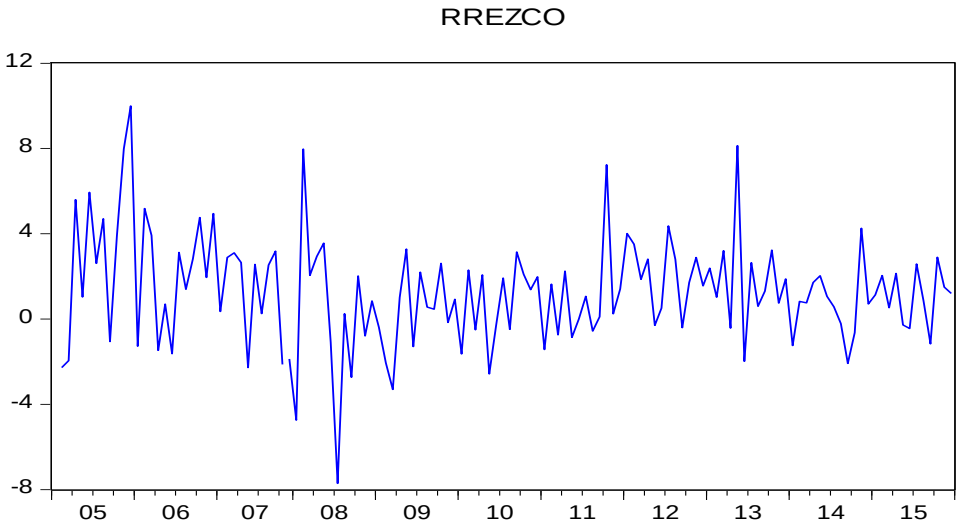

Figure 3.8: Monthly compounded returns of Rezco Value Trend Fund A

Source of data: Bloomberg

3.2.9 Stanlib Property Income Fund A

The Stanlib Property Income Fund is incorporated in South Africa and channels funds to recognised stock exchanges, through investing in financially sound property equity and property related securities. These securities include, but not limited to loan stock, debentures, debenture stock, debenture bonds, unsecured notes. The Stanlib Property Income Fund may invest up to 30% of its funds in fixed income securities.

Figure 3.9 below shows monthly compounded returns of the Stanlib Property Income Fund A for the period January 2005 to December 2015.

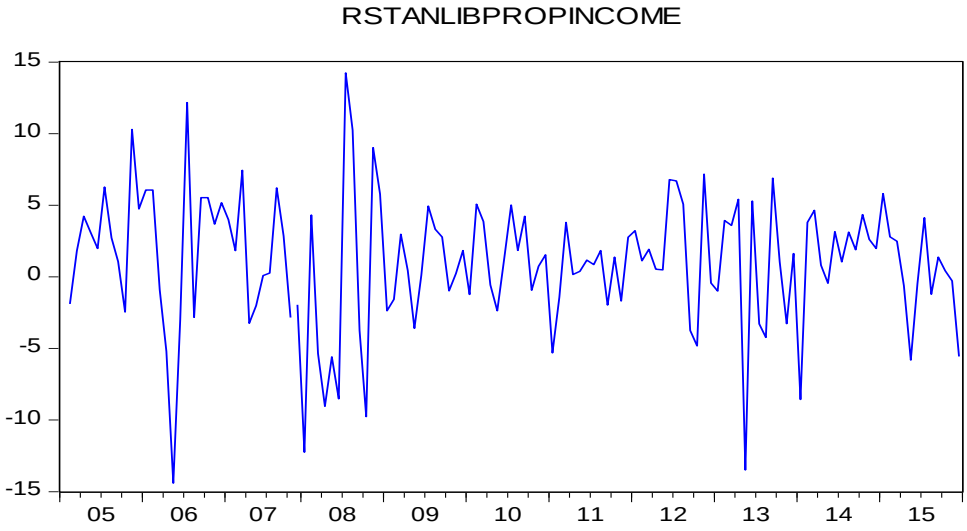

Figure 3.9: Monthly compounded returns of Stanlib Property Income Fund A

Source of data: Bloomberg

3.2.10 Nedgroup Investments Entrepreneur Fund R

This fund incorporated in South Africa provides capital growth in the long term by investing in small to medium companies trading on the FTSE/JSE Mid Cap and Small Cap Indices. The Nedgroup Investments Entrepreneur Fund also invests in companies outside the ALSHI40 Index.

Figure 3.10 below shows monthly compounded returns of the Nedgroup Investments Entrepreneur Fund R for the period January 2005 to December 2015.

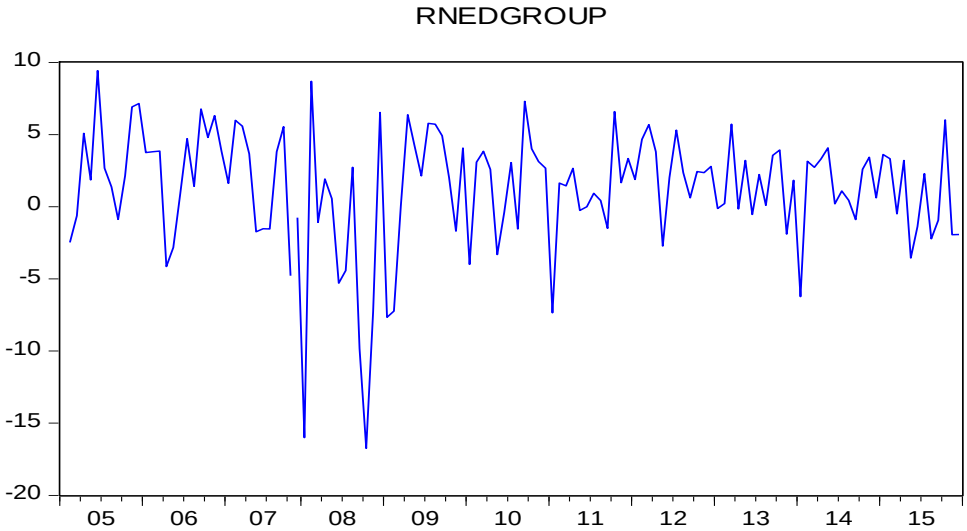

Figure 3.10: Monthly compounded returns of Nedgroup Investments Entrepreneur Fund R

Source of data: Bloomberg

3.3 Descriptive Statistics

Individual fund descriptive statistics are presented in Appendix A, from Figure 3.11 to Figure 3.21. As can be noted from those diagrams funds returns range from a minimum of negative returns to a maximum of positive returns.

3.4 Testing for Normality

To test for normality of the returns, the Jarque-Bera test is performed. The null hypothesis is that the data is normally distributed. As can be seen form Appendix A (Figures 11 to 21), the null hypothesis of normality is rejected for all funds and the Johannesburg Stock Exchange All Share Index.

3.5 Testing for Stationarity

To test for stationery of the returns, the Augmented Dickey Fuller (ADF) test is performed. The null hypothesis is that the data is stationery. If data is not stationary at level, the first difference stationarity is performed. Table 3 presents the results of the ADF test performed on the fund returns data.

Table 3: Stationarity test results

	Level (t-stat, prob.)	**1st Difference**
SIM Industrial Fund R	2.1E-06 (1.0000)	60.4071 (0.0000)*
Coronation Industrial Fund	5.0E-0.5 (1.0000)	56.6302 (0.0000)*
36ONE MET Flexible Opportunity Fund A	0.00065 (0.9997)	23.7058 (0.0000)*
Stanlib Industrial Fund R	0.02120 (0.9895)	61.0172 (0.0000)*
Investec Property Equity Fund A	0.12637 (0.9398)	46.4033 (0.0000)*
Catalyst SA Property Equity PSG Fund	0.14017 (0.9323)	53.6302 (0.0000)*
Stanlib Multi Manager Property Fund B1	0.38222 (0.8260)	50.5631 (0.0000)*

Rezco Value Trend Fund A	0.00049 (0.00049)	65.1320 (0.0000)*
Stanlib Property Fund A	0.20308 (0.9034)	47.3740 (0.0000)*
Nedgroup Investments Entrepreneur Fund R	0.01591 (0.9921)	51.7122 (0.0000)*
JSE All Share Index		71.2891 (0.0000)*

* denotes stationarity at the 1% level.

As evidenced from Table 3 above, the fund return data to be used in this study is not I(0) stationary. However, once the first difference is performed the data becomes stationary (i.e. I(1) stationarity).

3.6 Hypothesis

Under the null hypothesis of no performance persistence, no funds are expected to sustainably achieve higher returns than the market, i.e. no funds are expected to outperform/beat the market.

3.7 Statistical methodology

3.7.1 An investigation of fund characteristics influencing performance

This section is concerned with finding out whether relationships between mutual fund performance and certain attributes of mutual funds exist. Both simple and multiple regressions are used to test the possible existence of these relationships. Mutual fund performance is regressed against the independent variables:

$$FP_{jt} = RS_{jt} + AF_{jt} + SF_{jt} + \mathcal{E}_t \dots\dots (1)$$

Where;

FP_{jt} = Performance of fund j at time t.

RS_{jt} = Risk associated with investing in fund j at time t (as measure by Beta).

AF_{jt} = Fund j age at time t.

SF_{jt} = Size of fund j at time t, as measured by assets under management

The multiple regression above tests the following expected relationships:

- Mutual funds with a higher level of risk produce higher returns than those with a low level of risk
- Fund age has an impact on returns
- Fund size has no impact on performance.

3.7.2 Testing for persistence in mutual funds

Multiple methods exist in literature for testing for persistence in mutual funds. These methods include (but not limited to) Binomial test, Contingency table based on cross product ratio test, Chi-squared test, Hurst exponent test, Spearman's rank correlation test, Cross sectional regression test, and Kolmogorov/Smirnov test. For purposes of the current study, time series regression analysis will be used to test for persistence in mutual funds' performance. This choice is a result of simplicity of the model, as well as the limiting number of mutual funds to be tested for performance in this study.

The time series regression analysis to be used in this study is similar to that developed in the methodology of Kahn and Rudd (1995), which was later adopted by Oldham and Kroeger (2005). Under this approach, performance for the current period (t) is regressed against performance in the previous period (t-1), yielding the following regression equation:

$$Performance_t = \emptyset + \sigma\, Performance_{t-1} + \varepsilon \dots\dots (2)$$

Where Performance is measured by the respective alpha performance measures, $\emptyset$ is a constant, σ is a slope coefficient measuring the effect of past performance on current performance, and ε is the error term. Persistence in performance is present when estimates of $\emptyset$ coefficient are positive and significant. Positive $\emptyset$ estimates can thus be

inferred as implying that past performance is useful in predicting future performance. It is to be noted that as per the methodology of Kahn and Rudd (1995), significance of the Ø estimates is implied by significant t-statistics at n-2 degrees of freedom and 5% significance level.

3.7.3 Outperformance evaluation models

Nominal returns fail to account for risk associated with investing in mutual funds. As a result, widely accepted measures that take into account inherent risk of investing in mutual funds will be mainly used for performance evaluation in this study. A variety of these measures exist in practise, but the focus of this paper will be on only two measures, namely; Jensen's Alpha model (1968). In the above aforementioned model superior mutual funds or 'winners' as most literature calls them, will be those whose alpha is positive while those with negative alphas will be categorised as 'losers'.

3.7.3.1 Jensen's Alpha model (1968)

In this section, we evaluate the performance of South African Unit Trusts using the methodology developed by Jensen (1968). This model was built on the foundations of capital asset pricing models developed by Sharpe (1964), Lintner (1965), Treynor (1966), as well as Jensen (1967). This model, as well as those developed by the authors mentioned above is founded on the above assumptions:

- All investors are risk-averse
- All investors are exposed to the same decision horizons and homogeneous expectation on investment opportunities
- Investment decisions are based solely on expected returns and risk of returns for all investors
- All transaction costs and taxes are zero
- Investors can choose any amount of assets, that is, all asserts are infinitely divisible

In addition to the above assumptions, Jensen (1968) assumes that capital markets are at equilibrium and allows for the possibility of fund managers to correctly forecast security prices and thus select those securities to which the error term is greater zero. In this case, it becomes feasible for the manager to obtain returns that are above normal given the risk premium for the level of risk of the portfolio. Thus, Jensen (1968) comes up with a model for which the intercept can be non-zero (alpha), depending on the ability of the mutual fund manager to correctly forecast security prices. This model is given below and is known as the Jensen Alpha Model, and will be used in the current study to evaluate unit trusts' performance:

$$R_{jt} - R_{Ft} = \alpha_j + \beta_j[R_{Mt} - R_{Ft}] + u_{jt} \dots\dots (3)$$

The variables in the Jensen (1968) model are described below:

R_{Mt} is the estimated monthly continuously compounded rate of return on the market portfolio M for time t.

R_{jt} is the annual continuously compounded rate of return on the j^{th} fund during the time t.

R_{Ft} is the annual continuously compounded risk free rate of return for time t.

3.7.3.2 Interpretation of the Jensen (1968) model

A superior ability by the mutual fund manager to successfully forecast security prices would be reflected by a positive Jensen's alpha (α_j). A negative alpha would imply that the mutual fund manager is unable to accurately forecast security prices. A zero intercept (alpha) is interpreted to represent a random selection buy and hold policy. Thus a positive alpha will be interpreted to mean that on average the mutual fund is able to accurately predict future security such that net of expenses and management fees, the funds perform better than the random buy and a hold strategy. A negative alpha will be interpreted to imply that on average the open end mutual funds were unable to accurately predict future security prices such that net of expenses and

management fees, the funds perform better that the random buy and hold strategy (Jensen, 1968).

3.7.3.3 Testing for significance of the estimates: the Student's t-test

Fama and French (2010) find that mutual funds alphas are symmetrically distributed around zero. For this reason, the Student's t-test serves as an appropriate test and is widely used as a test for the significance of performance measures such as Jensen's Alpha (Le Sourd, 2007). Moreover, Jensen (1968) asserts that alpha, the sampling distribution of the estimate, is a student's t distribution with n – 2 degrees of freedom. Under the student's t-test, the null and alternative hypotheses are given below, respectively;

H_0: the relative performance is not significantly different from zero.
H_1: the relative performance is significantly different from zero.

The test statistic is given by;
$t = \frac{\acute{\alpha}}{s/\sqrt{n}}$, distributed as a Student's t-distribution with n-2 degrees of freedom

Where;

$\acute{\alpha}$ represents the mean of the mean monthly's Jensen's alpha for each mutual fund for the period under consideration

s represents the sample standard deviation of the mean mutual fund alphas; and

n represents the number of mean alphas (equivalently, the number of mutual funds in the sample)

In the current study the t-test will be used to test for the significance of the results that will be obtained by the Jensen (1968) model. Rejection of the null hypothesis will be

interpreted as a persistent under-performance or over-performance of the FTSE/JSE All Share index (the market) by the unit trusts.

CHAPTER 4: EMPIRICAL RESULTS AND ANALYSIS

4.1 Introduction

In this chapter, results from the statistical methodology discussed in the methodology section will be presented. These results will be then be tested for consistency with literature and thereafter inferences will be made about the South African mutual fund industry. As asserted in earlier chapters, the main focus of this study is to investigate whether mutual fund managers are able to outperform the JSE All Share Index (the market). Before answering that question, the study attempts to address to sub-questions: are there any characteristics that affect mutual fund performance, and is there evidence of performance persistence in South African mutual funds. These two sub-questions are vital because when combined with the main focus of the study, they all provide a complete investment decision aid to investors.

Results and analysis are therefore provided below in this order: An investigation of fund characteristics influencing performance, testing for persistence in mutual funds, and

4.2 An investigation of fund characteristics influencing performance

4.2.1 Diagnostic Tests

- **Results for Normality**

To test for normality of the residuals emanating from the regressions including each of the funds, we perform the Jarque-Bera Test. The Jarque-Bera test assumes a null hypothesis of normality with skewness of zero and kurtosis of 3. Figure 4.1 to 4.10 in Appendix C presents the results of normality of the residuals for each fund. As can be seen from the tables presented in Appendix C, none of the residuals of any of the funds appear to be normal. Thus the null hypothesis of normality is rejected for all funds.

- **Results for Serial Correlation**

Serial correlation is tested using Breusch-Godfrey also known as the LM Test for serial correlation. The null hypothesis is that there is no presence of serial correlation. Table 4.1 in Appendix C displays results of the LM test for serial correlation for each fund. The test rejects the null hypothesis of no serial correlation of up to order 2 for only two funds; namely 36ONE MET Flexible Opportunity Fund A and Rezco Value Trend Fund A. For all the other funds, the test fails to reject the null hypothesis and it is thus concluded that serial correlation does not exist for those funds.

- **Results for Heteroscedasticity**

The White Test is performed to test for heteroscedasticity. White test makes the null hypothesis of homoscedasticity. Results of White Test are presented in Table 4.2 in Appendix C. The null hypothesis of homoscedasticity is rejected in 4 out of the 10 funds; namely, 36ONE MET Flexible Opportunity Fund A, Investec Property Equity Fund A, SIM Industrial Fund R, and Stanlib Property Income Fund A.

4.2.2 Regression Results

In this section we present results on whether risk, age and fund size affect performance of mutual funds. Table 4.3 below shows the results for simple regressions of fund age, fund size and fund risk. Simple regressions provide effects of each of the fund characteristics on fund performance individually.

Table 4.3: Simple Regression results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	R^2	DW
Age	0.000950	0.000843	1.127110	0.2600	0.001250	1.854627
Size	0.003309	0.102123	0.032399	0.9742	0.000001	1.860749
Risk	0.000379	0.007413	0.051145	0.9592	0.000002	1.835800

Table 4.3 shows that age, size and risk of unit trusts are not significantly different from zero when performing simple regressions. None of the results presented in the table are

significant. This means that for the unit trusts under investigation, individually, these fund attributes have no effect on fund performance.

A multiple regression was employed to investigate whether these characteristics, together, can affect fund performance. The results thereof are presented in Table 4.4 below:

Table 4.4: Multiple Regression results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	R^2	DW
C	1.137316	1.301610	0.873777	0.3825		
Age	0.000953	0.000881	1.082286	0.2794		
Size(LN)	-0.016883	0.114503	-0.147449	0.8828		
Risk	-0.007877	0.011131	-0.707620	0.4794	0.001910	1.892582

Table 4.4 reveals that even when a multiple regression is run, none of the fund characteristics are able to significantly explain mutual fund returns. When the multiple regression is performed, coefficient signs for size and risk change to negative signs, though insignificantly so. Accordingly, it can be concluded that age, size and risk do not affect performance of the top ten unit trusts in South Africa.

