

The performance of value and momentum investing strategies on the JSE, South Africa

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A research report submitted to the Faculty of Commerce, Law and Management, University of Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

June, 2014

ABSTRACT

Previously, value and momentum investing strategies were widely used investment strategies by investment managers around the world. However, due to the global economic crisis that occurred in 2008, investors became uncertain regarding which investment strategy to utilise to generate the greatest amount of return. This study uses share price data of all the shares listed on the JSE over a period of 15 years to determine whether value and momentum investing generates excess returns. Furthermore, the study seeks to determine which investment strategy (value or momentum) delivers the greatest returns during bull and bear market conditions. It was found that both value and momentum investing generate excess returns and that momentum investing significantly outperforms value investing during bull and bear market conditions.

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CHAPTER 1

1.1 Introduction

This chapter introduces the context or background and the motivation for conducting the research on this topic. The problem statement provides insight into the relevancy of this research topic. The research objectives and research questions are also presented. The significance of the study briefly describes the topic's importance and who can benefit from the evidence. The outline of the study highlights the different chapters of the report and what its constituents are.

1.2 Context of the study

The aim of all investors is to maximise investment returns for a given level of risk. However, this task has become somewhat more difficult over the last 5 years because of the global economic crisis of 2008 and its subsequent effect on global equity markets. Investors have found themselves in uncharted waters and have become uncertain about which investment strategy would be most appropriate in order to maximise returns under such conditions. There are a number of investment strategies that investors can employ to form investment portfolios with the ultimate aim of generating returns above the appropriate benchmark. The two most common investment strategies that have been extensively researched are value investing and momentum investing (Bird and Whitaker, 2003).

The foundations of value investing date back to Graham and Dodd (1934) who suggested that analysts extrapolate past earnings growth too far out into the future and by so doing drive the price of the stock of the better performing firms to an excessive level. The Graham and Dodd hypothesis is that companies that are currently experiencing high earnings growth are unlikely to be able to sustain it for an extended period of time. When the earnings growth of such companies revert toward some industry mean, it will fall well short of the unrealistic expectations that have been built into current prices

and give rise to a downward correction in stock prices. Similarly, companies that have been performing poorly, whose share prices have been driven down too far subsequently mean-reverts when the fundamentals of the company begin to improve. These two phenomena – of share price momentum and undervalued shares being re-valued upwards over time – give investors the opportunity to generate superior returns from pursuing both momentum and value investing strategies.

Value strategies are defined as those in which shares that are perceived to be relatively under-valued by the market are purchased in order to realise superior returns (Fraser and Page, 1999). Measures of value include equity book-to-market ratios, earnings price ratios, dividend price ratios and cash flow-to-price ratios (Lakonishok, Shleifer & Vishny, 1994; Asness 1997). Shares are considered under-valued when they exhibit high ratios i.e. the shares of a company whose book value of equity is high relative to the current market value of equity are considered cheap (value shares) whereas the shares of a company whose book value of equity is low relative to the current market value of equity are considered expensive (growth shares) (Fraser and Page, 1999).

Momentum investing differs quite substantially from value investing. Momentum investing is based on the premise that past returns are an indication of future returns. In other words, shares that have produced the greatest returns over the past 6 – 12 months produce superior returns over the following 12 months (Novy-Marx, 2012).

International research has shown both value and momentum strategies to be effective in earning excess returns/predicting future returns (Fraser and Page, 1999). Rouwenhorst (1999) found that value investing is a profitable investment strategy, not only in the USA and developed markets but also in most other emerging markets such as Brazil, India, Indonesia, Portugal and Turkey. With regards to momentum investing, Jegadeesh and Titman (1993) demonstrate that investing in winners (companies that have generated superior returns over the past 6 – 12 months) produces excess returns within the first year.

The aim of this study is to determine whether an investor that utilises value and/or momentum investing strategies when forming investment portfolios over a period of time will be able to generate excess returns. In addition, the study seeks to determine which of the two investment strategies (value or momentum) delivers superior returns during bull and bear market conditions. In this context, a bull market is defined as a stock market that has generated positive annual returns for at least two consecutive years whereas a bear market is defined a stock market that has generated negative annual returns for at least two consecutive years (Gonzalez, Powell, Shi & Wilson, 2005).

1.3 Problem statement

The ramifications of the global economic crisis that occurred in 2008 have been felt throughout the world over the last 5 years. In order to stabilise their economies and boost economic activity, countries such as the U.S., UK and Japan have implemented some form of quantitative easing (repurchase programme for government bonds) which has had a significant impact on equity markets across the world due to excess amounts of liquidity flooding the markets. Most investors in the abovementioned countries have deployed their capital into emerging equity and bond markets in search of greater returns and yield. This has resulted in unprecedented flows of capital into South Africa's equity and bond markets over the last 4 years which has caused considerable volatility in the JSE (Huefner and Koepker, 2013).

The economic meltdown in 2008 has led to uncertainty among investors regarding which investment strategy to utilise in order to maximise returns. Hence, this study seeks to provide investors with evidence regarding whether these two investment strategies (value and momentum) generate excess returns in the JSE. Furthermore, the study seeks to provide evidence regarding which investment strategy yields the greatest returns during bull and bear markets.

1.4 Research Objectives

- To assess the performance of portfolios when value or momentum strategies are used
- To determine which investment strategy yields the greatest returns during bull and bear market conditions

1.5 Research Questions

- Does value investing generate excess returns?
- Does momentum investing generate excess returns?
- Which strategy yields higher returns during bull and bear markets?

1.6 Significance of the study

A vast amount of research on value and momentum investing has been conducted around the world over the last four decades. However the vast majority of this research has been conducted on the US, UK and European equity markets (Bird and Whitaker, 2003). With respect to South Africa and the JSE, little research has been carried out on the merits of value investing and momentum investing (in comparison to developed markets). The findings extracted from this research will augment the current literature on the importance of adopting a clear investment strategy when investing in the JSE in order to maximise returns. Furthermore, the study seeks to establish which investment strategy delivers superior returns during bull and bear markets in the JSE – a proposition which has not been extensively researched across the world, let alone in South Africa.

Value investing has been proven to be a profitable investment strategy across world markets (Arshanapalli *et al*, 1998). There is however, still a debate regarding whether the excess returns associated with a value strategy represent a market anomaly (Lakonishok *et al*, 1994) or whether they simply represent a premium for taking on extra investment risk (Fama

and French, 1993). Hence, this study seeks to investigate whether value investing is a profitable investment strategy in South Africa.

With respect to momentum investing, Jegadeesh and Titman (2001) when evaluating US stocks found that the relative return on stocks over a 3 – 12 month period is highly correlated with their relative returns over the previous 3 – 12 months. Rouwenhorst (1998) found that price momentum strategies also performed well in other developed markets and also many emerging markets. As is the case for value investing, this study seeks to augment the current literature on momentum investing and its possible superior profitability, specifically in the context of the South African market.