The results relating to fund size are consistent with those of Gallagher and Martin (2005) who used data from Australian mutual funds to investigate whether fund size matters for performance. The authors failed to find any statistical significant difference in performance for big and small finds alike. Thus the results presented here resonate with the findings of Gallagher and Martin (2005) in that fund size does not matter for mutual fund performance. The results of no relationship between fund and age and performance presented by this study are consistent with those found by Peterson et al (2001), who also concluded that fund age has no significant effect on performance. The insignificant results between risk and fund performance are somewhat appalling; one would expect that as per the basis of the CAPM itself, investors should be rewarded for taking risk. However, most academics believe that investors will only be rewarded in the long run for taking risk (Peterson et al, 2001). Thus the results obtained in this study maybe as a result of a rather shorter period.

Caution should be practised when accepting these results, mainly because other factors such as turnover, expense ratio, and management tenure have not been included in the analysis of the current study. Such factors were excluded because of data limitations. Because only a few regressors were used, the accuracy of these results may be highly doubted.

4.3 Testing for persistence in mutual funds

Mean alpha values for the sample as a whole will not be considered when testing for persistence in mutual funds. This is because some mutual funds prove to be persistent outperformers more often than not while others prove to be persistent underperformers more often than not, thus invalidating mean values for the whole sample as indicators of persistence (Nana, 2012). In addition, it is to be noted that largely the R-Squared are mostly very low, except in instances of significance and a few other cases.

Table 4.5 through Table 4.14 in Appendix B show estimation results for time series regressions performed for each unit trust over adjacent period pairs. These regressions are split into 3 months, 6 months and 12 months holding periods. Statistically significant coefficients are interpreted as representing evidence of persistence.

Table 4.5 reveals that for 360ONE MET Flexible Opportunity Fund only 3 out of the 40 observations are statistically significant. One out of 20 observations and 3 out of 10 observations are statistically significant for 6-months and 12 months holding periods respectively.

Four of the 40 observations, 2 of the twenty and one of the 10 observations are statistically significant for the 3-months, 6 months and 12 months holding periods respectively. These findings are presented in Table 4.6.

In Table 4.7 which shows results for the Coronation Industrial Fund, only 4 of the 40 observations are statistically significant for the 3 month holding period. Out of the 20

observations for the 6 month holding period only 4 of the 20 observations are statistically significant, while only one observation is significant for the 12 month holding period.

Time series regressions for Investec Property Equity Fund A in Table 4.8 shows significance in 4, 3 and 2 observations for the 3 months, 6 months and 12 months holding periods respectively.

For Nedgroup Investments Entrepreneur Fund R significance is found in 6, 1 and 2 observations for the 3 months, 6 months and 12 months holding periods respectively. These results are shown in Table 4.9.

Rezco Value Trend Fund A possesses significant coefficients in 3 observations, 4 observations and 1 observation for 3month, 6 months and 12 months holding periods respectively. This evidence is reported in Table 4.10.

Table 4.11 provides evidence of persistence for the SIM Industrial Fund R in 4 of the 40 observations for the 3 month holding period, 2 of the 20 observations for the 6 months holding period, and 2 of the 10 observations for the 12 months holding period.

Table 4.12 presents significance for the Stanlib Industrial Fund R in 3 of the 40 observations for the 3 month holding period, 2 of the 20 observations for the 6 months holding period, and 2 of the 10 observations for the 12 months holding period.

Stanlib Multi Manager Property Fund B1 possess significance in 2 observations for both the 3 months and 6 months holding period, while none of the observations in the 12 month holding period are significant. Evidence of this is presented in Table 4.13.

Lastly, Table 4.14 provides estimation results for the Stanlib Property Income Fund A. From this table, it is apparent that significance is only observed for 2 of the 3 month holding period observations, 4 of the 6 month holding period observations and, only 1 observation is significant for the 12 months holding period.

From the above results, it is noted that for all ten mutual funds the highest performance persistence level attained is 30 percent across all holding periods. Moreover, persistence barely happens regularly for all funds. It is thus inferred that for the regression analysis produces weak evidence of short-term persistence performance in the top ten performing equity unit trusts in South Africa for the 3 months, 6 months and 12 months holding periods. These results are consistent with those of Nana (2012) who found evidence of no performance persistence when employing the time series regression in South African unit trusts. Moreover, this result of weak short-term performance persistence echoes those of Wessels and Krige (2005) and Firer et al (2001).

4.4 Outperformance evaluation: Jensen's Alpha

4.4.1 Diagnostic Tests

- **Testing for Normality**

To test for normality of the residuals emanating from the regressions including each of the funds, we perform the Jarque-Bera Test. The Jarque-Bera test assumes a null hypothesis of normality with skewness of zero and kurtosis of 3. Figure 4.11 to 4.20 in Appendix D presents the results of normality of the residuals for each fund. As can be seen from the tables presented in Appendix D, none of the residuals of any of the funds appear to be normal. Thus the null hypothesis of normality is rejected for all funds.

- **Testing for Serial Correlation**

Serial correlation is tested using Breusch-Godfrey also known as the LM Test for serial correlation. The null hypothesis is that there is no presence of serial correlation. Table 4.15 in Appendix D displays results of the LM test for serial correlation for each fund. The test rejects the null hypothesis of no serial correlation of up to order 2 for only two funds; namely Coronation Industrial Fund and Stanlib Multi Manager Property Fund B1. For all the other funds, the test fails to reject the null hypothesis and it is thus concluded that serial correlation does not exist for those funds.

- **Testing for Heteroscedasticity**

The White Test is performed to test for heteroscedasticity. White test makes the null hypothesis of homoscedasticity. Results of White Test are presented in Table 4.16 in Appendix D. The null hypothesis of homoscedasticity is rejected in 5 out of the 10 funds; namely, Stanlib Multi Manager Property Fund B1, Stanlib Industrial Fund R, Rezco Value Trend Fund A, Coronation Industrial Fund and Catalyst SA Property Equity PSG Fund.

4.4.2 Model Robustness

Table 4.17 below presents the robustness and appropriateness of the Jensen's CAPM Model using the unit trusts' monthly compounded returns from January 2006 to December 2015. This is achieved by means of summary statistics in respect of the regression intercepts and explanatory variables.

Table 4.17: Summary statistics of Model Robustness

	Goodness of fit Measure	
Performance Measure	**R-Squared**	**Adjusted R**
Jensen's CAPM	0.522561	0.522196

The table shows that R-squared measure, which is a measure of goodness of fit of the model, is 0.522561. Statistically, this implies that approximately 52.26% of the unit trusts' returns are explain the CAPM regression model. The model can thus be accepted as fairly robust.

4.4.3 Outperformance Estimation Results and Analysis

This section addresses the focal question of this study, "Do mutual managers beat the market? Evidence from the Johannesburg Stock Exchange." Table 4.18 below presents the results of the CAPM Model presented as equation (3) in previous sections.

Table 4.18: Summary Statistics of Regression for the Jensen's CAPM Model

	Alpha (intercept)				$R_m - R_f$			
Performance Measure	**Coefficient**	**Std Error**	**t-Stat**	**P-values**	**Coefficient**	**Std Error**	**t-Stat**	**P-values**
Jensen's Alpha (CAPM)	0.474067*	0.105287	4.502603	0.0000	0.689534*	0.018231	37.82226	0.0000

* denotes significance at 1% significance level.

In the period under investigation, a decade ranging from January 2006 to December 2015, the average Jensen's alpha for all the unit trust is 0.474067. From this positive value of Jensen's alpha, it can be inferred that the best performing equity unit trusts over the ten years under investigation outperformed the JSE All Share Index Benchmark by approximately 0.47 percent over the same period. Thus, 0.474067 percent represents 'abnormal' or superior returns that investors in these unit trusts obtained over and above that obtained by the market. This result is inconsistent with the norm as documented in literature. Taylor (1977), Knight and Firer (1989) and recently Nana (2012) all found that South African mutual fund/unit trusts managers are unable to outperform the market. However, this study is consistent with the findings of Gilbertson and Vermaak (1982), who found evidence of superior performance or outperformance of the market in the late 1970s. Recently, Bradfield and Swartz (2001) also found evidence of outperformance in mutual funds in South Africa.

The selection of the top performing equity unit trusts over the decade ranging from 2005 to 2015 may be the cause of outperformance of the JSE All Share Index by the unit trusts. Selecting the top performing funds poses a bias in that it is not a representation of the whole market. Rather it presents a sample whose managers possess high investment skills. Evidence of the high investment skill is found in Table 4.19 below which presents estimation results for the individual alphas of the each unit trust over the ten year period.

Table 4.19: Individual Alpha Values for the unit trusts

Unit Trust	Alpha Value	Std Error	t-Stat	P-values	R^2	DW
360ONE MET Flexible Opportunity Fund A	0.660303***	0.072413	9.118568	0.0000	0.745471	2.112583
Catalyst SA Property Equity PSG Fund	0.361176**	0.147825	2.443268	0.0147	0.313716	1.764023
Coronation Industrial Fund	0.735227***	0.076222	9.645812	0.0000	0.725098	1.524080
Investec Property Equity Fund A	0.413537***	0.138414	2.987681	0.0029	0.283610	1.561439
Nedgroup Investments Entrepreneur Fund R	0.432696***	0.083018	5.212061	0.0000	0.705153	2.061311
Rezco Value Trend Fund A	0.633630***	0.066869	9.475725	0.0000	0.656368	1.968163
SIM Industrial Fund R.	0.752863***	0.072926	10.32366	0.0000	0.744319	1.873340
Stanlib Industrial Fund R.	0.514750***	0.085723	6.004838	0.0000	0.678013	2.126926
Stanlib Multi Manager Property Fund B1	0.345560***	0.130851	2.640855	0.0084	0.167845	1.642328
Stanlib Property Income Fund A	0.364990**	0.143608	2.541580	0.0111	0.276439	1.629155

***and ** denote significance at the 1% and 5% level respectively.

As can be seen from Table 4.19, all ten unit trusts produce significant positive alphas for the 10 year period. All unit trusts were able to outperform the market. The table shows that all unit trusts outperformed the market by a factor of less than one percent. In light of this, the outperformance of the JSE All Share Index by the top ten performing equity unit trusts can be interpreted as managers of these funds having exhibited high investment expertise over the period under consideration.

Proponents of the hypothesis that mutual funds are unable to produce superior returns often argue that outperformance depends on the periods under which the investigation is being performed. Such authors include Nana (2012). The ten year period is thus split

into two 5-year periods to investigate whether outperformance is sensitive to the time period under investigation. It is vital to note that the first sub-period (2006-2010) was plugged with the global 2007/2008 financial crisis. As a result, one might expect that under this period mutual fund managers should underperform the market. Table 4.19 provides estimation results of these sub-periods.

Table 4.19: Estimation results for the two sub-periods

	2006-2010	**2011-2015**
Alpha Coefficient	0.421322**	0.525406***
Std Error	0.176173	0.117467
t-Statistic	2.391532	4.472809
Prob.	0.0171	0.0000
R^2	0.530273	0.503775
DW Stat.	1.619194	2.206404

*** and ** denote significance at the 1% level and 5% level respectively.

As evidenced from Table 4.19, mutual fund managers are able to outperform the market in both the two 5-year sub-periods. The funds outperform the market even in the period that was hit by the 2007/8 financial crisis. It is thus concluded that outperformance in the top ten performing equity unit trusts in South Africa is not sensitive to the time period. This also confirms that the selected unit trusts have managers who have demonstrated high investment skills.

It is therefore concluded that the top ten equity unit trusts' managers are able to beat the market. However, the magnitude of outperformance is not so attractive as it stands at approximately 0.47%. Given transaction costs of searching for skill full managers, investors are better off investing in index funds. This is because even if investors were able to identify managers with high investment expertise, the abnormal returns associate with that selections are minimal. Thus, it is concluded that the outperformance presented here is merely evidence of employment of high investment skills on the part of fund managers.

On average the top ten equity unit trusts have a beta of 0.689534. This result is significant at 1% confidence level. This means that on average, the top 10 equity unit trusts in South Africa are less volatile than the market. This is a good result since it implies that investors in the unit trusts under investigation have a cushion from shocks that may hit the market. As shown in Table 19 below, individually, all top ten performing unit trusts over the last decade produced positive and significant alphas. All unit trust are less volatile than the market. Furthermore, 50% of the unit trusts have a beta value greater than 75% which suggests that these unit trusts might be tracking the index, i.e. "benchmark huggers". However this hypothesis would need to be investigated further, which is not the focus of this study.

Table 4.20: Beta values for the unit trusts

Unit Trust	**Beta Value**	**Std Error**	**t-Stat**	**P-values**	R^2	**DW**
360ONE MET Flexible Opportunity Fund A	0.775772***	0.012539	61.87069	0.0000	0.745471	2.112583
Catalyst SA Property Equity PSG Fund	0.625655***	0.025596	24.44300	0.0000	0.313716	1.764023
Coronation Industrial Fund	0.774929***	0.013198	58.71472	0.0000	0.725098	1.524080
Investec Property Equity Fund A	0.545177***	0.023967	22.74699	0.0000	0.283610	1.561439
Nedgroup Investments Entrepreneur Fund R	0.803687***	0.014375	55.90890	0.0000	0.705153	2.061311
Rezco Value Trend Fund A	0.578523***	0.011579	49.96487	0.0000	0.656368	1.968163
SIM Industrial Fund R.	0.778902***	0.012627	61.68332	0.0000	0.744319	1.873340
Stanlib Industrial Fund R.	0.778692***	0.014843	52.46118	0.0000	0.678013	2.126926
Stanlib Multi Manager Property Fund B1	0.367875***	0.022657	16.23638	0.0000	0.167845	1.642328
Stanlib Property Income Fund A	0.555662***	0.024866	22.34602	0.0000	0.276439	1.629155

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion on the findings

South Africa has been mirroring the global increase in investments made in mutual funds. This rise in assets managed by mutual fund managers has been coupled with rising curiosity among investors, as to whether fund managers are able to outperform the market. This curiosity of investors has been translated into a wide debate in literature documented since the early days of Treynor (1965), Sharpe (1966) and Jensen (1968), and most recently In South Africa Bradfield and Swartz (2001) and Nana (2012).

In this study, this debate is extended by evaluating mutual funds in the South African context. While performance valuation literature is widely available, a few authors have focused on the South African scene. This study differs from previous literature by its criteria of selecting mutual funds to be investigated; only the top ten performing equity unit trusts over the past decade are selected.

The question that most investors ask themselves is "Do mutual fund managers beat the market?", and is the main research question that this study attempts to address. To provide a complete investment decision tool to aid investors in their quest for higher returns, two more questions are asked and critically investigated: "Are there any fund characteristics that influence fund performance?" and "Is there evidence of persistence in performance of funds?" All three questions are investigated on the South African unit trust industry with the aim of aiding investors. Answers to these questions are vital to the investor's decision to commit funds to active mutual funds or index funds.

Simple and multiple regressions are employed to investigate whether fund risk (as measured by beta), fund size (as measured by assets under management), and fund age have an effect on the performance of unit trusts. To test for persistence in unit trust performance a regression is performed to investigate whether performance in the current period is as a result of performance in the previous period. Estimation periods are split into 3 months, 6 months and 12 months 'holding periods'. Lastly, Jensen's

CAPM model is performed to investigate whether the top ten unit trust are able to outperform the market, which is represented by the JSE ALSI.

The results of the study are thus three fold. It is found that fund risk, fund size and fund age have no effect on mutual fund performance. However, it is acknowledged that many factors such as fund style, turnover, expense ratio, and management tenure are perceived to have an effect on performance. Exclusion of these variables in the regression thus provides doubt on the current findings. These variables however, were not included due to data limitations. The second result is that there is weak short-term evidence of performance persistence in the funds under investigation, in that outperformance does not happen regularly. This result is more consistent with previous literature such as Wessels and Krige (2005) and Firer et al (2001). Thus, investors cannot rely on past performance to predict future performance of mutual funds. The last and more important result is that of outperformance, a question asked by the title of the study. According to the analysis presented in the top ten equity unit trust are able to outperform the market, though marginally so. The superior returns produced by the funds are 0.47% more than the returns presented by the market.

It is important here to conclude by commenting on the inferred outperformance prevalent in this study. The sample used to investigate evidence of outperformance provides a bias in that the funds selected clearly have managers who possess high investment expertise and skills. The fact that the funds are already in the top 10 in terms of performance is an indication of their skills. Thus, the outperformance results found in this study may just be an indication of their superior skills. This then limits the extent to which the conclusion of this study, in that outperformance may not be true across all unit trusts in South Africa. Indeed, Nana (2012) failed to find evidence of mutual fund outperformance of the market in South African equity unit trusts. Also, the top performing funds are mostly specialist funds (four real estate and three industrials), thus indicating that outperformance might be no more due to the sector's caharcteristics. However, this view does not discredit the results found in this study. In particular, the conclusion to be drawn here is that if investors select mutual funds whose managers have a proven track record of high investment skills, outperformance of the market is a possibility. The credibility of the current study is proven when the

period under investigation is split into two 5-year periods, with one period encompassing the 2007/8 financial crises. Even then, the unit trusts are able to outperform the market providing further evidence of superior skills.

The magnitude of outperformance is notably very small, in fact just under 0.5%. One might argue that this is not enough to entice investors to disinvest in index funds and commit their funds into active mutual funds. This is especially true since such outperformance was obtained by all already skill-full managers. Instead of having to search for skill-full mangers, investors can be better off in investing in index funds.

5.2 Recommendations

To be consistent with the key questions investigated in this study, three recommendations for investors are made:

I. Mutual fund risk, age and size should not matter for investors when choosing which funds to invest in. However, given the non-employment of non-parametric tests used, this recommendation should be taken with care.

II. Performance in the previous period is not likely to be a predictor of performance in the current period.

III. Fund managers who possess superior investment skills may be able to produce abnormal returns, though marginally so. This outperformance produced by the managers in the current study is under 1%. Thus, investors need to spend a lot of time doing research on fund performance, something that might not sit well with investors given abnormal returns of under 1%. Hence those investors not willing to engage in research are better off investing in index funds as opposed to active mutual funds.

5.3 Limitations and recommendations for future research

This study implicitly assumed that the South African market is efficient. Authors such as Gilbertson (1976) and Gilbertson and Vermaak (1982) reported that the South African market is not efficient, a hypothesis which if true, could null the findings of the current study. Thus as a suggestion for future research, one would need to first investigate whether the South African market is efficient before investigating outperformance. Further the data points used in this study maybe considered to be very few. In future, weekly returns can be used and the number of years be increased. It goes without saying that the current study is biased towards top performing equity unit trust and thus not a true representation of entire mutual fund industry. Of course this can be corrected by considering all unit trusts in South Africa including all categories other than equity unit trusts. This would lead to the use of other benchmarks other than the Johannesburg Stock Exchange All Share Index.

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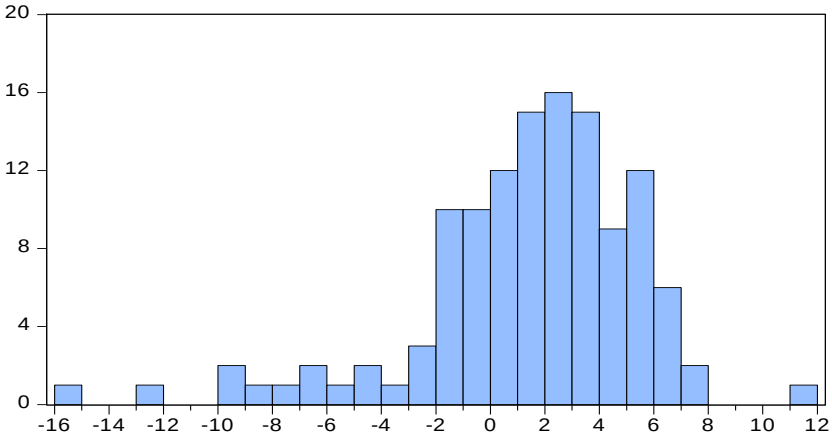
APPENDICES

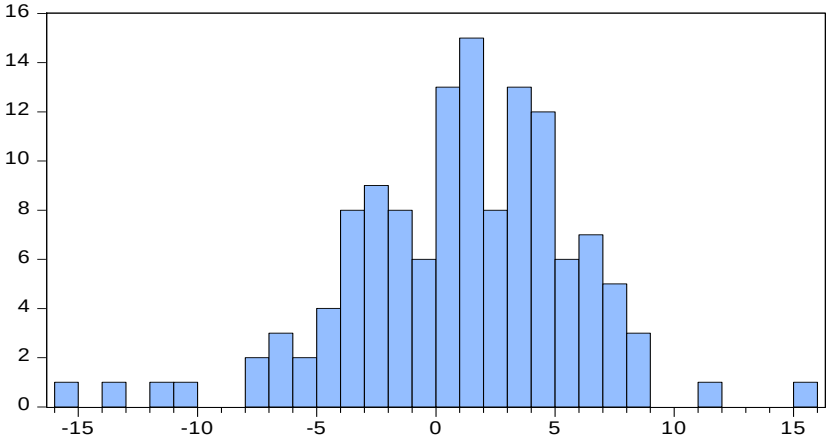
Appendix A: Descriptive statistics and normality results for fund returns

Figure 3.11: Descriptive statistics for 36ONE MET Flexible Opportunity Fund



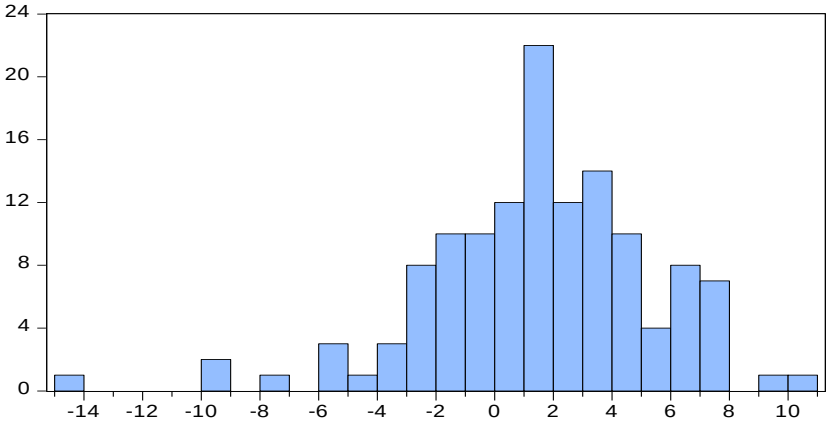
Series: R360	
Sample 2005M01 2015M12	
Observations 123	
Mean	1.416692
Median	1.854189
Maximum	11.07110
Minimum	-15.15331
Std. Dev.	4.020764
Skewness	-1.274532
Kurtosis	5.872654
Jarque-Bera	75.59309
Probability	0.000000

Figure 3.12: Descriptive Statistics for Catalyst SA Property Equity PSG Fund



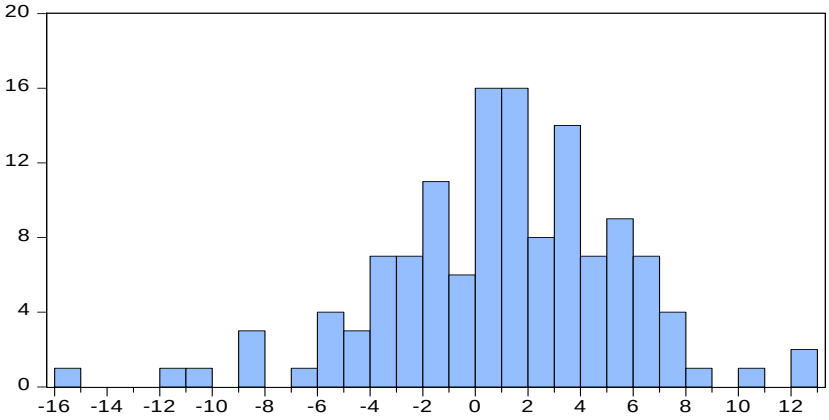
Series: RCATALYST	
Sample 2005M01 2015M12	
Observations 130	
Mean	1.038855
Median	1.474230
Maximum	15.39738
Minimum	-15.41402
Std. Dev.	4.717629
Skewness	-0.530826
Kurtosis	4.433107
Jarque-Bera	17.22988
Probability	0.000181

Figure 3.13: Descriptive Statistics for Coronation Industrial Fund



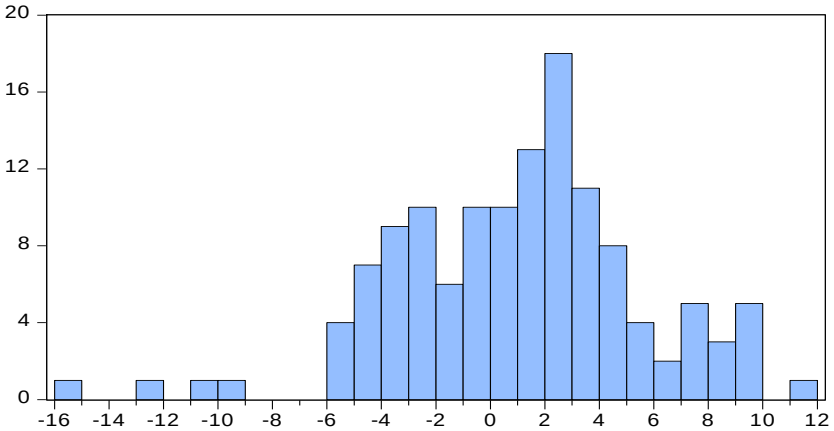
Series: RCORONATION	
Sample 2005M01 2015M12	
Observations 130	
Mean	1.502450
Median	1.630973
Maximum	10.03472
Minimum	-14.23719
Std. Dev.	3.840016
Skewness	-0.712494
Kurtosis	4.794455
Jarque-Bera	28.44106
Probability	0.000001

Figure 3.14: Descriptive Statistics for Investec Property Equity Fund A



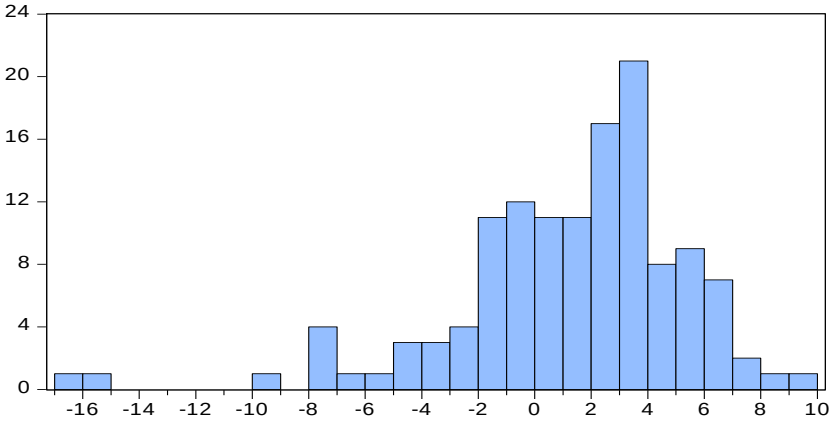
Series: RINVESTEC	
Sample 2005M01 2015M12	
Observations 130	
Mean	1.044487
Median	1.161624
Maximum	12.73169
Minimum	-15.21037
Std. Dev.	4.526707
Skewness	-0.490961
Kurtosis	4.108158
Jarque-Bera	11.87435
Probability	0.002639

Figure 3.15: Descriptive Statistics for the JSE All Share Index



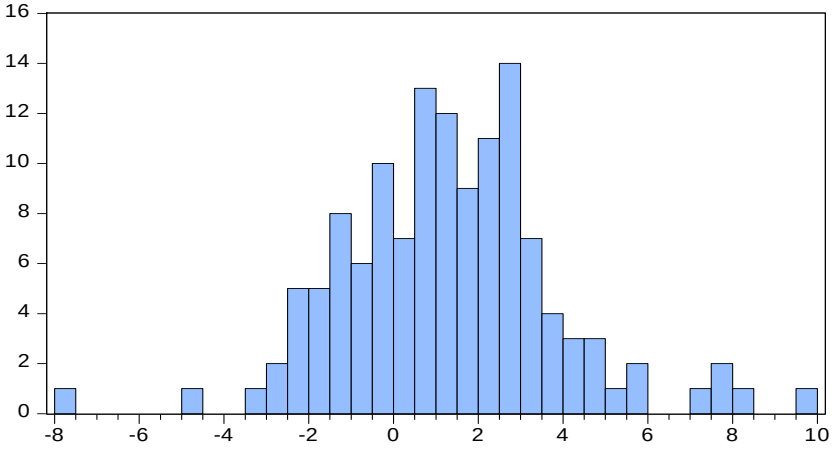
Series: RJSE	
Sample 2005M01 2015M12	
Observations 130	
Mean	1.019114
Median	1.413847
Maximum	11.58926
Minimum	-15.03110
Std. Dev.	4.532370
Skewness	-0.415317
Kurtosis	3.971645
Jarque-Bera	8.851083
Probability	0.011968

Figure 3.16: Descriptive Statistics for Nedgroup Investments Entrepreneur Fund R



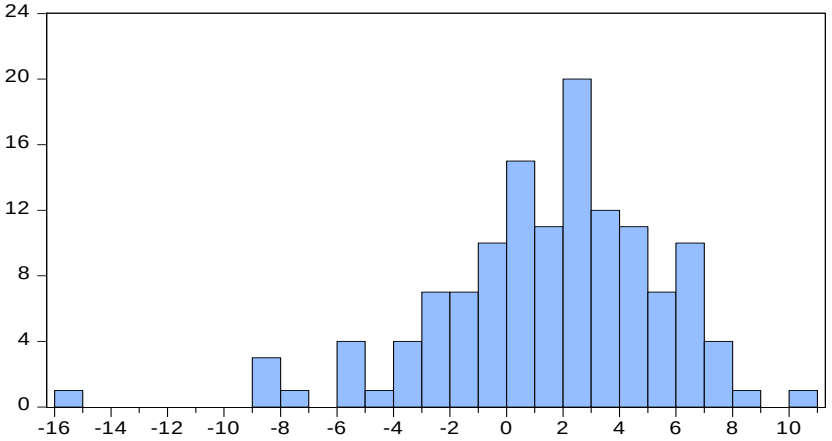
Series: RNEDGROUP	
Sample 2005M01 2015M12	
Observations 130	
Mean	1.232662
Median	2.025023
Maximum	9.429142
Minimum	-16.73272
Std. Dev.	4.205384
Skewness	-1.382771
Kurtosis	6.529218
Jarque-Bera	108.8945
Probability	0.000000

Figure 3.17: Descriptive Statistics for Rezco Value Trend Fund R



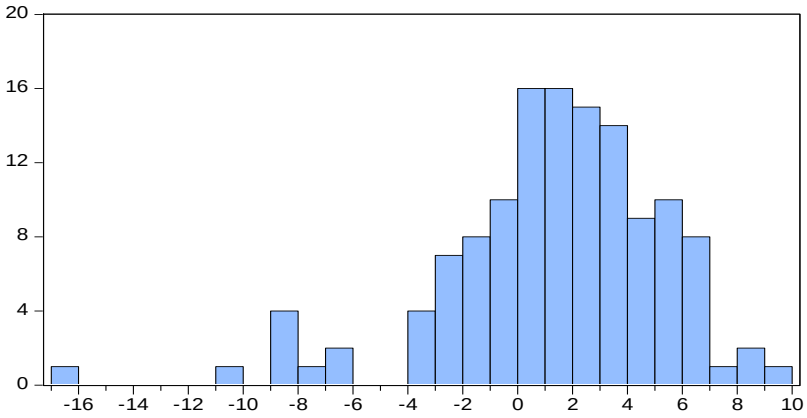
Series: RREZCO	
Sample 2005M01 2015M12	
Observations 130	
Mean	1.285486
Median	1.167721
Maximum	9.998140
Minimum	-7.705019
Std. Dev.	2.561965
Skewness	0.298139
Kurtosis	4.666245
Jarque-Bera	16.96457
Probability	0.000207

Figure 3.18: Descriptive Statistics for SIM Industrial Fund R



Series: RSIM	
Sample 2005M01 2015M12	
Observations 130	
Mean	1.533822
Median	2.172021
Maximum	10.01968
Minimum	-15.23561
Std. Dev.	3.917319
Skewness	-0.943685
Kurtosis	5.025441
Jarque-Bera	41.51643
Probability	0.000000

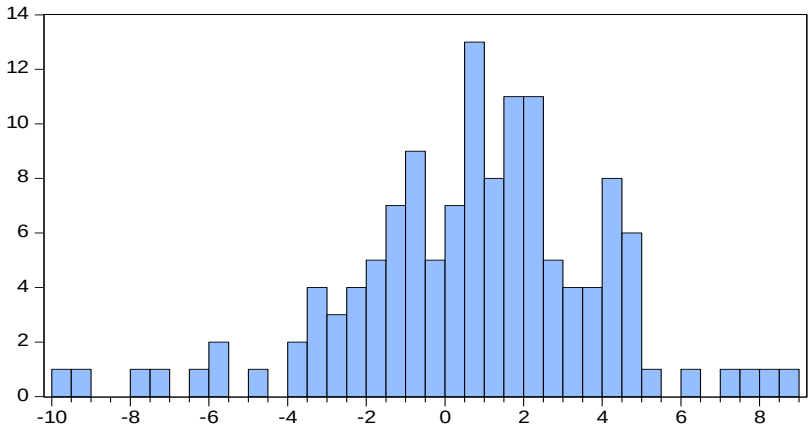
Figure 3.19: Descriptive Statistics for Stanlib Industrial Fund R



Series: RSTANLIBINDUSTRIAL
Sample 2005M01 2015M12
Observations 130

Mean	1.306645
Median	1.589263
Maximum	9.932410
Minimum	-16.13237
Std. Dev.	4.066627
Skewness	-1.082506
Kurtosis	5.377135
Jarque-Bera	55.99778
Probability	0.000000

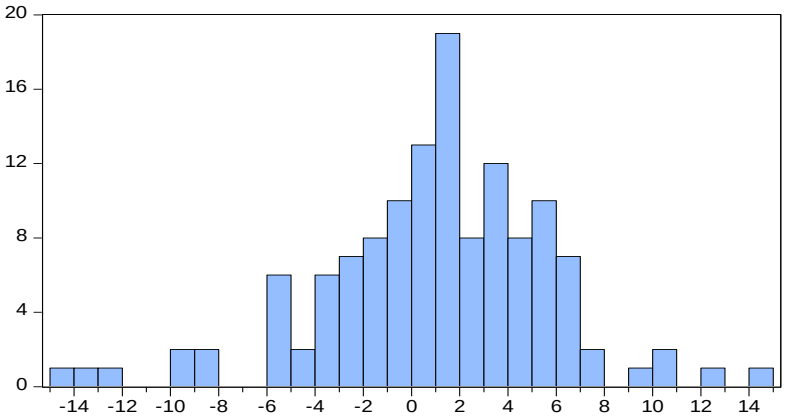
Figure 3.20: Descriptive Statistics for Stanlib Multi Manager Property Fund B1



Series: RSTANLIBMULTIMAN
Sample 2005M01 2015M12
Observations 130

Mean	0.732269
Median	0.910875
Maximum	8.978873
Minimum	-9.760750
Std. Dev.	3.241641
Skewness	-0.508024
Kurtosis	4.183710
Jarque-Bera	13.18157
Probability	0.001373

Figure 3.21: Descriptive Statistics for Stanlib Property Income Fund A



Series: RSTANLIBPROPINCOME
Sample 2005M01 2015M12
Observations 130

Mean	0.987865
Median	1.325650
Maximum	14.23555
Minimum	-14.39581
Std. Dev.	4.702940
Skewness	-0.526846
Kurtosis	4.269468
Jarque-Bera	14.74318
Probability	0.000629

Appendix B: Performance Persistence Estimation Results

In this section, significant coefficients are highlighted in red.