This study is intended to assist fund managers with their share portfolio construction techniques. Not surprisingly, value investing has attracted an increasing number of investment managers to integrate this form of investing into their process (Bird and Whitaker, 2003). Hence, by testing the merits of value investing in the South African context, South African fund managers will know whether the strategy is worthwhile in terms of generating superior returns. However, the popularity of momentum investing in South Africa is a far cry from that of value investing (Dhayalam, 2012). Most South African fund managers have a value investing bias and hence momentum investing strategies are underutilised (Dhayalam, 2012). The findings from this study will provide evidence in terms of which of the two strategies is superior with respect to maximising investment returns.

From a management perspective, the results of this study may affect the portfolio construction techniques of fund managers. Whilst value investing is well recognised and utilised by numerous fund managers in South Africa, momentum investing is somewhat ignored and underutilised. If the results of this study indicate that momentum investing consistently produces excess returns then this will suggest that more research needs to be done in this field and that fund managers should be taught about the benefits of momentum investing. Furthermore, if this study finds that momentum investing outperforms value investing during bull and bear market conditions then this

will assist fund managers to understand which strategy is suitable under different market conditions.

1.7 Structure of the thesis

This thesis is structured as follows: Chapter 2 presents the review of the literature related to the topic of research. Chapter 3 presents the research methodology which includes the data, data sources and research design. Chapter 4 presents the results and Chapter 5 concludes the thesis by discussing and drawing conclusions to the study.

Chapter Summary

This chapter has introduced the concepts of value investing and momentum investing. The study has been contextualised and motivation behind the proposed research has been provided. Investors and specifically fund managers are uncertain regarding which investment strategy yields the greatest returns. Hence this study aims to provide evidence to investors on which investment strategy delivers the greatest returns and will thereby assist investors and fund managers with their portfolio construction processes and techniques. The objectives and questions relating to this study have been clearly defined and the layout of the thesis has been provided. The ensuing chapter seeks to provide an in depth literature review of past research that has been conducted on the merits of value and momentum investing in developed and developing markets, with specific emphasis on the South African market.

CHAPTER 2

2 LITERATURE REVIEW

2.1 Introduction

This chapter covers the literature review of the key themes that form the basis of this study. The literature review commences with a background discussion on investment theory and strategies and is followed by a discussion of the performance of value investing and momentum investing strategies both in developed and developing markets. Thereafter, possible explanations for the superior performances that these two strategies yield are provided. The literature review concludes by identifying the gap in the literature.

2.2 The Efficient Market Hypothesis and Investment Strategies

Financial economists have always considered the random walk hypothesis as an important component of financial theory and its validity has been confirmed by empirical support from early research by Nelson and Plosser (1982) which illustrated that stock price changes are unpredictable. However, the fact that asset returns cannot be forecasted is neither a necessary nor a sufficient condition of equilibrium (Barberis, Huang & Santos, 2001). Furthermore, more recent research in finance provides empirical evidence that historical stock prices do not follow random walks (Chaudhuri and Wu, 2003). Deviations from the random walk hypothesis imply that price changes can be forecasted to some degree. Moreover, other studies indicate that it is possible to earn significant profits due to market inefficiencies (Urrutia and Vu, 2004).

The Efficient Market Hypothesis states that investors cannot consistently “beat the market,” or consistently earn positive excess returns. However, if an

investor can “beat the market” consistently, then the market is said to be inefficient. There are three forms of market efficiency, namely; weak-form, semi-strong form and strong form efficient markets.

The weak-form efficient market hypothesis states that investors cannot consistently outperform the market by using historical price patterns. Semi-strong efficient markets have current share prices which fully reflect all publicly available information. Strong-form efficient markets have current share prices which reflect all information, public and private (Fama 1992).

From a behavioural finance perspective, value investing is associated with an overreaction by the market pertaining to poor earnings announcements from companies that have performed below average which result in their share prices being severely punished to a level that is significantly below their fundamental value (Guay, 2000). This is characteristic of an inefficient market and represents a buying opportunity for value investors. Specifically, value investing seeks to capitalise from the inefficiencies that exist with semi-strong efficient markets. When the financial performance of the companies improves and subsequent earnings announcements surprise the market to the upside, the share prices of the companies recover to the industry mean (Bird and Whitaker, 2003).

The concept of momentum investing is considered to have its roots in behavioural finance where the assumption is that the best bet about market movements is that they will generally continue in the same direction (Dhayalam, 2012). However, there is literature showing rational/market-based reasons for momentum. Momentum challenges the age-old hypothesis of efficient markets that implies past price performance offers no information about the future price performance. Thus, momentum investing may be associated with some inefficiency in markets (Dhayalam, 2012) and seeks to take advantage of weak form efficient markets (that states that investors cannot consistently outperform the market by using historical price patterns).

The primary goal of any investor or money manager is to maximise investment returns for a given level of risk. Over the past four decades,

numerous studies into various types of investment strategies (such as Fama and French (1992), Asness (1997) and Chan and Lakonishok (2004)) have been conducted and the two most popular investment strategies to emerge from these studies (due to the consistent superior returns delivered by these two strategies) are value investing and momentum investing. Investors and money managers across the world have incorporated these two investment strategies into their investment processes in order to extract maximum returns from their portfolios and they have done so with great success (Bird and Whitaker, 2003).

The explosion of academic interest in value and momentum investing strategies can be traced back to Fama and French (1992), and Lakonishok, Schleifer and Vishny (1994). The results of Fama and French (1992) delivered a stunning blow to the explanatory power of the Capital Asset Pricing Model, and sparked debates about the “death of beta”. Due to the outcomes of this study, academics shifted their attention to the ratio of book-to-market value of equity, earnings yield and firm size as the leading explanatory variables for the cross-section of average stock returns (Chan and Lakonishok, 2002).

The academic work on value and momentum investing has had a strong impact on professional investment management. Value and momentum are now widely recognised distinctive specialisations adopted by money managers (Chan and Lakonishok, 2002).

2.3 Value Investing

International research shows that both value and momentum investing strategies are effective in earning excess returns/predicting future returns (Fraser and Page, 1999). Plaistowe and Knight (1986) showed that, between 1973 and 1980 in South Africa, a portfolio of “discount” companies, with essentially high book-to-market ratio companies, earn persistent, albeit small, abnormal returns. However, a portfolio of “premium” companies earns significantly negative abnormal returns over the same period (Fraser and Page, 1999). This research by Plaistowe and Knight (1986) was the first

piece of evidence to suggest that value investing reaps superior returns in the South African market.

Fraser and Page (1999), find that both value (based on the book-to-market value of equity) and momentum (based on the returns generated by shares during the preceding 12 months) investing strategies generate superior returns.