Table 4.5: 360ONE MET Flexible Opportunity Fund A Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
3 MONTHS					
Jan-Mar 06	0.555447	1.564478	0.355037	0.7828	0.111941
Apr-Jun06	-2.441419	1.828369	-1.335299	0.4092	0.640679
Jul-Sep06	0.753756	0.482726	1.561458	0.3626	0.709146
Oct-Dec06	-0.069112	0.306647	-0.225379	0.8589	0.048340
Jan-Mar 07	0.322115	1.058459	0.304325	0.8119	0.084763
Apr-Jun07	-9.726206	11.69386	-0.831736	0.5583	0.408908
Jul-Sep07	N/A				
Oct-Dec07	N/A				
Jan-Mar08	17.40666	5.537533	3.143397	0.1961	0.908096
Apr-Jun08	0.252276**	0.010578	23.84994	0.0267	0.998245
Jul-Sep08	-0.516216	0.281948	-1.830889	0.3183	0.770229
Oct-Dec08	0.135579	0.200233	0.677104	0.6211	0.314350
Jan-Mar 09	-6.598275	15.69274	-0.420467	0.7466	0.150232
Apr-Jun09	0.021541	0.005827	3.696566	0.1682	0.931809
Jul-Sep09	4.205874	1.379356	3.049157	0.2017	0.902888
Oct-Dec09	0.579694	11.56489	0.050125	0.9681	0.002506
Jan-Mar 10	-0.795276	0.884666	-0.898956	0.5338	0.446940
Apr-Jun10	-0.756865	0.874316	-0.865664	0.5458	0.428367
Jul-Sep10	0.003076	0.003376	0.911145	0.5296	0.453607
Oct-Dec10	296.7780	187.6718	1.581367	0.3590	0.714345
Jan-Mar 11	0.319005	0.351401	0.907810	0.5307	0.451790
Apr-Jun11	-0.062667	0.024652	-2.542051	0.2386	0.865988
Jul-Sep11	7.247589	10.72063	0.676041	0.6216	0.313673
Oct-Dec11	1.082519	1.740406	0.621992	0.6458	0.278954
Jan-Mar 12	0.290349	0.202165	1.436195	0.3872	0.673486
Apr-Jun12	0.342573	0.646533	0.529862	0.6898	0.219210
Jul-Sep12	-1.660659	0.422383	-3.931641	0.1586	0.939239
Oct-Dec12	0.581139	0.847197	0.685955	0.6172	0.319975
Jan-Mar13	-1.733512	1.172485	-1.478494	0.3786	0.686121
Apr-Jun13	0.244372	0.041844	5.840127	0.1080	0.971516
Jul-Sep13	0.957200**	0.023413	40.88320	0.0156	0.999402
Oct-Dec13	0.826030	0.381610	2.164592	0.2755	0.824113
Jan-Mar 14	N/A				
Apr-Jun14	N/A				
Jul-Sep14	-0.254348***	0.001182	-215.1256	0.0030	0.999978
Oct-Dec14	-0.884376	2.404277	-0.367835	0.7756	0.119177
Jan-Mar 15	-0.361545	0.857804	-0.421477	0.7461	0.150846
Apr-Jun15	-0.915472	1.114654	-0.821306	0.5623	0.402822
Jul-Sep15	0.053285	0.013327	3.998278	0.1560	0.941129
Oct-Dec15	N/A				
6 MONTHS					

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jan-Jun06	-4.103584**	1.237806	-3.315207	0.0295	0.733166
Jul-Dec06	-0.298295	0.189536	-1.573814	0.1906	0.382420
Jan-Jun07	0.503973	1.802932	0.279530	0.8061	0.037599
Jul-Dec07	0.040944	0.058635	0.698279	0.5573	0.196010
Jan-Jun08	-0.130765	0.937912	-0.139421	0.8959	0.004836
Jul-Dec08	0.084317	0.130376	0.646723	0.5530	0.094664
Jan-Jun09	-0.191226	0.220249	-0.868224	0.4343	0.158570
Jul-Dec09	-10.18003	8.258959	-1.232604	0.2852	0.275272
Jan-Jun10	-0.011157	0.006369	-1.751788	0.1547	0.434130
Jul-Dec10	52.05429	66.76506	0.779664	0.4791	0.131921
Jan-Jun11	-0.044084	0.034782	-1.267449	0.2738	0.286533
Jul-Dec11	3.150482	3.009463	1.046859	0.3543	0.215057
Jan-Jun12	-0.337136	0.428603	-0.786593	0.4755	0.133961
Jul-Dec12	-0.463985	0.898977	-0.516125	0.6330	0.062438
Jan-Jun13	-0.034911	0.141787	-0.246220	0.8176	0.014930
Jul-Dec13	1.173501	0.639953	1.833732	0.1641	0.528493
Jan-Jun14	-0.705514	0.986352	-0.715277	0.5261	0.145694
Jul-Dec14	-0.695641	0.840297	-0.827851	0.4543	0.146273
Jan-Jun15	-0.042487	0.044437	-0.956099	0.3932	0.186020
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	0.070461	0.612661	0.115009	0.9113	0.001651
Jan-Dec07	-0.196705*	0.103816	-1.894736	0.0947	0.309751
Jan-Dec08	-0.127333*	0.061713	-2.063286	0.0660	0.298598
Jan-Dec09	0.052181	0.120927	0.431511	0.6753	0.018280
Jan-Dec10	-0.294760	3.681919	-0.080056	0.9378	0.000640
Jan-Dec11	-1.078355	0.925000	-1.165790	0.2708	0.119646
Jan-Dec12	0.286670	0.308818	0.928284	0.3751	0.079335
Jan-Dec13	-0.117749	0.285471	-0.412471	0.6896	0.018553
Jan-Dec14	0.125007**	0.052928	2.361826	0.0425	0.382641

***, ** and * denote significance at the 1% level, 5% level and 10% respectively.

Table 4.6: Catalyst SA Property Equity PSG Fund Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
3 MONTHS					
Jan-Mar 06	0.353202	0.288410	1.224651	0.4359	0.599963
Apr-Jun06	0.183484	0.228668	0.802403	0.5695	0.391672
Jul-Sep06	2.597782	4.727764	0.549474	0.6801	0.231904
Oct-Dec06	0.943308	0.151224	6.237804	0.1012	0.974944
Jan-Mar 07	-0.009947	0.395818	-0.025131	0.9840	0.000631
Apr-Jun07	7.953269	9.864681	0.806237	0.5680	0.393946
Jul-Sep07	N/A				
Oct-Dec07	N/A				
Jan-Mar08	1.040139	0.478284	2.174733	0.2744	0.825464
Apr-Jun08	0.121619	0.148445	0.819283	0.5630	0.401636
Jul-Sep08	3.103221**	0.107674	28.82056	0.0221	0.998798
Oct-Dec08	0.578860	0.121686	4.756999	0.1319	0.957679
Jan-Mar 09	-0.384958	2.136485	-0.180183	0.8865	0.031445
Apr-Jun09	-0.043282	0.063444	-0.682211	0.6189	0.317598
Jul-Sep09	-2.555634	10.59971	-0.241104	0.8494	0.054938

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Oct-Dec09	-1.262824	0.953875	-1.323889	0.4118	0.636718
Jan-Mar 10	-1.789610	2.742404	-0.652570	0.6319	0.298663
Apr-Jun10	-0.225420	0.434951	-0.518265	0.6956	0.211729
Jul-Sep10	0.004829	0.008522	0.566659	0.6718	0.243056
Oct-Dec10	49.21090**	1.124689	43.75510	0.0145	0.999478
Jan-Mar 11	-1.359392	2.299592	-0.591145	0.6601	0.258959
Apr-Jun11	-0.049958**	0.001345	-37.15307	0.0171	0.999276
Jul-Sep11	-15.64922	16.53122	-0.946646	0.5174	0.472612
Oct-Dec11	N/A				
Jan-Mar 12	N/A				
Apr-Jun12	N/A				
Jul-Sep12	0.187850	0.288274	0.651637	0.6323	0.298064
Oct-Dec12	4.116837	4.904086	0.839471	0.5554	0.413390
Jan-Mar13	0.011762	1.172436	0.010032	0.9936	0.000101
Apr-Jun13	0.430225	0.343803	1.251370	0.4292	0.610277
Jul-Sep13	-0.431379	6.037694	-0.071448	0.9546	0.005079
Oct-Dec13	0.232611	0.273927	0.849173	0.5518	0.418974
Jan-Mar 14	2.610096**	0.108321	24.09601	0.0264	0.998281
Apr-Jun14	-0.946457	0.395619	-2.392343	0.2521	0.851264
Jul-Sep14	0.059852	0.007588	7.888051	0.0803	0.984183
Oct-Dec14	0.969779	1.196281	0.810662	0.5663	0.396562
Jan-Mar 15	1.520766	3.417809	0.444954	0.7335	0.165264
Apr-Jun15	0.874213	1.120170	0.780429	0.5781	0.378523
Jul-Sep15	0.048013	0.006921	6.937096	0.0911	0.979643
Oct-Dec15	N/A				
6 MONTHS					
Jan-Jun06	-0.118356	0.222103	-0.532885	0.6223	0.066286
Jul-Dec06	0.332068	1.120041	0.296479	0.7816	0.021502
Jan-Jun07	1.429738	1.471736	0.971463	0.4338	0.320592
Jul-Dec07	-0.366700	0.172137	-2.130273	0.1669	0.694099
Jan-Jun08	0.185435	0.116959	1.585473	0.1880	0.385912
Jul-Dec08	1.154820	0.616145	1.874266	0.1342	0.467581
Jan-Jun09	-0.114135	0.065328	-1.747105	0.1555	0.432815
Jul-Dec09	-7.635430	7.911595	-0.965094	0.3891	0.188872
Jan-Jun10	-0.005763	0.007125	-0.808752	0.4640	0.140539
Jul-Dec10	-0.547471	24.68235	-0.022181	0.9834	0.000123
Jan-Jun11	0.077201	0.056959	1.355383	0.2468	0.314724
Jul-Dec11	-0.888525*	0.215353	-4.125900	0.0540	0.894864
Jan-Jun12	0.010624	0.154663	0.068694	0.9515	0.002354
Jul-Dec12	1.895917	2.724919	0.695770	0.5249	0.107958
Jan-Jun13	-0.295181	0.348449	-0.847129	0.4446	0.152116
Jul-Dec13	1.266379*	0.553289	2.288823	0.0840	0.567039
Jan-Jun14	0.019372	0.100282	0.193172	0.8562	0.009243
Jul-Dec14	0.106870	0.834856	0.128010	0.9043	0.004080
Jan-Jun15	-0.009756	0.120377	-0.081044	0.9393	0.001639
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	0.857198	0.807567	1.061458	0.3195	0.123450
Jan-Dec07	-0.148638	0.181252	-0.820061	0.4359	0.077544
Jan-Dec08	-0.138165	0.087649	-1.576337	0.1460	0.199028
Jan-Dec09	-0.001631	0.088724	-0.018378	0.9857	0.000034

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jan-Dec10	0.436541	2.103042	0.207576	0.8397	0.004290
Jan-Dec11	-0.057923	0.424653	-0.136400	0.8949	0.002320
Jan-Dec12	1.189167	1.136759	1.046103	0.3261	0.120331
Jan-Dec13	-0.045912	0.123955	-0.370396	0.7188	0.013534
Jan-Dec14	-0.417207***	0.058083	-7.182967	0.0000	0.837649

***, ** and * denote significance at the 1% level, 5% level and 10% level respectively.

Table 4.7: Coronation Industrial Fund Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jan-Mar 06	0.742508	1.719574	0.431798	0.7405	0.157149
Apr-Jun06	-0.184506	0.357995	-0.515387	0.6970	0.209876
Jul-Sep06	3.590622	6.810280	0.527236	0.6911	0.217514
Oct-Dec06	-0.043015	0.084131	-0.511285	0.6991	0.207238
Jan-Mar 07	-0.813974	0.611642	-1.330803	0.4102	0.639124
Apr-Jun07	N/A				
Jul-Sep07	N/A				
Oct-Dec07	N/A				
Jan-Mar08	-3.502416	3.529172	-0.992419	0.5024	0.496195
Apr-Jun08	-0.044646	0.148357	-0.300934	0.8139	0.083041
Jul-Sep08	-6.446316	6.303927	-1.022587	0.4929	0.511166
Oct-Dec08	0.200573	0.193476	1.036684	0.4885	0.518006
Jan-Mar 09	4.446247	2.838976	1.566145	0.3618	0.710381
Apr-Jun09	N/A				
Jul-Sep09	N/A				
Oct-Dec09	2.753220	12.51991	0.219907	0.8622	0.046129
Jan-Mar 10	0.791810	11.95908	0.066210	0.9579	0.004365
Apr-Jun10	-0.013000	0.099917	-0.130113	0.9176	0.016648
Jul-Sep10	0.009668	0.011906	0.811986	0.5658	0.397344
Oct-Dec10	13.06025**	0.747018	17.48317	0.0364	0.996739
Jan-Mar 11	4.661596	2.675707	1.742192	0.3317	0.752183
Apr-Jun11	0.002523	0.040096	0.062927	0.9600	0.003944
Jul-Sep11	19.14589	19.73321	0.970237	0.5096	0.484897
Oct-Dec11	3.603803	7.095323	0.507912	0.7008	0.205072
Jan-Mar 12	0.071556	0.020298	3.525243	0.1760	0.925525
Apr-Jun12	-0.156760	0.245551	-0.638401	0.6383	0.289549
Jul-Sep12	0.535712	0.193580	2.767395	0.2207	0.884506
Oct-Dec12	-0.068195	2.580494	-0.026427	0.9832	0.000698
Jan-Mar13	N/A				
Apr-Jun13	N/A				
Jul-Sep13	-0.682120	0.254969	-2.675304	0.2277	0.877410
Oct-Dec13	-0.649365	0.519953	-1.248891	0.4298	0.609334
Jan-Mar 14	-3.073447	1.047463	-2.934182	0.2091	0.895935
Apr-Jun14	1.130908*	0.138264	8.179345	0.0774	0.985273
Jul-Sep14	0.055044***	0.000211	260.3421	0.0024	0.999985
Oct-Dec14	4.862515	6.284697	0.773707	0.5808	0.374462
Jan-Mar 15	1.113046	1.460769	0.761959	0.5855	0.367321
Apr-Jun15	1.793307*	0.273638	6.553563	0.0964	0.977246
Jul-Sep15	-0.074716	0.011938	-6.258768	0.1009	0.975107
Oct-Dec15	N/A				
6 MONTHS					

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jan-Jun06	-1.142327**	0.310865	-3.674668	0.0213	0.771470
Jul-Dec06	-0.058992	0.216675	-0.272259	0.7989	0.018194
Jan-Jun07	-1.587106	2.662440	-0.596110	0.6578	0.262181
Jul-Dec07	0.021827	0.469151	0.046525	0.9704	0.002160
Jan-Jun08	0.538685	0.305686	1.762214	0.1528	0.437048
Jul-Dec08	-2.267783**	0.577953	-3.923819	0.0172	0.793776
Jan-Jun09	0.058857	0.046639	1.261967	0.2962	0.346770
Jul-Dec09	-7.786402***	3.090049	-2.519831	0.0862	0.679129
Jan-Jun10	-0.014872	0.020306	-0.732417	0.5045	0.118250
Jul-Dec10	3.898029	4.649523	0.838372	0.4490	0.149455
Jan-Jun11	0.182231	0.095687	1.904443	0.1296	0.475541
Jul-Dec11	-3.574296	8.501737	-0.420419	0.6958	0.042318
Jan-Jun12	-0.100126*	0.042602	-2.350277	0.0785	0.580000
Jul-Dec12	-0.006123	1.139762	-0.005373	0.9961	0.000010
Jan-Jun13	-0.288971	0.165087	-1.750419	0.1784	0.505274
Jul-Dec13	0.446395	0.366552	1.217823	0.2902	0.270485
Jan-Jun14	0.091079	0.095833	0.950395	0.3957	0.184215
Jul-Dec14	4.169542	2.415282	1.726317	0.1594	0.426948
Jan-Jun15	-0.185557	0.135859	-1.365809	0.2438	0.318039
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	0.177056	0.260259	0.680307	0.5182	0.062017
Jan-Dec07	-0.157052	0.258172	-0.608323	0.5622	0.050211
Jan-Dec08	-0.548298	0.161674	-3.391369	0.0080	0.561005
Jan-Dec09	0.166646	0.151013	1.103518	0.2984	0.119180
Jan-Dec10	0.312350	0.808021	0.386561	0.7072	0.014723
Jan-Dec11	0.104184	0.761430	0.136827	0.8939	0.001869
Jan-Dec12	-0.065036	0.300044	-0.216757	0.8332	0.005193
Jan-Dec13	-0.011656	0.079521	-0.146577	0.8867	0.002382
Jan-Dec14	-1.939909***	0.273546	-7.091718	0.0000	0.834142

***, ** and * denote significance at the 1% level, 5% level and 10% respectively.

Table 4.8: Investec Property Equity Fund A Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
3 MONTHS					
Jan-Mar 06	1.045897	1.584390	0.660126	0.6286	0.303508
Apr-Jun06	-0.022529	0.830819	-0.027117	0.9827	0.000735
Jul-Sep06	6.611543	11.00055	0.601019	0.6555	0.265367
Oct-Dec06	0.174315	0.187199	0.931176	0.5227	0.464407
Jan-Mar 07	0.169682	0.209022	0.811793	0.5659	0.397230
Apr-Jun07	5.293040	7.116622	0.743757	0.5929	0.356158
Jul-Sep07	N/A				
Oct-Dec07	N/A				
Jan-Mar08	0.411581	0.209612	1.963539	0.2999	0.794047
Apr-Jun08	0.422685	0.660079	0.640355	0.6374	0.290808
Jul-Sep08	1.460698**	0.063054	23.16590	0.0275	0.998140
Oct-Dec08	0.363824	1.282038	0.283786	0.8240	0.074532
Jan-Mar 09	1.707725	1.538744	1.109817	0.4669	0.551910

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Apr-Jun09	-0.147684	0.177518	-0.831938	0.5582	0.409026
Jul-Sep09	-1.683797	3.111226	-0.541200	0.6842	0.226544
Oct-Dec09	-0.875959	0.831401	-1.053593	0.4834	0.526080
Jan-Mar 10	0.516363	0.676830	0.762914	0.5851	0.367904
Apr-Jun10	0.844574	1.448952	0.582886	0.6640	0.253596
Jul-Sep10	0.008598	0.012922	0.665380	0.6262	0.306870
Oct-Dec10	26.76995**	1.407235	19.02309	0.0334	0.997244
Jan-Mar 11	-0.950108	1.133776	-0.838003	0.5560	0.412542
Apr-Jun11	-3.458841**	0.233887	-14.78853	0.0430	0.995448
Jul-Sep11	0.555694	0.840275	0.661324	0.6280	0.304275
Oct-Dec11	-0.255183	0.675532	-0.377751	0.7701	0.124877
Jan-Mar 12	-0.228635	0.542085	-0.421770	0.7459	0.151024
Apr-Jun12	-0.199014*	0.024181	-8.230138	0.0770	0.985451
Jul-Sep12	0.208159	0.314821	0.661199	0.6281	0.304195
Oct-Dec12	8.263402	10.38426	0.795762	0.5721	0.387719
Jan-Mar13	-0.057618	0.762214	-0.075592	0.9520	0.005682
Apr-Jun13	0.388188	0.187074	2.075056	0.2859	0.811529
Jul-Sep13	-1.467001	1.317416	-1.113544	0.4658	0.553568
Oct-Dec13	-0.429151	1.106533	-0.387834	0.7645	0.130748
Jan-Mar 14	-2.367228	1.526877	-1.550373	0.3647	0.706198
Apr-Jun14	0.496793	0.188500	2.635508	0.2309	0.874149
Jul-Sep14	0.380215	0.089199	4.262552	0.1467	0.947833
Oct-Dec14	0.359254	0.361204	0.994602	0.5017	0.497294
Jan-Mar 15	1.531420	2.891168	0.529689	0.6899	0.219098
Apr-Jun15	1.047440	1.326564	0.789588	0.5745	0.384028
Jul-Sep15	0.046921	0.008151	5.756306	0.1095	0.970705
Oct-Dec15	N/A				
6 MONTHS					
Jan-Jun06	-0.044007	0.971460	-0.045300	0.9660	0.000513
Jul-Dec06	0.392456	0.456889	0.858975	0.4388	0.155733
Jan-Jun07	2.379410	1.305766	1.822233	0.2100	0.624098
Jul-Dec07	0.250081*	0.064128	3.899734	0.0599	0.883775
Jan-Jun08	0.425549	0.290598	1.464392	0.2169	0.349005
Jul-Dec08	0.087452	0.491503	0.177927	0.8674	0.007852
Jan-Jun09	-0.794085*	0.342207	-2.320480	0.0811	0.573771
Jul-Dec09	-1.365509	1.490835	-0.915936	0.4115	0.173372
Jan-Jun10	0.018560	0.012767	1.453715	0.2197	0.345688
Jul-Dec10	-6.060131	11.69556	-0.518157	0.6317	0.062900
Jan-Jun11	-0.237432	0.902059	-0.263211	0.8054	0.017025
Jul-Dec11	-0.248638	0.589520	-0.421763	0.6949	0.042578
Jan-Jun12	-0.013030	0.036597	-0.356044	0.7398	0.030718
Jul-Dec12	2.706056	4.717263	0.573650	0.5969	0.076015
Jan-Jun13	-0.211835	0.209179	-1.012696	0.3685	0.204068
Jul-Dec13	2.130173*	0.554668	3.840444	0.0185	0.786655
Jan-Jun14	0.099512	0.234995	0.423462	0.6937	0.042907
Jul-Dec14	0.120397	0.333954	0.360520	0.7367	0.031471
Jan-Jun15	0.006552	0.121090	0.054110	0.9594	0.000731
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	-0.186739	0.885444	-0.210899	0.8382	0.005529
Jan-Dec07	0.284159*	0.127327	2.231728	0.0561	0.383696