Value investing is an investment philosophy that is premised on buying shares that are undervalued by the market in order to generate superior returns that prevail when the underlying sales growth and earnings of the undervalued companies beat the expectations of the market. In order to identify value shares, metrics such as the book-to-market value of equity, dividend price ratio, earnings price ratio and cash-flow-to-price ratio are used (Lakonishok, Schleifer and Vishny, 1994; Asness, 1997). Value investing strategies have been developed using such multiples where stocks are ranked according to the value of the applicable ratios and the investment portfolio is tilted towards the cheaper stocks (e.g. high book-to-market value of equity) and away from the expensive stocks (e.g. low book-to-market value of equity) (Bird and Whitaker, 2003).

A consistent finding amongst empirical research that has been conducted is that value investing is a profitable investment strategy not only in the USA but also in most of the other major markets (Arshanapalli, Coggin, & Doukas, 1998; Rouwenhorst, 1999). Irrespective of the source of the extra returns from value investing, they seem to exist and persist across all of the major world markets (Bird and Whitaker, 2003). Bird and Whitaker (2003) found that value investing would have performed well over the period studied (January 1990 to June 2002) both if applied across the combination of all markets evaluated (7 European markets) and, in general, at the individual market level. Fama and French (1992) who assessed a value investing strategy on the New York, American and Nasdaq markets found that when stocks were ranked via the book-to-market value of equity, the highest ranked (value) portfolio generated an average return of 1.83% per month as opposed to the lowest ranked (glamour) portfolio which generated a return of

0.30% per month. In other words, the value (cheap) portfolio generated an excess return of 18.36% per annum over the glamour (expensive) portfolio. Lakonishok, Schleifer and Vishny (1994) provide similar findings based on the NYSE and American Exchange stocks. Their study reports that value stocks out-perform growth stocks by 10.5% per annum on average over the five years following portfolio formation. Chan, Hamoa and Lakonishok (1991) studied the Japanese market and their findings were consistent with previous studies conducted on the US and European markets with respect to value stocks outperforming glamour stocks. They found that value stocks outperformed glamour stocks by 13.2% per annum. Furthermore, Fama and French (1998) conducted a value investing study on several markets across the world including the U.S., several European markets, numerous Asian markets as well as Australasia (a total of 13 countries) and their results were also consistent with previous studies. In almost every country, the value portfolio generated a higher return than the glamour portfolio. The results remained consistent using a variety of value investing metrics such as book-to-market value of equity as well as earnings, cash flow and dividends to price.

There are a number of plausible explanations behind the superior returns that are generated by value portfolios. Many financial economists attribute the excess return earned by value portfolios to the higher risk that is assumed by the investor when investing in value stocks with a high book-to-market value of equity or high earnings to price ratio. However, this explanation is somewhat disputed due to the fact that many companies – particularly service based companies (such as Internet stocks) – have low book values implying that they are low risk. However utility stocks to the contrary have high book values often resulting in high book-to-market equity ratios implying that they are high risk. Lakonishok, Schleifer and Vishny (1994) use earnings to price and past growth in sales to classify value and growth stocks. In order to determine whether value stocks were fundamentally riskier than glamour stocks, they studied periods of economic depression and poor stock market performance – the proviso being that value stocks would underperform glamour stocks during such periods. However, their results illustrated that

value stocks still outperformed glamour stocks during periods of poor economic and stock market performance. Their study provides evidence that value stocks are not fundamentally riskier than glamour stocks.

A competing explanation for the returns on value stocks draws on behavioural and agency cost considerations (Chan and Lakonishok, 2002). Studies in psychology suggest that individuals tend to use simple heuristics for decision making, opening up the possibility of judgemental biases in investment behaviour (Kahneman and Riepe, 1998). Specifically, investors may extrapolate the past performance of companies too far into the future. Investors and brokerage analysts project past performance into the future and create favourable sentiment towards glamour stocks. Furthermore, in the past, analysts were found to have a self interest in recommending successful stocks in order to generate trading commissions as well as investment banking business (Chan and Lakonishok, 2002). Professional money managers and pension fund trustees may be reluctant to hold a portfolio of companies that are tainted by lacklustre past performance, hence they gravitate towards holding companies that have performed well in the past (i.e. glamour stocks). This results in value stocks becoming underpriced and glamour stocks becoming overpriced relative to their fundamentals (Chan and Lakonishok, 2002). Lastly, La Porta, Lakonishok, Schleifer and Vishny (1997) analysed investors reaction to earnings announcements and discovered that investors are disappointed with the future earnings of glamour stocks due to unrealistically high expectations and are positively surprised with the earnings announcements of value stocks due to being overly pessimistic. This could be a plausible explanation for the superior performance of value stocks.

2.3.1 Hypothesis 1

H1₀ – The portfolio with the greatest value outperforms the portfolio with the least value.

2.4 Momentum Investing

Momentum investing involves investing on the basis of a past trend in order to generate superior returns. Most international investment managers include some component of this form of investing strategy in their investment processes (Bird and Whitaker, 2003). Momentum investing has become very popular and has become a distinct, well-recognized investment style in the U.S. and other developed markets (Chan, Jegadeesh, and Lakonishok, 1996). In order to identify companies that have momentum, stocks are ranked with respect to their performance over the last six to twelve months (Fraser and Page, 1999). Companies with the highest return over the past six to twelve months are deemed to have 'momentum' and generate superior returns over the following three to twelve months. This finding is reinforced by Jegadeesh and Titman (1993), who showed that over an intermediate horizon of three to twelve months, past winners (stocks that increase in value) on average continue to outperform past losers (stocks that decrease in value) by about 1% per month.

In order to exploit the returns that can be generated from momentum investing, investors should buy past winners and sell past losers. For instance, Chan, Jegadeesh and Lakonishok (1996) and Bernard, Thomas, and Wahlen (1995), among others, find that firms reporting unexpectedly high earnings outperform firms reporting unexpectedly poor earnings. The superior performance persists over a period of about six months after earnings announcements. Urrutia and Vu (2004) studied the momentum investing profits generated across 48 markets of which 28 were emerging markets (including South Africa). Their results indicated that momentum strategy profits are especially large for emerging markets. Rouwenhorst (1998) found that price momentum strategies performed well in developed markets other than the U.S. and also many emerging markets. Bird and Whitaker (2003) studied momentum strategies across 7 European countries and found that superior returns would have been generated by deploying momentum strategies in these markets. Rouwenhorst (1999) also investigated momentum for a sample of 20 emerging markets. He found that

emerging market stocks exhibit momentum. Chan, Hameed and Tong (2000) found that the momentum profits generated across 23 markets are statically and economically significant.