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jan-Dec08	-0.337311	0.238744	-1.412855	0.1881	0.166400
Jan-Dec09	-0.025574	0.051991	-0.491896	0.6334	0.023625
Jan-Dec10	-1.159367	7.033631	-0.164832	0.8724	0.002710
Jan-Dec11	-0.061801	0.053822	-1.148255	0.2776	0.116490
Jan-Dec12	0.841457	1.075992	0.782029	0.4523	0.057632
Jan-Dec13	-0.392069	0.294246	-1.332450	0.2123	0.150774
Jan-Dec14	-0.183770***	0.049278	-3.729232	0.0039	0.581716

***, ** and * denote significance at the 1% level, 5% level and 10% level respectively.

Table 4.9: Nedgroup Investments Entrepreneur Fund R Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
3 MONTHS					
Jan-Mar 06	0.417620	0.670750	0.622617	0.6455	0.279358
Apr-Jun06	N/A				
Jul-Sep06	N/A				
Oct-Dec06	-0.114982	0.120053	-0.957762	0.5137	0.478435
Jan-Mar 07	N/A				
Apr-Jun07	N/A				
Jul-Sep07	N/A				
Oct-Dec07	N/A				
Jan-Mar08	4.865736	1.940779	2.507105	0.2416	0.862742
Apr-Jun08	0.375312	0.426334	0.880325	0.5405	0.436611
Jul-Sep08	0.491237	0.092381	5.317498	0.1183	0.965842
Oct-Dec08	-0.593078	0.136089	-4.358025	0.1436	0.949981
Jan-Mar 09	4.126285	1.578102	2.614714	0.2325	0.872396
Apr-Jun09	-0.007880	0.028993	-0.271793	0.8311	0.068790
Jul-Sep09	N/A				
Oct-Dec09	N/A				
Jan-Mar 10	1.466340	0.909809	1.611701	0.3535	0.722035
Apr-Jun10	1.194183	0.514860	2.319432	0.2591	0.843254
Jul-Sep10	0.002495	0.001378	1.810621	0.3212	0.766265
Oct-Dec10	44.60021	2.803115	15.91094	0.0400	0.996065
Jan-Mar 11	-2.677340	1.423183	-1.881234	0.3110	0.779689
Apr-Jun11	-0.099833	0.050034	-1.995292	0.2958	0.799245
Jul-Sep11	3.154624	12.94140	0.243762	0.8478	0.056087
Oct-Dec11	0.784803	2.761404	0.284204	0.8237	0.074735
Jan-Mar 12	-0.153632*	0.017753	-8.653969	0.0732	0.986823
Apr-Jun12	2.811053	0.515906	5.448768	0.1156	0.967415
Jul-Sep12	-0.016545	0.297286	-0.055653	0.9646	0.003088
Oct-Dec12	-0.458402	0.317362	-1.444414	0.3855	0.675991
Jan-Mar13	-0.743580	1.104031	-0.673514	0.6227	0.312063
Apr-Jun13	1.295105	0.335581	3.859289	0.1614	0.937084
Jul-Sep13	1.286728**	0.074111	17.36206	0.0366	0.996694
Oct-Dec13	0.374745	0.327308	1.144931	0.4570	0.567262
Jan-Mar 14	5.488693**	0.164968	33.27132	0.0191	0.999097
Apr-Jun14	-1.712824*	0.150422	-11.38678	0.0558	0.992346
Jul-Sep14	0.028068*	0.004129	6.797891	0.0930	0.978819
Oct-Dec14	1.875371	2.956646	0.634290	0.6401	0.286898

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jan-Mar 15	6.057723*	0.733905	8.254098	0.0768	0.985535
Apr-Jun15	-0.120480	0.351866	-0.342405	0.7900	0.104938
Jul-Sep15	0.158647	0.032218	4.924099	0.1276	0.960391
Oct-Dec15	N/A				
6 MONTHS					
Jan-Jun06	-0.079903	0.867487	-0.092109	0.9324	0.002820
Jul-Dec06	0.227239	0.457073	0.497162	0.6684	0.109992
Jan-Jun07	-0.014019	2.196876	-0.006381	0.9959	0.000041
Jul-Dec07	0.064492	0.032786	1.967075	0.2994	0.794635
Jan-Jun08	-0.115396	0.491159	-0.234945	0.8258	0.013612
Jul-Dec08	0.142552	0.424165	0.336077	0.7537	0.027461
Jan-Jun09	-0.026086	0.085814	-0.303982	0.7810	0.029881
Jul-Dec09	13.33937	33.11959	0.402764	0.7141	0.051299
Jan-Jun10	0.005536	0.003343	1.656089	0.1730	0.406760
Jul-Dec10	0.863950	20.83387	0.041469	0.9689	0.000430
Jan-Jun11	0.229339	0.135729	1.689680	0.1664	0.416486
Jul-Dec11	-0.981583	2.789633	-0.351868	0.7427	0.030023
Jan-Jun12	-0.233440	0.322572	-0.723683	0.5093	0.115771
Jul-Dec12	-0.060481	0.330706	-0.182884	0.8638	0.008292
Jan-Jun13	-0.147028	0.750095	-0.196012	0.8542	0.009514
Jul-Dec13	0.532265*	0.208849	2.548563	0.0634	0.618872
Jan-Jun14	0.074461	0.155223	0.479704	0.6565	0.054399
Jul-Dec14	0.996320	1.805375	0.551863	0.6104	0.070751
Jan-Jun15	-0.108220	0.161842	-0.668676	0.5403	0.100543
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	0.571879	0.547881	1.043801	0.3444	0.178917
Jan-Dec07	-0.119421	0.158061	-0.755536	0.4785	0.086874
Jan-Dec08	-0.059380	0.040728	-1.457946	0.1788	0.191055
Jan-Dec09	0.060834	0.179181	0.339514	0.7420	0.012646
Jan-Dec10	3.032541	4.483314	0.676406	0.5141	0.043751
Jan-Dec11	0.488010	0.923902	0.528206	0.6089	0.027143
Jan-Dec12	0.430900**	0.162379	2.653663	0.0242	0.413212
Jan-Dec13	-0.135922	0.114503	-1.187056	0.2626	0.123507
Jan-Dec14	-1.221097***	0.206141	-5.923601	0.0001	0.778217

***, ** and * denote significance at the 1% level, 5% level and 10% level respectively.

Table 4.10: Rezco Value Trend Fund A Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
3 MONTHS					
Jan-Mar 06	0.265357	0.001747	151.9218	0.0042	0.999957
Apr-Jun06	0.082035	1.617418	0.050720	0.9677	0.002566
Jul-Sep06	-0.134273	0.775930	-0.173048	0.8909	0.029075
Oct-Dec06	0.282156	0.557879	0.505765	0.7019	0.203694
Jan-Mar 07	0.287203	0.091992	3.122031	0.1973	0.906951
Apr-Jun07	-1.695635	3.339115	-0.507810	0.7009	0.205006
Jul-Sep07	N/A				
Oct-Dec07	N/A				

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jan-Mar08	0.560964*	0.068004	8.249047	0.0768	0.985517
Apr-Jun08	-0.917158	2.125875	-0.431426	0.7407	0.156921
Jul-Sep08	0.167520	0.033983	4.929495	0.1274	0.960474
Oct-Dec08	-0.735040*	0.093196	-7.887039	0.0803	0.984179
Jan-Mar 09	-11.05367	5.439889	-2.031967	0.2911	0.805026
Apr-Jun09	0.003834	0.017656	0.217147	0.8639	0.045029
Jul-Sep09	16.40523	35.58655	0.460995	0.7250	0.175269
Oct-Dec09	-1.144341	0.075086	-15.24040	0.0417	0.995713
Jan-Mar 10	1.864384	1.869370	0.997333	0.5008	0.498665
Apr-Jun10	0.465906	0.444212	1.048838	0.4848	0.523823
Jul-Sep10	0.004020	0.004851	0.828607	0.5595	0.407088
Oct-Dec10	-386.9941	175.1657	-2.209303	0.2706	0.829961
Jan-Mar 11	0.407168	0.065867	6.181644	0.1021	0.974498
Apr-Jun11	0.002669	0.065363	0.040837	0.9740	0.001665
Jul-Sep11	-6.125825	4.068009	-1.505854	0.3732	0.693965
Oct-Dec11	17.96852	17.81717	1.008494	0.4973	0.504229
Jan-Mar 12	0.056478	0.039565	1.427463	0.3890	0.670798
Apr-Jun12	0.399419	0.251814	1.586165	0.3581	0.715579
Jul-Sep12	0.303710	0.193873	1.566544	0.3617	0.710486
Oct-Dec12	0.398266	2.814797	0.141490	0.9105	0.019627
Jan-Mar13	-3.232416	1.787704	-1.808138	0.3216	0.765773
Apr-Jun13	0.470236	0.125463	3.748010	0.1660	0.933544
Jul-Sep13	0.329890	0.335171	0.984244	0.5051	0.492060
Oct-Dec13	0.399762	0.254290	1.572071	0.3607	0.711932
Jan-Mar 14	55.84816	97.92514	0.570315	0.6700	0.245430
Apr-Jun14	-0.044282	0.102838	-0.430599	0.7411	0.156414
Jul-Sep14	0.021223**	0.001356	15.65477	0.0406	0.995936
Oct-Dec14	7.455173	5.804792	1.284314	0.4212	0.622565
Jan-Mar 15	0.774890	0.535125	1.448054	0.3848	0.677092
Apr-Jun15	-1.179103	0.480135	-2.455775	0.2462	0.857769
Jul-Sep15	0.152271	0.071899	2.117851	0.2808	0.817694
Oct-Dec15	N/A				
6 MONTHS					
Jan-Jun06	-0.757094***	0.147703	-5.125781	0.0069	0.867872
Jul-Dec06	0.274134	0.184668	1.484471	0.2119	0.355219
Jan-Jun07	-0.121887	0.850159	-0.143370	0.8991	0.010173
Jul-Dec07	-0.202221	0.271696	-0.744292	0.5343	0.216906
Jan-Jun08	-0.224819	0.189296	-1.187658	0.3007	0.260701
Jul-Dec08	-0.091531	0.372853	-0.245489	0.8182	0.014843
Jan-Jun09	-0.125650	0.079256	-1.585361	0.1881	0.385878
Jul-Dec09	0.664481	19.10289	0.034784	0.9739	0.000302
Jan-Jun10	0.006603	0.005322	1.240844	0.2825	0.277939
Jul-Dec10	-116.7596**	40.43147	-2.887840	0.0447	0.675841
Jan-Jun11	-0.031029	0.035448	-0.875345	0.4308	0.160762
Jul-Dec11	-4.143050	5.144370	-0.805356	0.4658	0.139526
Jan-Jun12	-0.021088	0.090615	-0.232725	0.8274	0.013359
Jul-Dec12	0.110244	1.549019	0.071171	0.9467	0.001265
Jan-Jun13	0.137084	0.362062	0.378620	0.7242	0.034598
Jul-Dec13	0.199482	0.240270	0.830241	0.4531	0.146994
Jan-Jun14	0.072513	0.138597	0.523189	0.6285	0.064049
Jul-Dec14	4.486010*	1.668018	2.689425	0.0547	0.643907

Jan-Jun15	-0.276294**	0.088315	-3.128522	0.0352	0.709885
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	-0.089730	0.159308	-0.563251	0.5887	0.038144
Jan-Dec07	0.095092	0.209827	0.453194	0.6624	0.025030
Jan-Dec08	0.018165	0.049108	0.369902	0.7192	0.013498
Jan-Dec09	0.033967	0.155350	0.218646	0.8313	0.004758
Jan-Dec10	1.576939	3.480862	0.453031	0.6602	0.020111
Jan-Dec11	0.423224	0.627050	0.674944	0.5150	0.043570
Jan-Dec12	0.334263	0.569580	0.586859	0.5703	0.033294
Jan-Dec13	-0.052626	0.050481	-1.042494	0.3217	0.098026
Jan-Dec14	-1.687709	0.244348	-6.906978	0.0000	0.826709

***, ** and * denote significance at the 1% level, 5% level and 10% l3v3l respectively.

Table 4.11: SIM Industrial Fund R Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
3 MONTHS					
Jan-Mar 06	1.135197	3.552356	0.319562	0.8031	0.092658
Apr-Jun06	0.171749	0.734966	0.233683	0.8539	0.051780
Jul-Sep06	-1.555289	1.733194	-0.897354	0.5344	0.446058
Oct-Dec06	0.047906	0.443923	0.107914	0.9316	0.011511
Jan-Mar 07	-0.184562	0.136557	-1.351541	0.4055	0.646226
Apr-Jun07	4.568195	8.329261	0.548451	0.6806	0.231242
Jul-Sep07	N/A				
Oct-Dec07	N/A				
Jan-Mar08	-2.011628	13.04592	-0.154196	0.9026	0.023224
Apr-Jun08	0.032110	0.102054	0.314642	0.8059	0.090081
Jul-Sep08	-2.930552	1.813224	-1.616210	0.3527	0.723155
Oct-Dec08	0.126549	0.235485	0.537397	0.6861	0.224082
Jan-Mar 09	3.050649	0.596072	5.117920	0.1228	0.963226
Apr-Jun09	-0.008557	0.032949	-0.259695	0.8382	0.063181
Jul-Sep09	20.29699	4.393819	4.619441	0.1357	0.955236
Oct-Dec09	-3.856543	3.746416	-1.029395	0.4908	0.514482
Jan-Mar 10	0.335677	0.709611	0.473043	0.7187	0.182853
Apr-Jun10	0.681169	0.882670	0.771714	0.5816	0.373254
Jul-Sep10	0.004247	0.004969	0.854745	0.5498	0.422162
Oct-Dec10	101.4297***	0.615268	164.8545	0.0039	0.999963
Jan-Mar 11	1.831952*	0.158192	11.58055	0.0548	0.992599
Apr-Jun11	0.165375	0.279189	0.592340	0.6596	0.259734
Jul-Sep11	-0.653029	0.978992	-0.667042	0.6255	0.307932
Oct-Dec11	5.479704	4.612248	1.188077	0.4454	0.585325
Jan-Mar 12	0.108211	0.083532	1.295438	0.4185	0.626609
Apr-Jun12	-1.175995	1.076047	-1.092885	0.4718	0.544294
Jul-Sep12	-0.310994	0.786756	-0.395287	0.7604	0.135137
Oct-Dec12	-0.477978	1.193863	-0.400363	0.7576	0.138147
Jan-Mar13	N/A				
Apr-Jun13	N/A				
Jul-Sep13	0.419734	0.116526	3.602057	0.1724	0.928443
Oct-Dec13	-1.273805	1.928647	-0.660466	0.6284	0.303725
Jan-Mar 14	0.120832	0.368987	0.327469	0.7985	0.096850
Apr-Jun14	1.647841	0.274867	5.995038	0.1052	0.972929

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jul-Sep14	0.091194***	4.41E-05	2068.902	0.0003	1.000000
Oct-Dec14	1.194193	1.771857	0.673978	0.6225	0.312359
Jan-Mar 15	8.883158**	0.445556	19.93723	0.0319	0.997491
Apr-Jun15	0.256463	0.263436	0.973531	0.5085	0.486590
Jul-Sep15	-0.146959	0.022412	-6.557107	0.0963	0.977270
Oct-Dec15	N/A				
6 MONTHS					
Jan-Jun06	0.326441	1.604089	0.203506	0.8487	0.010248
Jul-Dec06	-0.147422	0.099194	-1.486194	0.2114	0.355750
Jan-Jun07	-0.533553	0.796565	-0.669817	0.5720	0.183225
Jul-Dec07	-0.035327	0.098522	-0.358567	0.7542	0.060402
Jan-Jun08	0.542272	0.498446	1.087927	0.3378	0.228333
Jul-Dec08	-0.160576	0.464886	-0.345410	0.7472	0.028963
Jan-Jun09	-0.035302	0.057474	-0.614226	0.5723	0.086189
Jul-Dec09	-19.92988	37.10373	-0.537140	0.6197	0.067277
Jan-Jun10	0.006094*	0.002800	2.176736	0.0951	0.542239
Jul-Dec10	45.32000	28.47377	1.591640	0.1867	0.387754
Jan-Jun11	0.388730*	0.173424	2.241500	0.0885	0.556753
Jul-Dec11	-0.657075	0.702839	-0.934887	0.4028	0.179321
Jan-Jun12	-0.285498	0.667074	-0.427985	0.6907	0.043788
Jul-Dec12	0.790141	0.758920	1.041138	0.3743	0.265420
Jan-Jun13	0.521211	0.472527	1.103028	0.3506	0.288538
Jul-Dec13	0.536613	0.377359	1.422022	0.2281	0.335785
Jan-Jun14	0.069766	0.074069	0.941906	0.3996	0.181533
Jul-Dec14	0.723202	1.007554	0.717779	0.5126	0.114105
Jan-Jun15	-0.079879	0.256781	-0.311077	0.7713	0.023621
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	0.273206	0.273219	0.999952	0.3466	0.111102
Jan-Dec07	-0.056221	0.195478	-0.287607	0.7810	0.010234
Jan-Dec08	-0.091722*	0.045923	-1.997295	0.0737	0.285162
Jan-Dec09	0.042200	0.207405	0.203466	0.8429	0.004123
Jan-Dec10	3.279000	8.815943	0.371940	0.7177	0.013645
Jan-Dec11	0.570158	0.328308	1.736660	0.1131	0.231714
Jan-Dec12	0.194729	0.444538	0.438049	0.6717	0.020876
Jan-Dec13	0.021998	0.051288	0.428905	0.6781	0.020031
Jan-Dec14	-0.880762***	0.180876	-4.869423	0.0007	0.703363