The explanation behind the performance of momentum strategies is not as clear cut as value strategies. A popular explanation behind momentum profits is that stock prices under-react to information. Chan, Jegadeesh, and Lakonishok (1996) show that stock prices under-react to earnings news and a substantial portion of the momentum effect is concentrated around subsequent earnings announcements. The authors attribute the momentum in stocks to the delayed reaction of stock prices to earnings announcements and past earnings. Another explanation behind the superior returns generated from momentum strategies relates to the behaviour of investment managers and their tendency to follow one another's investment decisions, a phenomenon referred to as 'herding' (Urrutia and Vu, 2004). DeLong, Shleifer, Summers, and Waldmann (1990) illustrate that momentum investors, also referred as trend chasers or positive feedback traders, can destabilize stock prices and affect the efficiency of the market. They note that trend chasing by institutional investors can cause momentum, or positive autocorrelation, in stock prices.

2.4.1 Hypothesis 2

H₂₀ – The portfolio with the greatest momentum outperforms the portfolio with the least momentum.

2.4.2 Hypothesis 3

H₃₀ – Momentum investing outperforms value investing during bull and bear market conditions.

Chapter Summary

Value investing entails buying stocks that are underpriced relative to their fundamentals in order to generate excess profits and momentum investing is based on the premise that stocks that have generated the highest returns over the previous six to twelve months will continue to deliver superior returns over the following three to twelve months. There is ample empirical evidence and research that illustrates that these two investment strategies deliver superior returns across developed and developing markets. There are numerous plausible explanations for the success of these two strategies however researchers still seek a more qualified explanation for the returns generated by momentum strategies. Both strategies have become extremely popular over the last three decades and are widely used by investment managers across the world.

CHAPTER 3

3 METHODOLOGY

3.1 Introduction

This chapter discusses the methodology that is used to determine whether value and momentum investing in the JSE produces positive returns on an annual basis. Section 3.2 presents the data, data sources and sample selection criteria. Section 3.3 provides a description of the full research design, and the summary concludes the chapter.

3.2 Data, Data Source and Sample Selection

Consistent with Asness (1997) and Fraser and Page (1999), monthly closing prices for all shares traded on the JSE and the All Share Index as a whole are obtained from the *Bloomberg* database. The dataset consists of monthly closing prices and trading indicators for all JSE listed companies. Adjustments for share splits, consolidations, rights issues and cash dividends are effected on the first trading month in which they took effect. Brown and Warner (1980) recommend the use of monthly data to avoid statistical bias due to non synchronous and infrequent trading. Fraser and Page (2000) recommend that new companies that have been listed for less than three years are excluded from the analyses. The data period covers a period of 15 years starting from 1 January 1998 – 31 December 2012. This time frame is considered sufficient to capture varying market conditions i.e. bull and bear markets (Pagan and Sossounov, 2003).

Starting from the 1 January 1998, the following trading indicators and metrics are obtained for each share: monthly closing prices and earnings yield. Monthly closing prices are converted to monthly returns using the following formula: $R_1 = (P_1 - P_0)/P_0$ where R is the monthly return of the share, P_0 is

the price of the share on the 1st day of the month and P_1 is the price of the share on the 1st day of the following month.

3.3 Research Design

The specific values for each metric (PAST(12) and E/P) are computed as follows: PAST(12) is the arithmetic average of the prior twelve months of returns; E/P is the earnings yield computed as the company's preceding year's earnings divided by the current share price. The earnings yield relates the current price of a stock to a flow measure that captures activity within a company. This ratio is a robust indicator of value stocks (Asness, 1997). PAST(12) was chosen as a measure of momentum as previous studies show that the best results from forming price momentum portfolios are obtained by ranking stocks by their performance over the past twelve months (Bird and Whitaker, 2003).

3.3.1 *Measuring the Performance of Value Investing*

- In order to identify value stocks, the earnings yield ratio (E/P) will be used. This ratio is a robust indicator of value stocks (Asness, 1997).
- For January year, the cross section of data is used to form a set of portfolios based on earnings yield (earnings to price ratio).
- The value strategy ranks the shares in descending order on the basis of E/P (earnings yield) for the month of January on an annual basis (starting January 1998 and ending January 2010).
- Companies that generate a financial loss in a particular year and hence a negative earnings yield will end up at the bottom of the rankings and will by default be excluded from the analysis.
- For example, for the shares that have been ranked for January 1998, the top 100 shares (ranked by earnings yield) are assigned to five portfolios. The 20 stocks with the highest earnings yield are included in the first portfolio (the cheapest), the next 20 stocks ranked by earnings yield in the

second portfolio and so on. The fifth portfolio will be the most expensive portfolio by earnings yield.

- For each portfolio, an equally weighted portfolio is constructed and the average E/P computed. Furthermore, the monthly mean return over a three year period post portfolio formation is computed for each portfolio (Asness, 1997). The procedure is repeated annually, for the month of January ending January 2010, and the monthly mean, median, standard deviations as well as an ANOVA test for the portfolios are computed.

3.3.2 Measuring the performance of Momentum Investing

- For every year (1998 – 2011), all shares on the Johannesburg Stock Exchange are ranked using PAST(12).
- PAST(12) is the average monthly return for a stock over the previous 12 months. The momentum strategy ranks the shares in descending order on the basis of PAST(12) on an annual basis.
- For example, for the shares that have been ranked for 1998, the top 100 shares (ranked by PAST(12)) are assigned to five portfolios. The 20 stocks with the lowest PAST(12) are included in portfolio 1 (the portfolio with the least momentum), the next 20 stocks ranked by PAST(12) in portfolio 2 and so on. Portfolio 5 will be the portfolio with the highest average return over the past 12 months (the top 20 shares) and will have the greatest amount of momentum.
- For each portfolio, an equally weighted portfolio is constructed. Thereafter, the monthly mean return of each portfolio is computed over a 12 month period post portfolio formation. The procedure is repeated annually, ending 31 December 2012. The monthly mean, median, standard deviations as well as an ANOVA test for the portfolios are computed for each 12 month test period.

Chapter Summary

This chapter has provided insight into the data gathering, data manipulation and sample selection process as well as the intended research design. The methodology that will be deployed for this study is identical to that of Asness (1997) and Fraser and Page (1999) and will be used to provide quantitative evidence for this study.

CHAPTER 4

4 EMPIRICAL RESULTS

4.1 Introduction

This chapter presents the empirical results of the study. Sections 4.2 and 4.3 present the performance and statistical significance of the value investing and momentum investing strategies employed, respectively. Section 4.4 presents the performance of value and momentum investing during bull and bear markets.

4.2 The Performance of Value Investing

Table 1 contains the descriptive statistics and performance of the 5 portfolios over a three year period post portfolio formation for all formation years (1998 – 2010)

Year	Statistic	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Mean Difference Between Portfolios	
1998	Mean	0.013266	0.003936	0.008319	0.003791	0.010701	F-Statistic	P-Value
	Median	0.011249	0.007207	0.005896	0.011932	-0.002839	65.246400	<0.0001
	StdDev	0.066883	0.061146	0.084076	0.071110	0.093128		
1999	Mean	0.026034	0.019724	0.024514	0.016680	0.009046	F-Statistic	P-Value
	Median	0.023752	0.012819	0.023136	0.031910	-0.008651	87.865400	<0.0001
	StdDev	0.052537	0.051469	0.055412	0.057681	0.067772		
2000	Mean	0.029406	0.019746	0.017093	0.003122	0.009045	F-Statistic	P-Value
	Median	0.025949	0.022493	0.017183	0.000148	0.004992	23.568700	<0.0001
	StdDev	0.071181	0.053596	0.053387	0.060091	0.049478		
2001	Mean	0.043270	0.026117	0.018132	0.020027	0.016209	F-Statistic	P-Value
	Median	0.031982	0.018813	0.006972	0.024684	0.006771	15.354300	<0.0001
	StdDev	0.059355	0.033479	0.056419	0.035402	0.043063		
2002	Mean	0.052946	0.036692	0.030864	0.015413	0.018844	F-Statistic	P-Value
	Median	0.036985	0.031962	0.030769	0.018678	0.008077	45.646400	<0.0001
	StdDev	0.088980	0.064067	0.041934	0.038083	0.058782		
2003	Mean	0.044179	0.047890	0.036154	0.040389	0.026358	F-Statistic	P-Value
	Median	0.052945	0.033675	0.032062	0.038549	0.018701	37.364300	<0.0001
	StdDev	0.050926	0.079050	0.051638	0.045019	0.035509		

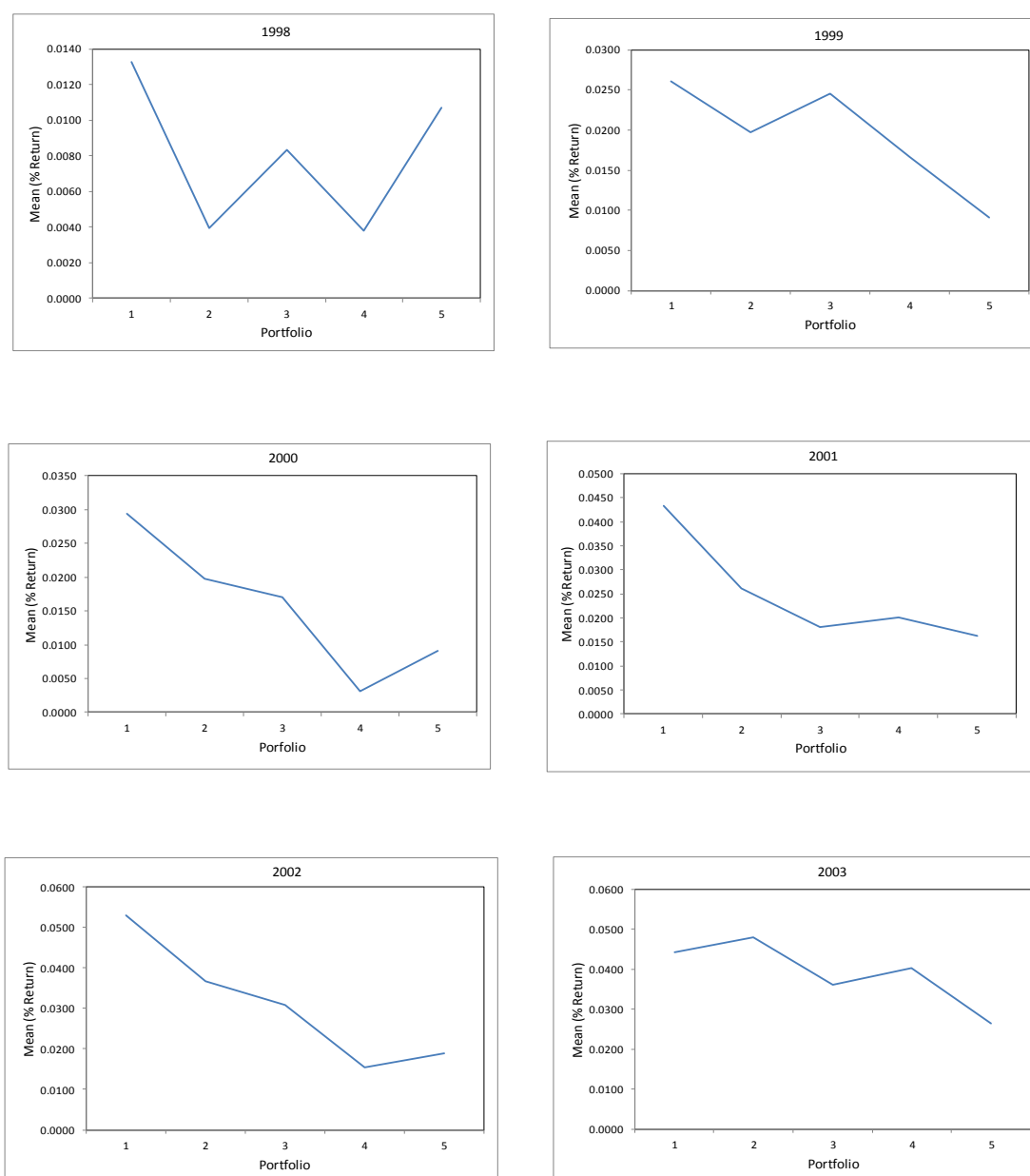
Year	Statistic	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Mean Difference Between Portfolios	
2004	Mean	0.051465	0.048700	0.036810	0.030147	0.036357	F-Statistic	P-Value
	Median	0.040784	0.039877	0.036656	0.029552	0.029276	75.836900	<0.0001
	StdDev	0.079743	0.063330	0.039169	0.041075	0.060585		
2005	Mean	0.042158	0.029396	0.020509	0.016621	0.014801	F-Statistic	P-Value
	Median	0.045616	0.034304	0.027118	0.014390	0.013954	14.398700	<0.0001
	StdDev	0.052105	0.044514	0.045592	0.047050	0.050564		
2006	Mean	0.015578	0.002214	0.004146	-0.001829	0.005207	F-Statistic	P-Value
	Median	0.020979	0.010501	0.004352	0.004600	0.018288	19.346700	<0.0001
	StdDev	0.059861	0.050214	0.058273	0.047080	0.048240		
2007	Mean	0.022104	-0.006764	-0.004849	-0.003806	0.004742	F-Statistic	P-Value
	Median	0.004688	-0.007225	-0.002595	-0.001478	0.009455	118.789600	<0.0001
	StdDev	0.106078	0.041298	0.059001	0.056191	0.051976		
2008	Mean	0.003993	0.002605	0.004797	0.005458	0.009131	F-Statistic	P-Value
	Median	0.006861	0.012218	0.004933	0.014220	0.008985	26.653800	<0.0001
	StdDev	0.035909	0.058471	0.059430	0.043043	0.060827		
2009	Mean	0.017597	0.013450	0.016509	0.012147	0.007930	F-Statistic	P-Value
	Median	0.017264	0.006365	0.015928	0.015865	0.012356	38.789100	<0.0001
	StdDev	0.048698	0.052446	0.060711	0.045613	0.038246		
2010	Mean	0.005192	0.015252	0.013913	0.014199	0.014235	F-Statistic	P-Value
	Median	0.000988	0.022101	0.013252	0.012937	0.011228	1.957800	0.083600
	StdDev	0.046285	0.038938	0.029785	0.026055	0.031842		