***, ** and * denote significance at the 1% level, 5% level and 10% level respectively.

Table 4.12: Stanlib Industrial Fund R. Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jan-Mar 06	-0.449052	3.312214	-0.135575	0.9142	0.018049
Apr-Jun06	0.570196	0.972131	0.586542	0.6623	0.255970
Jul-Sep06	3.750541	1.033410	3.629286	0.1712	0.929437
Oct-Dec06	0.054218***	0.000128	422.6865	0.0015	0.999994
Jan-Mar 07	0.839131	0.608687	1.378592	0.3995	0.655234
Apr-Jun07	-4.363711	6.813355	-0.640464	0.6374	0.290878
Jul-Sep07	N/A				

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Oct-Dec07	N/A				
Jan-Mar08	-2.843892	2.707563	-1.050351	0.4844	0.524543
Apr-Jun08	-0.068525	0.257550	-0.266064	0.8345	0.066110
Jul-Sep08	-2.516738	0.628669	-4.003282	0.1558	0.941267
Oct-Dec08	-0.004508	0.522725	-0.008623	0.9945	0.000074
Jan-Mar 09	3.540259	1.661109	2.131263	0.2793	0.819569
Apr-Jun09	-0.020006	0.049971	-0.400356	0.7576	0.138143
Jul-Sep09	3.373424	0.882291	3.823484	0.1629	0.935976
Oct-Dec09	14.50823	27.43122	0.528895	0.6903	0.218585
Jan-Mar 10	0.502195	0.209214	2.400392	0.2513	0.852112
Apr-Jun10	0.568593	0.633598	0.897402	0.5344	0.446085
Jul-Sep10	0.007928	0.006697	1.183743	0.4466	0.583550
Oct-Dec10	26.19720**	1.389336	18.85592	0.0337	0.997195
Jan-Mar 11	1.993295	1.326737	1.502404	0.3739	0.692989
Apr-Jun11	N/A				
Jul-Sep11	N/A				
Oct-Dec11	-1.561576	1.368250	-1.141295	0.4581	0.565700
Jan-Mar 12	-0.390659	0.160567	-2.432990	0.2483	0.855480
Apr-Jun12	2.594997	1.089665	2.381463	0.2531	0.850106
Jul-Sep12	-0.168033	0.160601	-1.046280	0.4856	0.522605
Oct-Dec12	-2.823756	3.018180	-0.935582	0.5212	0.466756
Jan-Mar13	-1.343751	2.788692	-0.481857	0.7141	0.188434
Apr-Jun13	-0.060920	0.015693	-3.881883	0.1605	0.937768
Jul-Sep13	N/A				
Oct-Dec13	N/A				
Jan-Mar 14	-9.326145	2.537239	-3.675706	0.1691	0.931086
Apr-Jun14	5.297331	5.108548	1.036955	0.4885	0.518136
Jul-Sep14	-0.003275	0.002492	-1.314196	0.4141	0.633312
Oct-Dec14	-1.185639	2.536821	-0.467372	0.7217	0.179276
Jan-Mar 15	3.017474	5.756675	0.524170	0.6926	0.215535
Apr-Jun15	2.722978*	0.300276	9.068244	0.0699	0.987986
Jul-Sep15	-0.031432	0.005556	-5.657556	0.1114	0.969704
Oct-Dec15	N/A				
6 MONTHS					
Jan-Jun06	0.716182	2.873226	0.249260	0.8154	0.015295
Jul-Dec06	0.131503	0.069085	1.903493	0.1297	0.475292
Jan-Jun07	-1.042473	2.109102	-0.494273	0.6701	0.108856
Jul-Dec07	-0.011960	0.069343	-0.172468	0.8789	0.014655
Jan-Jun08	0.658311	0.364955	1.803815	0.1456	0.448561
Jul-Dec08	0.113366	0.449193	0.252378	0.8132	0.015674
Jan-Jun09	-0.227173*	0.101286	-2.242888	0.0883	0.557059
Jul-Dec09	-0.656618	25.39097	-0.025860	0.9806	0.000167
Jan-Jun10	0.004954	0.004814	1.028965	0.3616	0.209294
Jul-Dec10	9.432428	7.967932	1.183799	0.3020	0.259448
Jan-Jun11	0.402967	0.390551	1.031791	0.3781	0.261919
Jul-Dec11	1.082702	1.800545	0.601319	0.5900	0.107564
Jan-Jun12	-0.646316***	0.138229	-4.675676	0.0095	0.845333
Jul-Dec12	1.290102	1.395758	0.924302	0.4076	0.175994
Jan-Jun13	0.161549	0.113089	1.428509	0.2485	0.404837
Jul-Dec13	0.543304**	0.114836	4.731119	0.0179	0.881813
Jan-Jun14	-0.100968	0.155091	-0.651025	0.5505	0.095807

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jul-Dec14	-0.848226	1.244921	-0.681349	0.5331	0.103990
Jan-Jun15	-0.194613	0.277309	-0.701790	0.5215	0.109629
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	-0.382742	0.366442	-1.044481	0.3268	0.120003
Jan-Dec07	-0.030417	0.102096	-0.297927	0.7733	0.010973
Jan-Dec08	-0.171407	0.096000	-1.785483	0.1045	0.241732
Jan-Dec09	0.090265	0.190586	0.473617	0.6459	0.021939
Jan-Dec10	1.448185	3.994410	0.362553	0.7253	0.014395
Jan-Dec11	-0.017441	0.496663	-0.035116	0.9728	0.000137
Jan-Dec12	0.679567*	0.308135	2.205424	0.0549	0.350832
Jan-Dec13	-0.013982	0.078642	-0.177795	0.8628	0.003500
Jan-Dec14	1.163313***	0.244110	4.765535	0.0008	0.694286

***, ** and * denote significance at the 1% level, 5% level and 10% level respectively.

Table 4.13: Stanlib Multi Manager Property Fund B1 Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
3 MONTHS					
Jan-Mar 06	0.290154	0.324604	0.893872	0.5356	0.444138
Apr-Jun06	-0.175080	0.088127	-1.986684	0.2969	0.797854
Jul-Sep06	3.273045	6.111243	0.535578	0.6870	0.222905
Oct-Dec06	0.887261	2.009085	0.441624	0.7353	0.163202
Jan-Mar 07	0.028481	0.061672	0.461819	0.7246	0.175786
Apr-Jun07	4.746648	8.468664	0.560496	0.6748	0.239055
Jul-Sep07	N/A				
Oct-Dec07	N/A				
Jan-Mar08	-1.701216	0.762978	-2.229705	0.2684	0.832540
Apr-Jun08	1.577697	0.755698	2.087735	0.2844	0.813385
Jul-Sep08	-0.081840	0.062660	-1.306098	0.4160	0.630436
Oct-Dec08	-0.196466**	0.010877	-18.06184	0.0352	0.996944
Jan-Mar 09	N/A				
Apr-Jun09	N/A				
Jul-Sep09	N/A				
Oct-Dec09	-3.022651	2.810492	-1.075488	0.4769	0.536323
Jan-Mar 10	-0.159164	0.272642	-0.583783	0.6636	0.254178
Apr-Jun10	-1.437732	1.828688	-0.786209	0.5758	0.382001
Jul-Sep10	0.005060	0.006184	0.818220	0.5634	0.401013
Oct-Dec10	N/A				
Jan-Mar 11	N/A				
Apr-Jun11	0.394681	0.147357	2.678392	0.2275	0.877658
Jul-Sep11	-6.115064	5.586071	-1.094699	0.4712	0.545116
Oct-Dec11	-5.395717	3.202118	-1.685046	0.3410	0.739541
Jan-Mar 12	N/A				
Apr-Jun12	N/A				
Jul-Sep12	-0.209376	0.055840	-3.749591	0.1659	0.933596
Oct-Dec12	-3.308308	0.883982	-3.742507	0.1662	0.933362
Jan-Mar13	1.066668	0.880714	1.211140	0.4394	0.594627
Apr-Jun13	0.469905	0.141565	3.319362	0.1863	0.916793

Jul-Sep13	2.286539*	0.248096	9.216355	0.0688	0.988364
Oct-Dec13	0.245617	0.756152	0.324825	0.8001	0.095441
Jan-Mar 14	2.174306	1.168625	1.860567	0.3140	0.775871
Apr-Jun14	0.977862	0.672141	1.454848	0.3834	0.679136
Jul-Sep14	0.324812	0.097852	3.319414	0.1863	0.916795
Oct-Dec14	0.240059	0.230431	1.041780	0.4870	0.520454
Jan-Mar 15	5.852094	2.615123	2.237789	0.2675	0.833547
Apr-Jun15	2.893526	1.529618	1.891665	0.3096	0.781583
Jul-Sep15	0.006922	0.017822	0.388392	0.7642	0.131076
Oct-Dec15	N/A				
6 MONTHS					
Jan-Jun06	-0.121464	0.183161	-0.663151	0.5435	0.099052
Jul-Dec06	-0.170601	0.461706	-0.369501	0.7305	0.033006
Jan-Jun07	0.186713	0.258061	0.723520	0.5445	0.207444
Jul-Dec07	0.342978	0.506412	0.677272	0.5681	0.186561
Jan-Jun08	-0.071762	0.169280	-0.423925	0.6934	0.042996
Jul-Dec08	0.014512	0.008327	1.742774	0.1797	0.503086
Jan-Jun09	-0.156473	0.200231	-0.781464	0.4915	0.169133
Jul-Dec09	-1.268897	13.70525	-0.092585	0.9307	0.002138
Jan-Jun10	-0.013903*	0.005195	-2.676161	0.0554	0.641636
Jul-Dec10	41.06324	26.61272	1.542993	0.2205	0.442465
Jan-Jun11	-1.141387	1.443547	-0.790682	0.4869	0.172454
Jul-Dec11	16.80628	15.15468	1.108983	0.3483	0.290754
Jan-Jun12	0.031701***	0.004648	6.819606	0.0064	0.939403
Jul-Dec12	-1.316115	1.219116	-1.079566	0.3411	0.225626
Jan-Jun13	0.269986	0.311757	0.866014	0.4353	0.157891
Jul-Dec13	0.380298	1.139117	0.333853	0.7553	0.027109
Jan-Jun14	0.290163	0.334508	0.867433	0.4346	0.158327
Jul-Dec14	0.175852	0.209081	0.841071	0.4476	0.150274
Jan-Jun15	-0.066575	0.187149	-0.355733	0.7400	0.030666
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	0.213813	0.354354	0.603389	0.5630	0.043529
Jan-Dec07	-0.075920	0.564817	-0.134415	0.8964	0.002253
Jan-Dec08	0.011671	0.025611	0.455708	0.6594	0.022554
Jan-Dec09	0.037654	0.165153	0.227996	0.8247	0.005743
Jan-Dec10	1.990741	9.682337	0.205605	0.8417	0.004675
Jan-Dec11	0.101658	0.225817	0.450177	0.6645	0.024706
Jan-Dec12	0.058984	0.511197	0.115385	0.9107	0.001477
Jan-Dec13	-0.196826	0.475460	-0.413969	0.6876	0.016848
Jan-Dec14	-0.131141	0.055542	-2.361098	0.0399	0.357936

***, ** and * denote significance at the 1% level, 5% level and 10% level respectively.

Table 4.14: Stanlib Property Income Fund A Persistence

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
3 MONTHS					
Jan-Mar 06	0.849986	1.313181	0.647273	0.6343	0.295260
Apr-Jun06	0.262695	1.077921	0.243705	0.8478	0.056063
Jul-Sep06	-0.729795	16.17335	-0.045123	0.9713	0.002032
Oct-Dec06	0.034725	0.051397	0.675626	0.6217	0.313408
Jan-Mar 07	1.260481	0.764072	1.649688	0.3469	0.731289

Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Apr-Jun07	2.202595	1.794032	1.227735	0.4351	0.601170
Jul-Sep07	N/A				
Oct-Dec07	N/A				
Jan-Mar08	0.549665	0.330581	1.662721	0.3447	0.734370
Apr-Jun08	0.278560	0.422683	0.659028	0.6290	0.302804
Jul-Sep08	1.515985***	0.022734	66.68390	0.0095	0.999775
Oct-Dec08	0.989105	1.675073	0.590485	0.6604	0.258530
Jan-Mar 09	5.033646	3.763860	1.337363	0.4087	0.641389
Apr-Jun09	N/A				
Jul-Sep09	N/A				
Oct-Dec09	-1.068956	0.462871	-2.309404	0.2601	0.842106
Jan-Mar 10	0.407608	0.522528	0.780070	0.5783	0.378307
Apr-Jun10	1.797726	2.873761	0.625566	0.6441	0.281264
Jul-Sep10	0.004631	0.006450	0.717919	0.6036	0.340112
Oct-Dec10	25.78893**	1.423363	18.11831	0.0351	0.996963
Jan-Mar 11	-0.876769	1.256499	-0.697787	0.6121	0.327463
Apr-Jun11	N/A				
Jul-Sep11	N/A				
Oct-Dec11	0.131694	0.671154	0.196221	0.8766	0.037075
Jan-Mar 12	-0.261427	0.712916	-0.366702	0.7762	0.118531
Apr-Jun12	-0.203085	0.041071	-4.944721	0.1270	0.960708
Jul-Sep12	0.182878	0.312895	0.584470	0.6633	0.254624
Oct-Dec12	5.689513	8.819459	0.645109	0.6353	0.293868
Jan-Mar13	-0.406919	0.971788	-0.418732	0.7475	0.149180
Apr-Jun13	0.350546	0.118939	2.947282	0.2082	0.896763
Jul-Sep13	N/A				
Oct-Dec13	N/A				
Jan-Mar 14	-4.829607	2.585253	-1.868137	0.3129	0.777280
Apr-Jun14	0.410866	0.202011	2.033874	0.2909	0.805320
Jul-Sep14	-1.131913	0.922805	-1.226600	0.4354	0.600726
Oct-Dec14	0.018900	0.108131	0.174791	0.8898	0.029646
Jan-Mar 15	1.683687	3.272548	0.514488	0.6975	0.209297
Apr-Jun15	1.125937	1.546454	0.728077	0.5994	0.346446
Jul-Sep15	N/A				
Oct-Dec15	N/A				
6 MONTHS					
Jan-Jun06	0.176238	1.173911	0.150129	0.8879	0.005603
Jul-Dec06	0.533749**	0.191280	2.790407	0.0493	0.660625
Jan-Jun07	3.573048	2.338724	1.527777	0.2661	0.538543
Jul-Dec07	0.241616**	0.054987	4.394085	0.0481	0.906138
Jan-Jun08	0.335576	0.189551	1.770376	0.1514	0.439323
Jul-Dec08	0.287499	0.741577	0.387686	0.7180	0.036214
Jan-Jun09	-0.139435*	0.046089	-3.025349	0.0565	0.753142
Jul-Dec09	-4.286788	10.18802	-0.420767	0.7022	0.055726
Jan-Jun10	0.019250	0.011229	1.714387	0.1616	0.423558
Jul-Dec10	-4.207559	11.46608	-0.366957	0.7322	0.032568
Jan-Jun11	-0.337472	0.286434	-1.178184	0.3237	0.316336
Jul-Dec11	1.051084	1.724531	0.609490	0.5853	0.110183
Jan-Jun12	-0.015518	0.039648	-0.391387	0.7155	0.036883
Jul-Dec12	1.333712	4.524005	0.294808	0.7828	0.021266
Jan-Jun13	-0.343876	0.174450	-1.971200	0.1433	0.564310

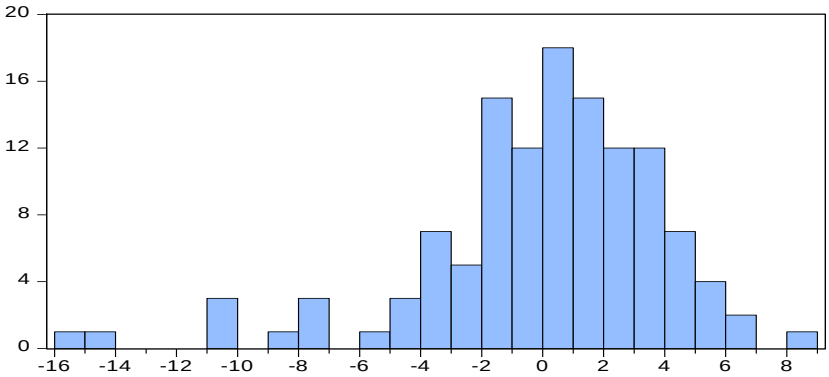
Period	Coefficient	Std. Error	t-Stat	P-value	R^2
Jul-Dec13	1.421985*	0.560314	2.537838	0.0848	0.682224
Jan-Jun14	-0.819920	0.913515	-0.897545	0.4202	0.167635
Jul-Dec14	0.118601	0.092642	1.280207	0.2697	0.290645
Jan-Jun15	0.003991	0.163104	0.024472	0.9820	0.000200
Jul-Dec15	N/A				
12 MONTHS					
Jan-Dec06	0.190222	0.684921	0.277728	0.7883	0.009550
Jan-Dec07	0.172708	0.143110	1.206819	0.2620	0.154013
Jan-Dec08	-0.125021	0.075307	-1.660141	0.1313	0.234438
Jan-Dec09	0.024310	0.172691	0.140773	0.8911	0.002197
Jan-Dec10	-1.501605	4.838003	-0.310377	0.7633	0.010590
Jan-Dec11	-0.071083	0.105750	-0.672186	0.5183	0.047804
Jan-Dec12	0.541066	0.316986	1.706906	0.1220	0.244556
Jan-Dec13	-0.994620**	0.364639	-2.727680	0.0233	0.452563
Jan-Dec14	-0.039450	0.058970	-0.668973	0.5203	0.047370