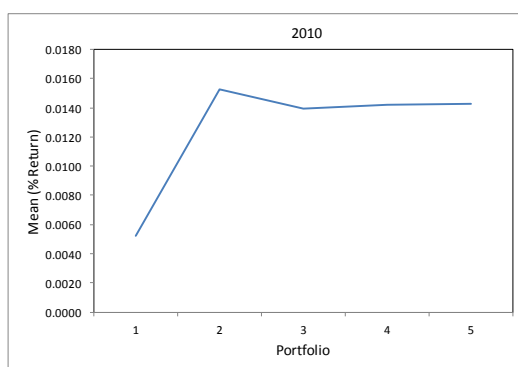
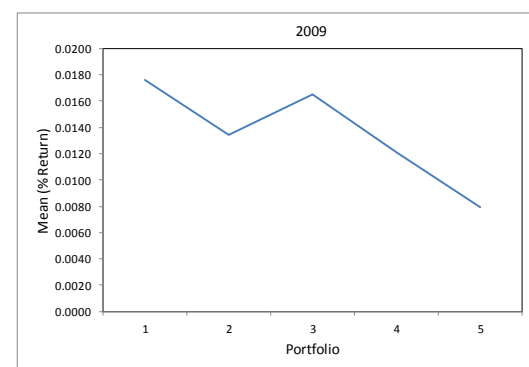
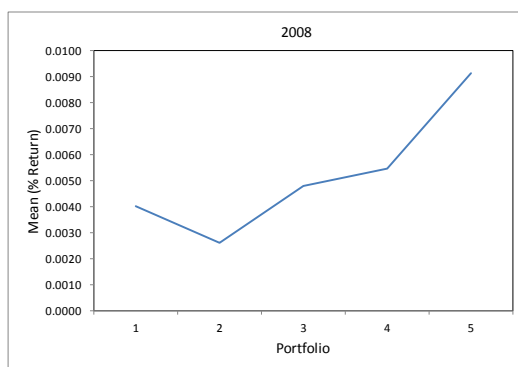
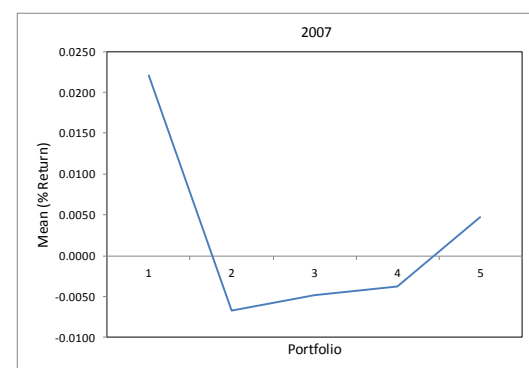
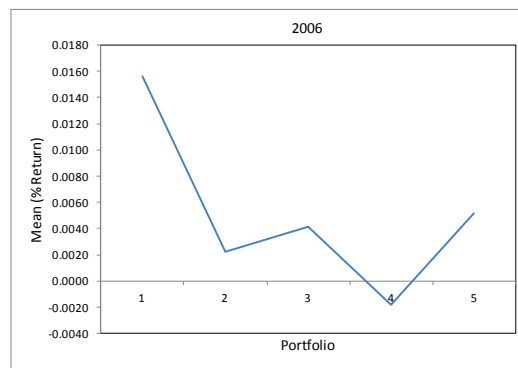
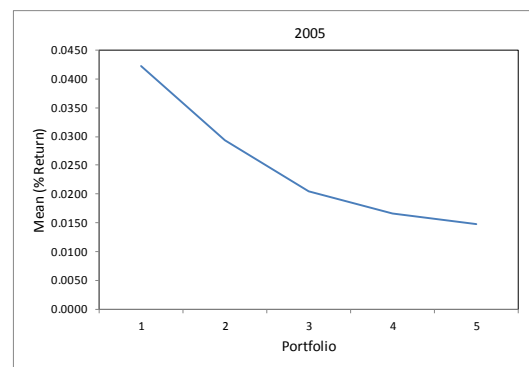
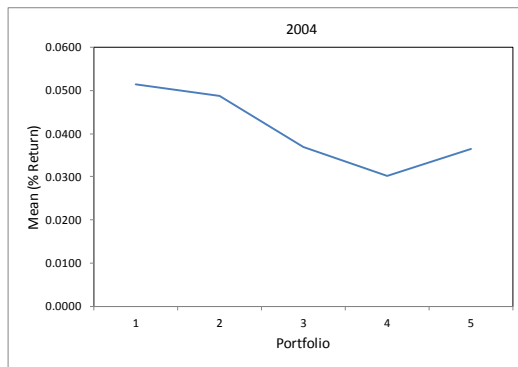
Table 1 above depicts the mean monthly returns, the median monthly returns and standard deviations for all 5 portfolios (over the 3 years post portfolio formation) from 1998 to 2010. It is clearly apparent from the data in Table 1 that portfolio 1 (the portfolio with the greatest value) outperformed the other four portfolios in 10 out of the 13 measurement periods. For example, in 1998 the mean and median monthly returns for the portfolio 1 were 1.32% and 1.12% respectively, whilst the mean and median monthly returns for portfolio 5 (the portfolio with the least value) were 1.07% and -0.29% respectively. In 2005, the mean and median monthly returns of portfolio 1 were 4.22% and 4.56% respectively, whilst the mean and median monthly returns of portfolio 5 were 1.48% and 1.40% respectively. The years in which portfolio 1 did not deliver the greatest monthly mean and median returns were 2003, 2008 and 2010. Hence value investing would have produced the desired results 77% of the time.

The test for difference in means was used to determine whether the means of each portfolio are significantly different from each other for each

measurement period. The test was carried out at the 5% significance level. The table above clearly illustrates that the p-value was less than 0.0001 for every year except 2010 (when it was 0.0836). This implies that the means of all 5 portfolios were significantly different at the 5% level for every year except 2010. The primary reason for this result is that the means and standard deviations of all the portfolios were very similar in 2010 (with the exception of portfolio 1).

Figure 1: The figures below display the monthly mean returns for each portfolio over a three year period post portfolio formation for every formation period (1998 – 2010)





The figures above are representative of the results contained in Table 1. The figures clearly illustrate the superior performance of the portfolio 1 (the portfolio with the greatest value) as compared to the other 4 portfolios. However, as mentioned in the analysis above, portfolio 1 outperformed the other 4 portfolios in 10 of the 13 measurement periods. Therefore, 2008 is one such case when portfolio 1 was outperformed by all the other portfolios except the portfolio 2. Another year in which this occurred was 2010 – when portfolio 1 was outperformed by the other 4 portfolios.

Based on the analysis provided above, it can be deduced that value investing is a reliable investment strategy that can be utilised in the JSE to generate superior returns. Furthermore, earnings yield is a consistent measure that can be used to identify a value stock with great accuracy. In 10 out of the 13 measurement periods that comprise this value investing study, portfolio 1 (the portfolio with the greatest amount of value) was the best performing portfolio. This implies that value investing would have produced the highest return 77% of the time that it was employed. Given the statements above, hypothesis $H1_0$ is true and cannot be rejected.

4.3 The performance of Momentum Investing

Table 2 contains the descriptive statistics and performance of the 5 portfolios over a 12 month period post portfolio formation for all formation years (1999 – 2012)

Year	Statistic	Portfolio 5	Portfolio 4	Portfolio 3	Portfolio 2	Portfolio 1	Mean Difference Between Portfolios	
1999	Mean	0.110344	0.073283	0.055291	0.040451	0.033113	F-Statistic	P-Value
	Median	0.103150	0.074172	0.055221	0.040040	0.032850	115.483400	<0.0001
	StdDev	0.027438	0.005407	0.005398	0.003191	0.001661		
2000	Mean	0.069080	0.026930	0.015140	0.006990	-0.000710	F-Statistic	P-Value
	Median	0.067511	0.025934	0.014570	0.006826	-0.000290	117.574800	<0.0001
	StdDev	0.024311	0.005528	0.003134	0.002172	0.002358		
2001	Mean	0.154484	0.059129	0.046283	0.034228	0.023008	F-Statistic	P-Value
	Median	0.090487	0.058510	0.046421	0.034015	0.023807	10.583900	<0.0001
	StdDev	0.161637	0.006182	0.002146	0.003733	0.003549		
2002	Mean	0.217311	0.063928	0.040895	0.027857	0.016583	F-Statistic	P-Value
	Median	0.139500	0.065760	0.040954	0.028003	0.016549	13.669700	<0.0001
	StdDev	0.222615	0.007321	0.005650	0.003221	0.004087		
2003	Mean	0.161590	0.066065	0.046181	0.034016	0.027655	F-Statistic	P-Value
	Median	0.126796	0.065922	0.044174	0.033661	0.027105	34.145600	<0.0001
	StdDev	0.093385	0.006699	0.004984	0.002107	0.001968		
2004	Mean	0.204722	0.077325	0.054242	0.043072	0.035216	F-Statistic	P-Value
	Median	0.168633	0.071358	0.054726	0.043293	0.035031	16.227300	<0.0001
	StdDev	0.172841	0.014734	0.004838	0.002207	0.002096		
2005	Mean	0.339941	0.070064	0.050003	0.041414	0.035073	F-Statistic	P-Value
	Median	0.115779	0.069018	0.049736	0.042468	0.035695	2.285900	0.0657
	StdDev	0.864518	0.009989	0.003579	0.002795	0.001736		
2006	Mean	0.175364	0.074782	0.053669	0.043566	0.037336	F-Statistic	P-Value
	Median	0.119736	0.074195	0.054391	0.044049	0.037459	7.940600	<0.0001
	StdDev	0.201402	0.008168	0.005109	0.001757	0.002260		
2007	Mean	0.185703	0.083472	0.058442	0.044460	0.036541	F-Statistic	P-Value
	Median	0.130813	0.083899	0.058158	0.044331	0.036692	16.209800	<0.0001
	StdDev	0.150686	0.007819	0.005173	0.002950	0.001595		
2008	Mean	0.061230	0.015960	0.002320	-0.004040	-0.009300	F-Statistic	P-Value
	Median	0.044118	0.015707	0.001102	-0.004310	-0.009370	16.681400	<0.0001
	StdDev	0.069362	0.004851	0.003002	0.002135	0.001347		

Year	Statistic	Portfolio 5	Portfolio 4	Portfolio 3	Portfolio 2	Portfolio 1	Mean Difference Between Portfolios	
2009	Mean	0.089145	0.057891	0.047319	0.040448	0.033199	F-Statistic	P-Value
	Median	0.078401	0.057672	0.046635	0.040591	0.032705	56.337900	<0.0001
	StdDev	0.028446	0.004580	0.002611	0.001843	0.002719		
2010	Mean	0.126623	0.056908	0.040198	0.031997	0.025445	0.024941	0.0013051
	Median	0.100941	0.055438	0.040179	0.032093	0.012356	32.451800	<0.0001
	StdDev	0.071624	0.007235	0.002662	0.002674	0.038246		
2011	Mean	0.116717	0.048407	0.033618	0.024107	0.018527	F-Statistic	P-Value
	Median	0.100482	0.045779	0.033186	0.023505	0.018480	45.548300	<0.0001
	StdDev	0.058561	0.006857	0.003268	0.002560	0.001287		
2012	Mean	0.097563	0.046867	0.039856	0.034494	0.030833	F-Statistic	P-Value
	Median	0.073849	0.045790	0.039489	0.034524	0.030917	14.370700	<.0001
	StdDev	0.071929	0.003057	0.001910	0.000876	0.001183		