***, ** and * denote significance at the 1% level, 5% level and 10% level respectively.

Appendix C: Diagnostic Test for Section 4.2

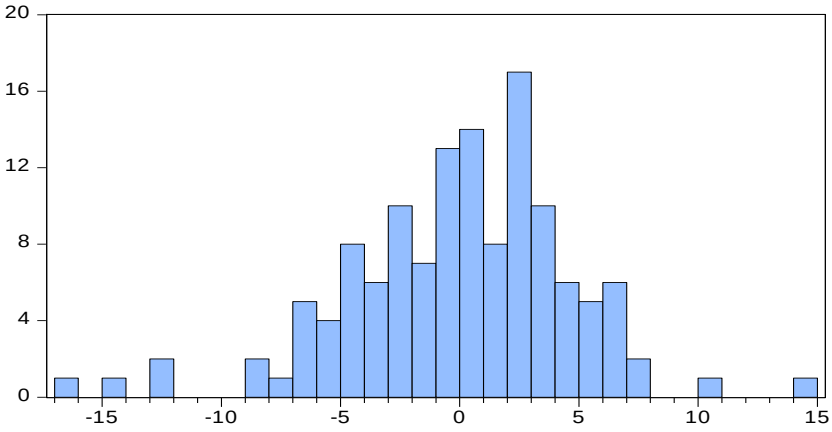
Figure 4.1 – 4.10 display Test for Normality Results:

Figure 4.1 36ONE MET Flexible Opportunity Fund A



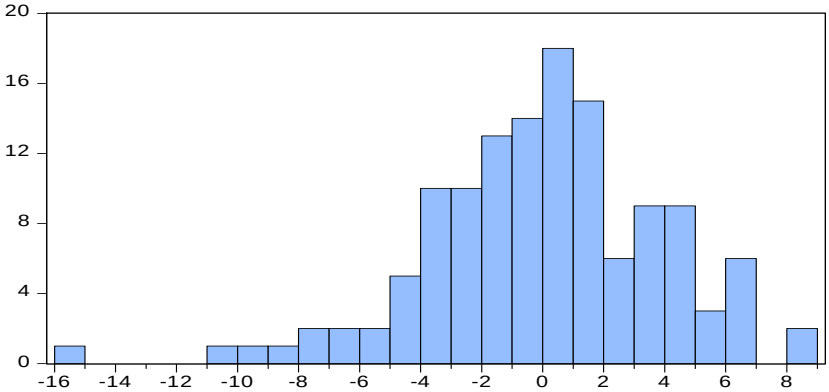
Series: Residuals	
Sample 2005M09 2015M12	
Observations 123	
Mean	-9.39e-16
Median	0.490089
Maximum	8.983134
Minimum	-15.94181
Std. Dev.	3.992486
Skewness	-1.280485
Kurtosis	5.832933
Jarque-Bera	74.74338
Probability	0.000000

Figure 4.2 Catalyst SA Property Equity PSG Fund



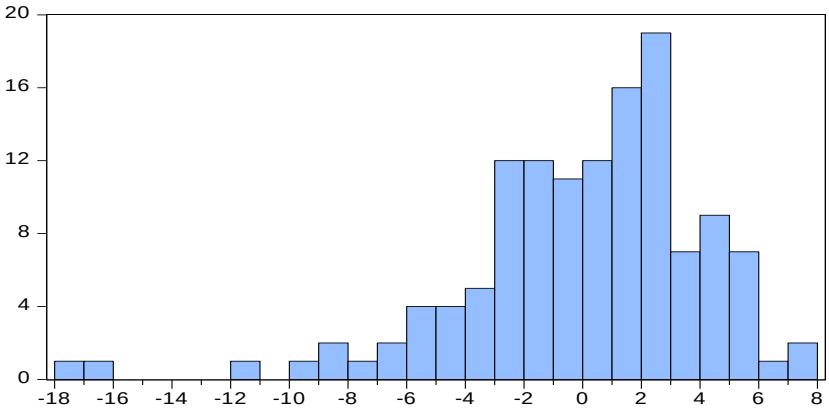
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	-3.07e-16
Median	0.503460
Maximum	14.20107
Minimum	-16.66213
Std. Dev.	4.711589
Skewness	-0.565031
Kurtosis	4.457781
Jarque-Bera	18.42840
Probability	0.000100

Figure 4.3 Coronation Industrial Fund



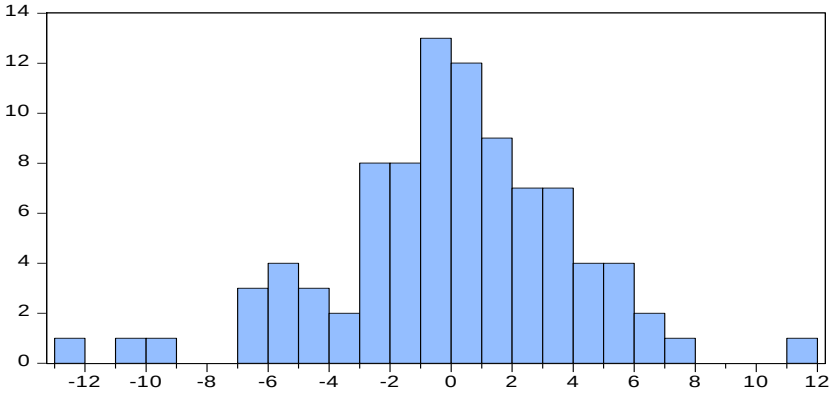
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	-1.57e-16
Median	0.202219
Maximum	8.326498
Minimum	-15.59940
Std. Dev.	3.824384
Skewness	-0.641105
Kurtosis	4.604139
Jarque-Bera	22.84382
Probability	0.000011

Figure 4.4 Nedgroup Investments Entrepreneur Fund R



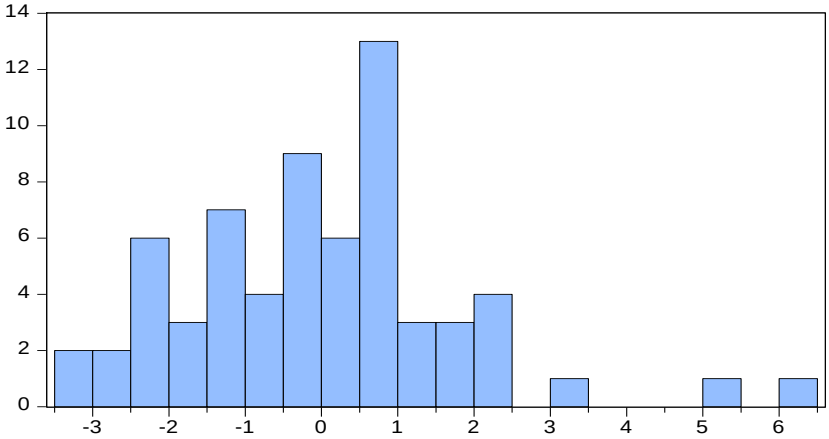
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	-2.60e-16
Median	0.698780
Maximum	7.892574
Minimum	-17.96310
Std. Dev.	4.166297
Skewness	-1.329375
Kurtosis	6.453889
Jarque-Bera	102.9075
Probability	0.000000

Figure 4.5 Investec Property Equity Fund A



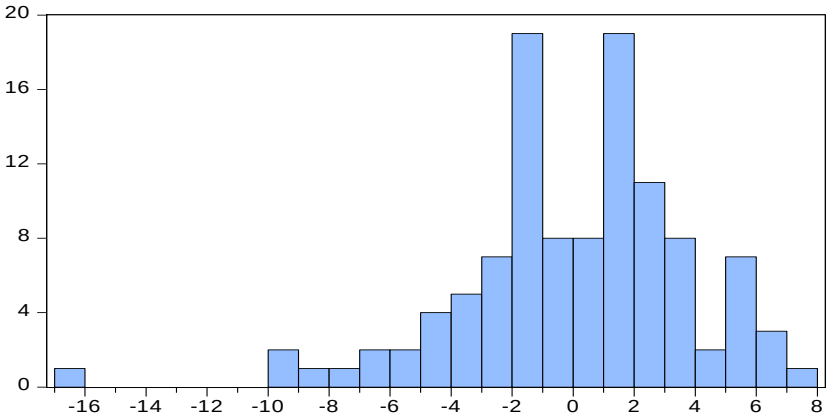
Series: Residuals	
Sample 2007M09 2015M12	
Observations 91	
Mean	-1.58e-15
Median	0.236479
Maximum	11.73716
Minimum	-12.73688
Std. Dev.	3.978877
Skewness	-0.366342
Kurtosis	4.123923
Jarque-Bera	6.825116
Probability	0.032957

Figure 4.6 Rezco Value Trend Fund A



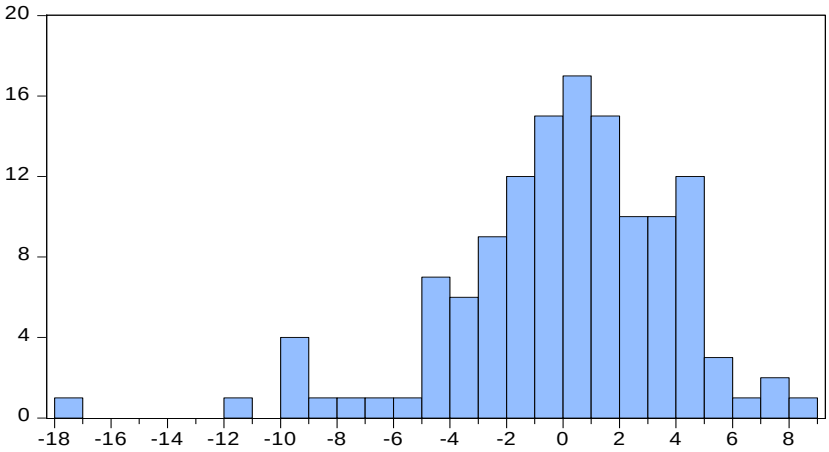
Series: Residuals	
Sample 2010M08 2015M12	
Observations 65	
Mean	-1.46e-15
Median	-0.036139
Maximum	6.464706
Minimum	-3.486386
Std. Dev.	1.824499
Skewness	0.848059
Kurtosis	4.899007
Jarque-Bera	17.55824
Probability	0.000154

Figure 4.7 SIM Industrial Fund R



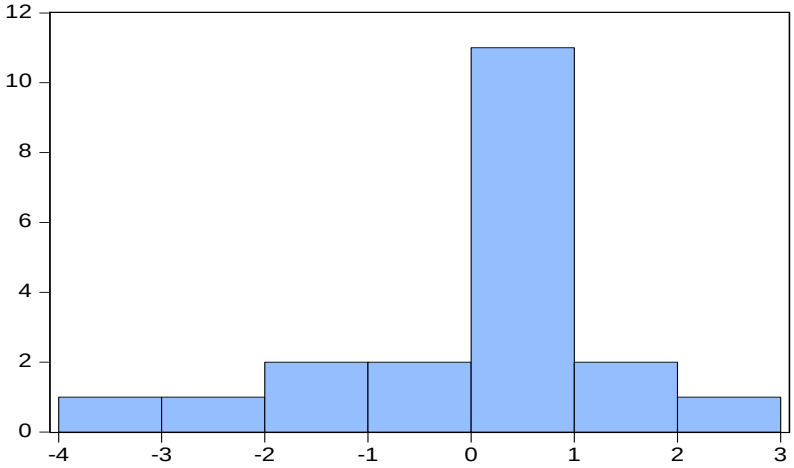
Series: Residuals	
Sample 2006M07 2015M12	
Observations 111	
Mean	-3.76e-15
Median	0.844395
Maximum	7.394672
Minimum	-16.52940
Std. Dev.	3.802004
Skewness	-0.963971
Kurtosis	5.445290
Jarque-Bera	44.84587
Probability	0.000000

Figure 4.8 Stanlib Industrial Fund R



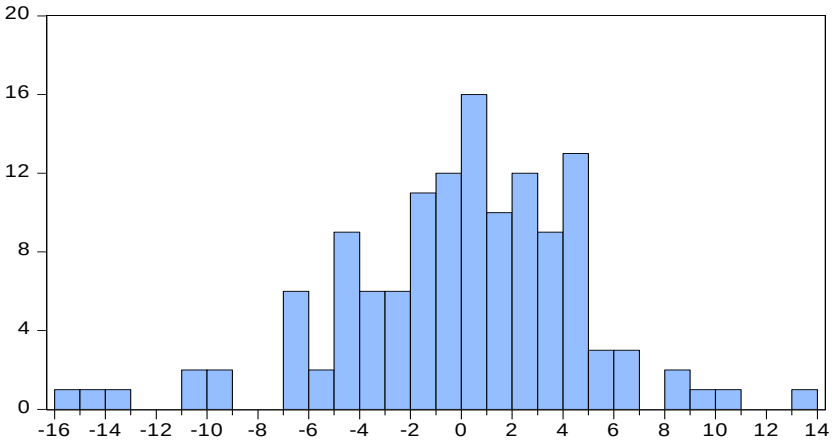
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	-2.21e-15
Median	0.143912
Maximum	8.779747
Minimum	-17.49024
Std. Dev.	4.015407
Skewness	-1.044774
Kurtosis	5.447436
Jarque-Bera	56.09582
Probability	0.000000

Figure 4.9 Stanlib Multi Manager Property Fund B1



Series: Residuals	
Sample 2014M05 2015M12	
Observations 20	
Mean	1.44e-14
Median	0.366172
Maximum	2.315174
Minimum	-3.549144
Std. Dev.	1.363202
Skewness	-0.977417
Kurtosis	3.830244
Jarque-Bera	3.758903
Probability	0.152674

Figure 4.10 Stanlib Property Fund A



Series: Residuals
Sample 2005M02 2015M12
Observations 130

Mean	9.63e-16
Median	0.366155
Maximum	13.26806
Minimum	-15.83301
Std. Dev.	4.695811
Skewness	-0.579766
Kurtosis	4.354350
Jarque-Bera	17.21837
Probability	0.000182

Table 4.1 Test for Correlation Results

36ONE			
F-statistic	5.158530	Prob. F(2,117)	0.0071
Obs*R-squared	9.967231	Prob. Chi-Square(2)	0.0068

CATALYST			
F-statistic	1.769314	Prob. F(2,124)	0.1747
Obs*R-squared	3.606920	Prob. Chi-Square(2)	0.1647

CORONATION			
F-statistic	0.397728	Prob. F(2,124)	0.6727
Obs*R-squared	0.828631	Prob. Chi-Square(2)	0.6608

NEDGROUP			
F-statistic	1.770495	Prob. F(2,124)	0.1745
Obs*R-squared	3.609261	Prob. Chi-Square(2)	0.1645

INVESTEC			
F-statistic	0.649304	Prob. F(2,85)	0.5250
Obs*R-squared	1.369353	Prob. Chi-Square(2)	0.5043

REZCO			
F-statistic	3.443621	Prob. F(2,59)	0.0385
Obs*R-squared	6.794498	Prob. Chi-Square(2)	0.0335

SIM			
F-statistic	0.713540	Prob. F(2,105)	0.4923
Obs*R-squared	1.488398	Prob. Chi-Square(2)	0.4751

STANLIB INDUSTRIAL

F-statistic	0.209485	Prob. F(2,124)	0.8113
Obs*R-squared	0.437763	Prob. Chi-Square(2)	0.8034

STANLIB MULTIMANAGER

F-statistic	0.334796	Prob. F(2,14)	0.7211
Obs*R-squared	0.912898	Prob. Chi-Square(2)	0.6335

STANLIB PROPERTY INCOME

F-statistic	1.916913	Prob. F(2,124)	0.1514
Obs*R-squared	3.898791	Prob. Chi-Square(2)	0.1424

Table 4.2 Test for Heteroscedasticity Results

36ONE

F-statistic	1.853822	Prob. F(9,113)	0.0662
Obs*R-squared	15.82443	Prob. Chi-Square(9)	0.0706
Scaled explained SS	35.79254	Prob. Chi-Square(9)	0.0000

CATALYST

F-statistic	1.058035	Prob. F(9,120)	0.3988
Obs*R-squared	9.557435	Prob. Chi-Square(9)	0.3875
Scaled explained SS	15.52256	Prob. Chi-Square(9)	0.0775

INVESTEC

F-statistic	2.763220	Prob. F(9,120)	0.0057
Obs*R-squared	22.31649	Prob. Chi-Square(9)	0.0079
Scaled explained SS	37.77912	Prob. Chi-Square(9)	0.0000

NEDGROUP

F-statistic	1.527603	Prob. F(9,120)	0.1458
Obs*R-squared	13.36311	Prob. Chi-Square(9)	0.1469
Scaled explained SS	34.23248	Prob. Chi-Square(9)	0.0001

INVESTEC

F-statistic	1.186718	Prob. F(9,81)	0.3148
Obs*R-squared	10.60119	Prob. Chi-Square(9)	0.3040
Scaled explained SS	15.13494	Prob. Chi-Square(9)	0.0873

REZCO

F-statistic	0.325980	Prob. F(9,55)	0.9628
Obs*R-squared	3.291658	Prob. Chi-Square(9)	0.9516
Scaled explained SS	5.651604	Prob. Chi-Square(9)	0.7742

SIM

F-statistic	2.025173	Prob. F(9,101)	0.0439
Obs*R-squared	16.96894	Prob. Chi-Square(9)	0.0492

Scaled explained SS	35.04663	Prob. Chi-Square(9)	0.0001

STANLIB INDUSTRIAL

F-statistic	1.221197	Prob. F(9,120)	0.2884
Obs*R-squared	10.90764	Prob. Chi-Square(9)	0.2821
Scaled explained SS	22.78583	Prob. Chi-Square(9)	0.0067

STANLIB MULTIMANAGER

F-statistic	0.322148	Prob. F(8,11)	0.9406
Obs*R-squared	3.796350	Prob. Chi-Square(8)	0.8750
Scaled explained SS	3.438271	Prob. Chi-Square(8)	0.9039

STANLIB PROPERTY INCOME

F-statistic	3.419988	Prob. F(9,120)	0.0009
Obs*R-squared	26.53793	Prob. Chi-Square(9)	0.0017
Scaled explained SS	41.81188	Prob. Chi-Square(9)	0.0000

Appendix D: Diagnostic Tests for Section 4.3

Figure 4.11 to 4.20 display Test for Normality Results:

Figure 4.11 36ONE MET Flexible Opportunity Fund A

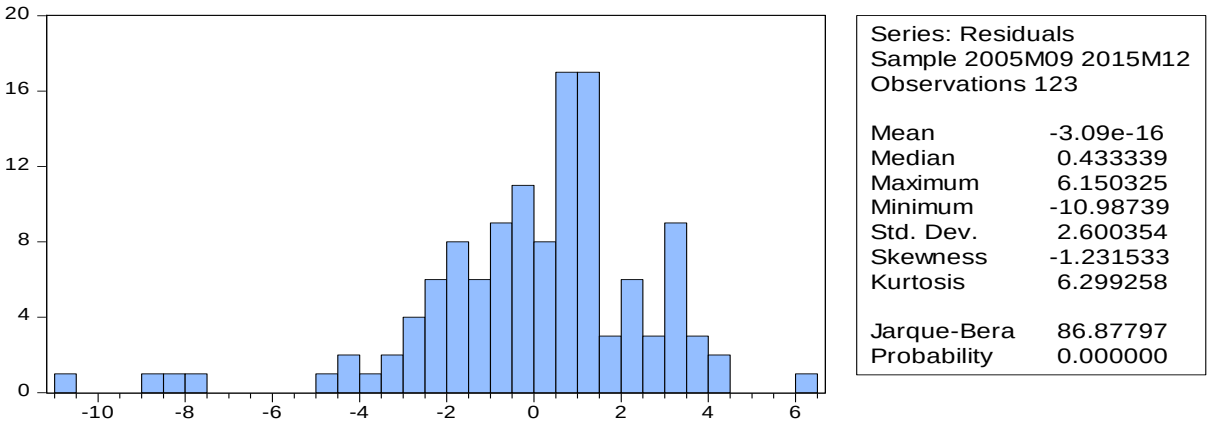
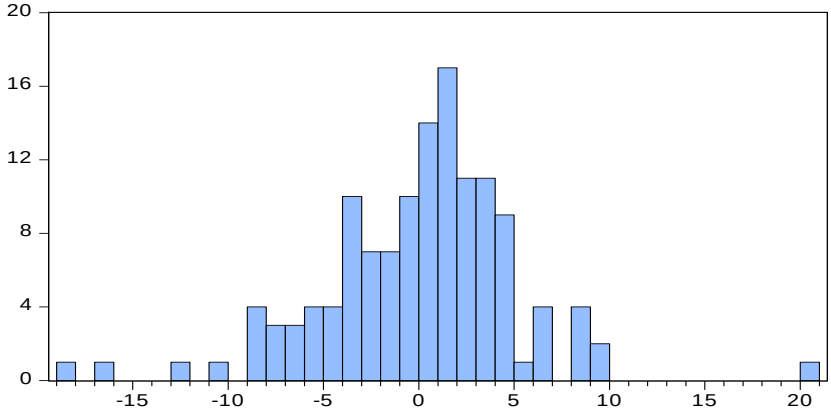
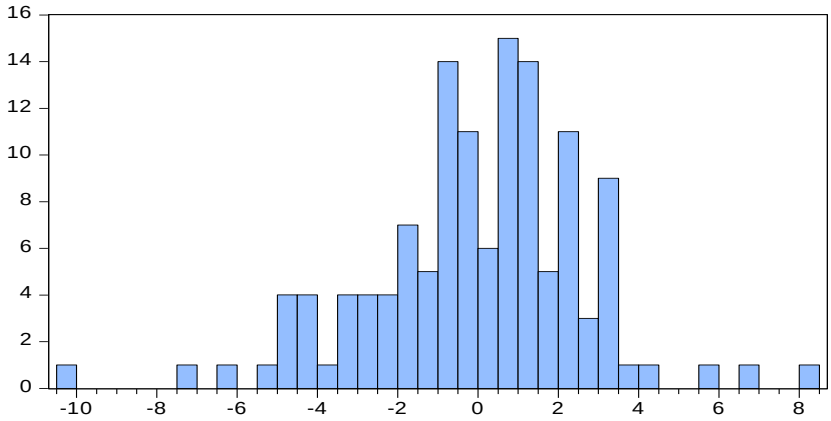


Figure 4.12 Catalyst SA Property Equity PSG Fund



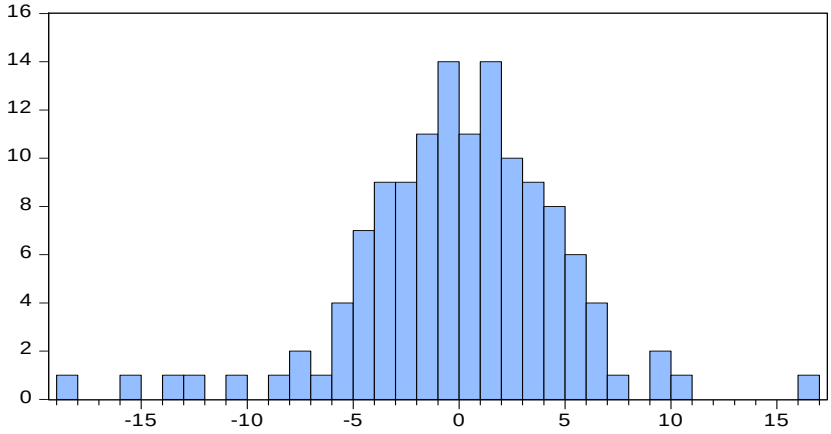
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	-5.53e-16
Median	0.700308
Maximum	20.74064
Minimum	-18.96519
Std. Dev.	5.163280
Skewness	-0.286866
Kurtosis	5.795383
Jarque-Bera	44.10973
Probability	0.000000

Figure 4.13 Coronation Industrial Fund



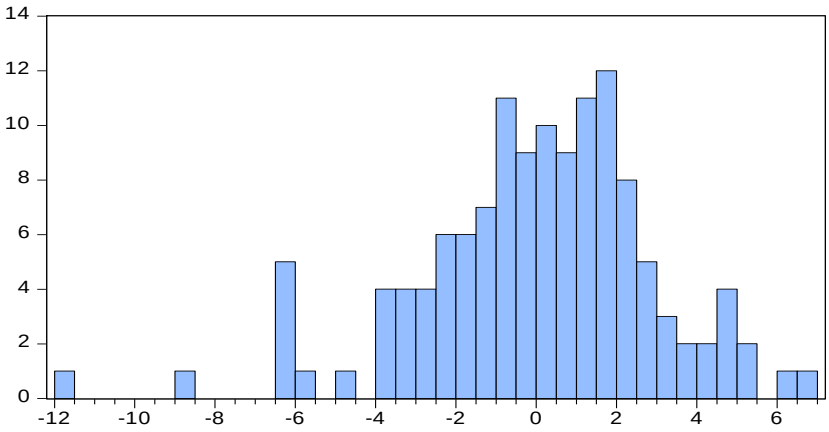
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	-4.07e-16
Median	0.244967
Maximum	8.173420
Minimum	-10.10889
Std. Dev.	2.681169
Skewness	-0.449022
Kurtosis	4.519499
Jarque-Bera	16.87487
Probability	0.000217

Figure 4.14 Investec Property Equity Fund A



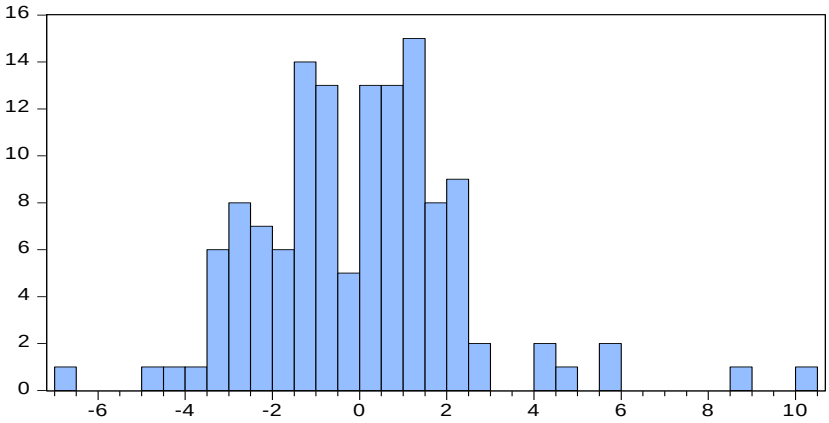
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	3.01e-16
Median	0.081166
Maximum	16.82473
Minimum	-18.07411
Std. Dev.	4.869885
Skewness	-0.491994
Kurtosis	5.419923
Jarque-Bera	36.96475
Probability	0.000000

Figure 4.15 Nedgroup Investments Entrepreneur Fund R



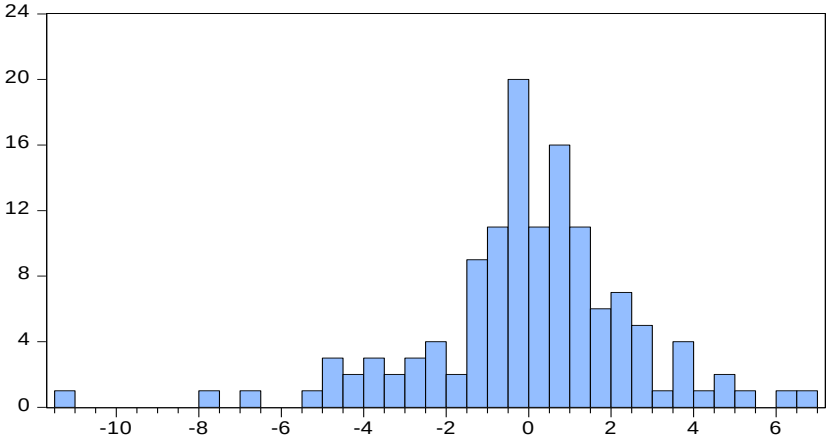
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	1.67e-16
Median	0.191212
Maximum	6.819684
Minimum	-11.53964
Std. Dev.	2.951943
Skewness	-0.698664
Kurtosis	4.535757
Jarque-Bera	23.35164
Probability	0.000008

Figure 4.16 Rezco Value Trend Fund A



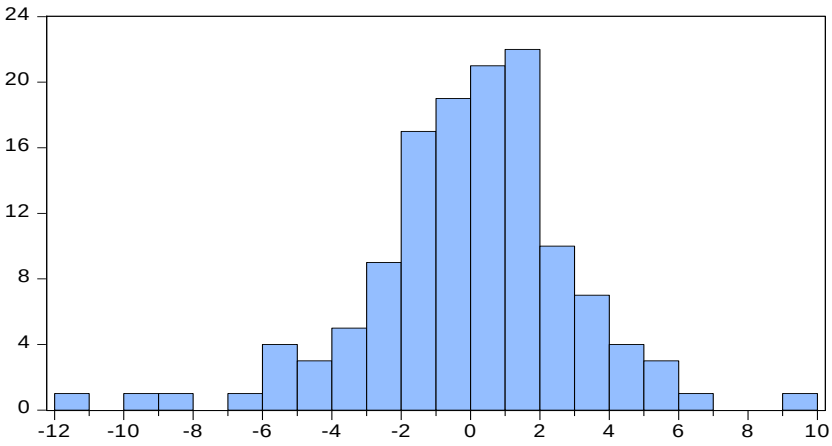
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	-8.54e-17
Median	0.067945
Maximum	10.31097
Minimum	-6.693425
Std. Dev.	2.380665
Skewness	0.944095
Kurtosis	6.171410
Jarque-Bera	73.79179
Probability	0.000000

Figure 4.17 SIM Industrial Fund R



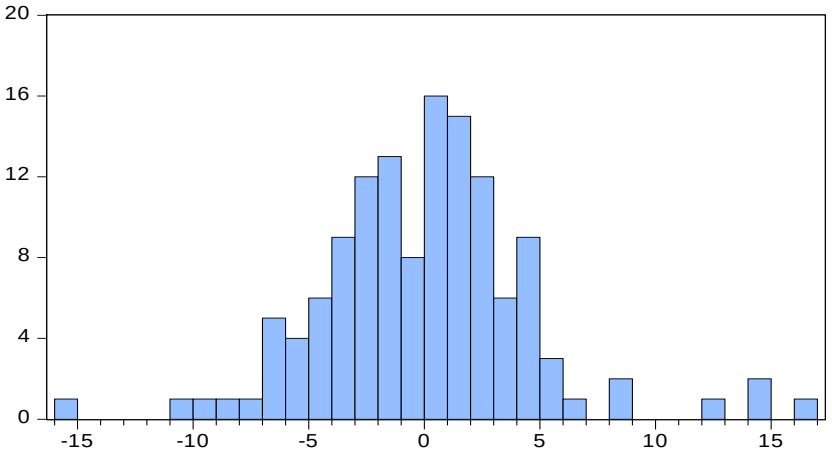
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	1.15e-16
Median	0.034464
Maximum	6.584229
Minimum	-11.09040
Std. Dev.	2.559195
Skewness	-0.773698
Kurtosis	5.705566
Jarque-Bera	52.62032
Probability	0.000000

Figure 4.18 Stanlib Industrial Fund R



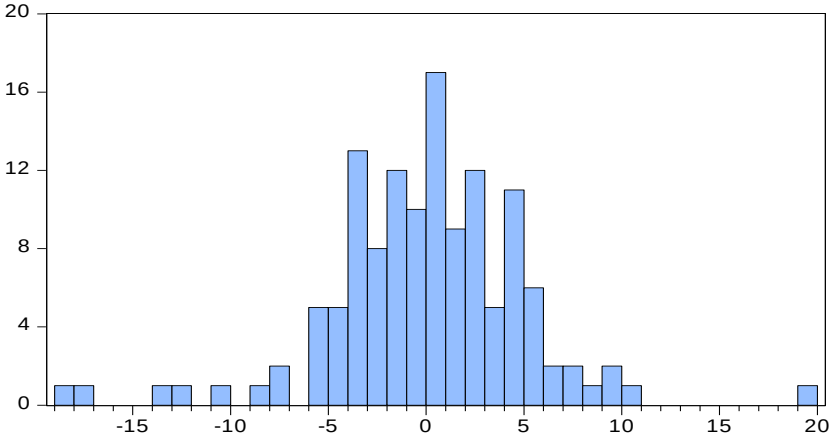
Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	6.83e-18
Median	0.252613
Maximum	9.703235
Minimum	-11.79749
Std. Dev.	2.979588
Skewness	-0.615283
Kurtosis	5.549974
Jarque-Bera	43.42357
Probability	0.000000

Figure 4.19 Stanlib Multi Manager Property Fund B1



Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	2.05e-16
Median	0.252179
Maximum	16.18136
Minimum	-15.78427
Std. Dev.	4.584896
Skewness	0.394533
Kurtosis	5.292824
Jarque-Bera	31.84820
Probability	0.000000

Figure 4.10 Stanlib Property Fund A



Series: Residuals	
Sample 2005M02 2015M12	
Observations 130	
Mean	2.60e-16
Median	0.307175
Maximum	19.04815
Minimum	-18.16688
Std. Dev.	5.030431
Skewness	-0.381425
Kurtosis	5.760841
Jarque-Bera	44.43933
Probability	0.000000

Table 4.15 Test for Serial Correlation Results

360			
F-statistic	1.692177	Prob. F(2,119)	0.1885
Obs*R-squared	3.401379	Prob. Chi-Square(2)	0.1826
CATALYST			
F-statistic	0.782131	Prob. F(2,126)	0.4596
Obs*R-squared	1.594130	Prob. Chi-Square(2)	0.4506
CORONATION			
F-statistic	3.978010	Prob. F(2,126)	0.0211
Obs*R-squared	7.721062	Prob. Chi-Square(2)	0.0211
INVESTEC			
F-statistic	2.111674	Prob. F(2,126)	0.1253
Obs*R-squared	4.216104	Prob. Chi-Square(2)	0.1215
NEDGROUP			
F-statistic	0.153993	Prob. F(2,126)	0.8574
Obs*R-squared	0.316989	Prob. Chi-Square(2)	0.8534
REZCO			
F-statistic	0.587996	Prob. F(2,126)	0.5570
Obs*R-squared	1.202105	Prob. Chi-Square(2)	0.5482
SIM			
F-statistic	0.251791	Prob. F(2,126)	0.7778
Obs*R-squared	0.517501	Prob. Chi-Square(2)	0.7720
STANLIB INDUSTRIAL			
F-statistic	0.338923	Prob. F(2,126)	0.7132
Obs*R-squared	0.695622	Prob. Chi-Square(2)	0.7062
STANLIB MULTIMANAGER			
F-statistic	4.141201	Prob. F(2,126)	0.0181
Obs*R-squared	8.018268	Prob. Chi-Square(2)	0.0181
STANLIB PROPERTY INCOME			
F-statistic	1.621179	Prob. F(2,126)	0.2018
Obs*R-squared	3.261364	Prob. Chi-Square(2)	0.1958

Table 4.16 Test for Heteroscedasticity Results

360

F-statistic	0.540262	Prob. F(2,120)	0.5840
Obs*R-squared	1.097654	Prob. Chi-Square(2)	0.5776
Scaled explained SS	2.814564	Prob. Chi-Square(2)	0.2448
CATALYST			
F-statistic	2.731525	Prob. F(2,127)	0.0689
Obs*R-squared	5.361468	Prob. Chi-Square(2)	0.0685
Scaled explained SS	12.46265	Prob. Chi-Square(2)	0.0020
CORONATION			
F-statistic	4.495174	Prob. F(2,127)	0.0130
Obs*R-squared	8.594324	Prob. Chi-Square(2)	0.0136
Scaled explained SS	14.66209	Prob. Chi-Square(2)	0.0007
INVESTEC			
F-statistic	0.841898	Prob. F(2,127)	0.4333
Obs*R-squared	1.701018	Prob. Chi-Square(2)	0.4272
Scaled explained SS	3.644406	Prob. Chi-Square(2)	0.1617
NEDGROUP			
F-statistic	0.914411	Prob. F(2,127)	0.4034
Obs*R-squared	1.845448	Prob. Chi-Square(2)	0.3974
Scaled explained SS	3.162915	Prob. Chi-Square(2)	0.2057
REZCO			
F-statistic	7.053058	Prob. F(2,127)	0.0012
Obs*R-squared	12.99586	Prob. Chi-Square(2)	0.0015
Scaled explained SS	32.57745	Prob. Chi-Square(2)	0.0000
SIM			
F-statistic	1.087210	Prob. F(2,127)	0.3403
Obs*R-squared	2.188318	Prob. Chi-Square(2)	0.3348
Scaled explained SS	4.991437	Prob. Chi-Square(2)	0.0824
STANLIB INDUSTRIAL			
F-statistic	2.835885	Prob. F(2,127)	0.0624
Obs*R-squared	5.557552	Prob. Chi-Square(2)	0.0621
Scaled explained SS	12.25732	Prob. Chi-Square(2)	0.0022
STANLIB MULTIMANAGER			
F-statistic	5.202480	Prob. F(2,127)	0.0067
Obs*R-squared	9.844221	Prob. Chi-Square(2)	0.0073
Scaled explained SS	20.48461	Prob. Chi-Square(2)	0.0000
STANLIB PROPERTY INCOME			
F-statistic	0.967617	Prob. F(2,127)	0.3828

Obs*R-squared	1.951216	Prob. Chi-Square(2)	0.3770
Scaled explained SS	4.502899	Prob. Chi-Square(2)	0.1052