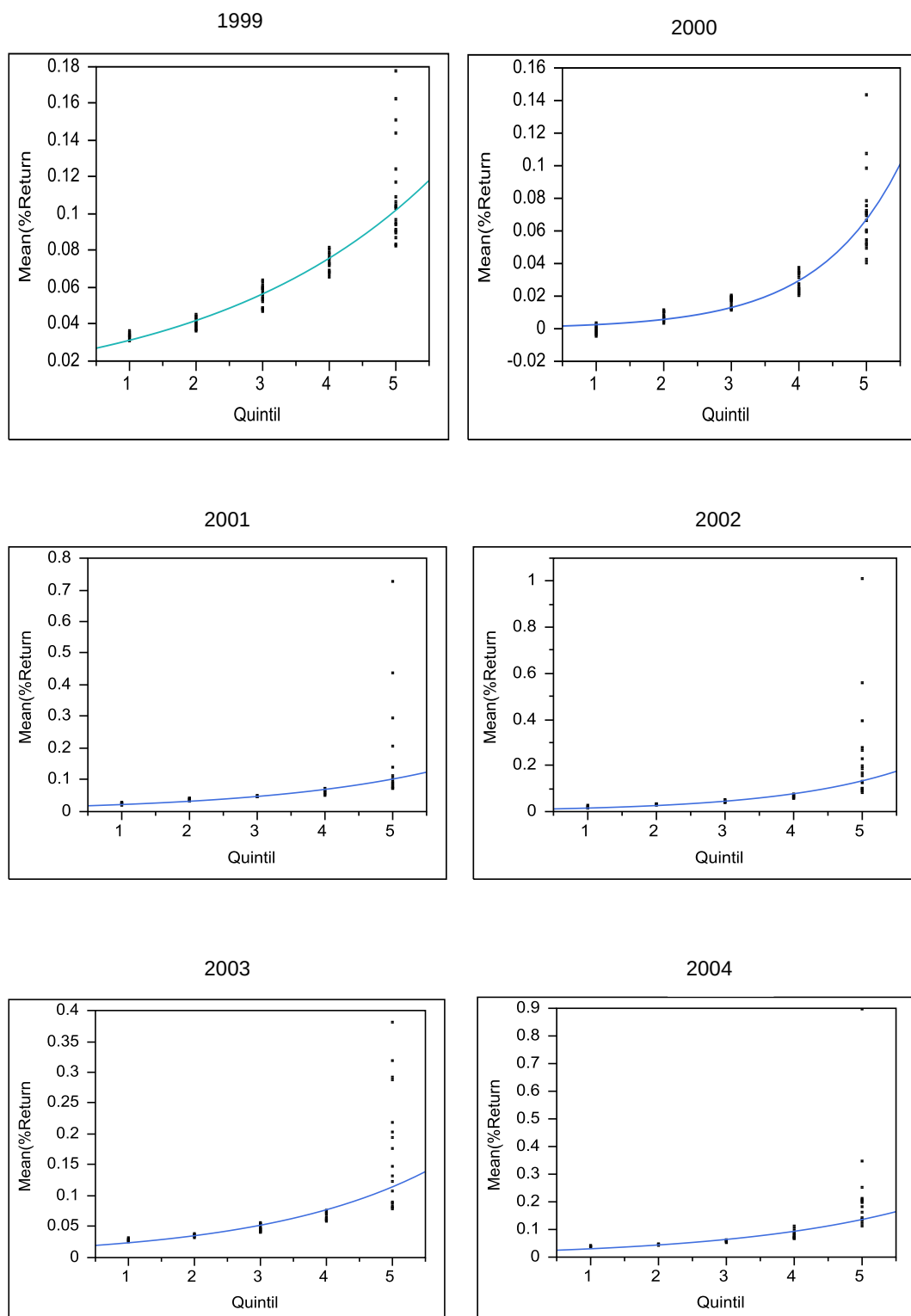
Table 2 above depicts the mean monthly returns, the median monthly returns and standard deviations for all 5 portfolios for the 12 months post portfolio formation for all formation years (1999 to 2012). It is quite clear that portfolio 5 (the portfolio with the greatest momentum) yields the greatest mean and median return every year for the entire measurement period (1999 – 2012). In 1999, portfolio 5 generated a mean return of 11.03% per month whilst its median return was 10.32%. However, portfolio 1 generated a mean monthly return of 3.31% and a median return of 3.39%. This implies that portfolio 5 outperformed portfolio 1 by 7.72% per month with respect to the mean returns and by 6.93% per month with respect to the median return. This equates to an annual outperformance of 92.64% with respect to the mean and 83.16% with respect to the median. This is a significant outperformance. In 2000, portfolio 5 generated a mean monthly return of 6.90% and a median monthly return of 6.75% whilst portfolio 1 delivered a mean monthly return of -0.07% and a median monthly return of -0.03%. This implies that portfolio 5 outperformed portfolio 1 by 6.97% per month with respect to the mean and by 6.78% per month with respect to the median. In 2005, portfolio 5 generated a mean monthly return of 40% and a median monthly return of 11.58% whilst portfolio 1 delivered a mean monthly return of 3.5% and a median monthly return of 3.57%. Hence, portfolio 5 significantly outperformed portfolio 1. In 2012, the same result occurred. Portfolio 5

delivered a mean monthly return of 9.76% and a median monthly return of 7.83% whilst portfolio 1 generated a mean monthly return of 3.10% and a median return of 3.10%.

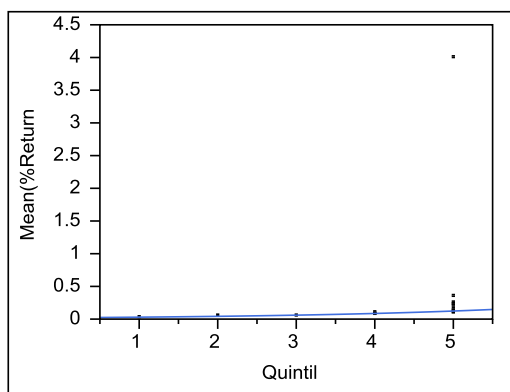
This phenomenon – of portfolio 5 being the best performing portfolio annually (in comparison to the other 4 portfolios) – occurred in every year of the measurement period (1999 – 2012). This provides concrete evidence in support of momentum investing. In other words, from the analysis above, it is clearly evident that shares with the highest returns over the preceding 12 months will continue to deliver the best returns over the subsequent 12 months. The phenomenon of momentum strongly exists in the South African market.

The test for difference in means was used to determine whether the means of each portfolio are significantly different from each other on an annual basis. The test was carried out at the 5% significance level. Table 2 above clearly illustrates that the p-value was less than 0.0001 for every year except 2005 (when it was 0.0657). This implies that the means of all 5 portfolios were significantly different at the 5% level for every year except 2005. In 2005, the means of each portfolio were significantly different at a significance level of 7%. The primary reason for this is that there was a slight difference in the means of the respective portfolios during 2005.

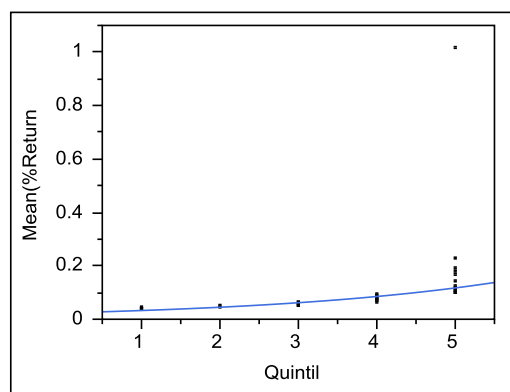
Figure 2: The figures below display the monthly mean returns for each portfolio over the 12 month period post portfolio formation for every formation year (1999 – 2012)



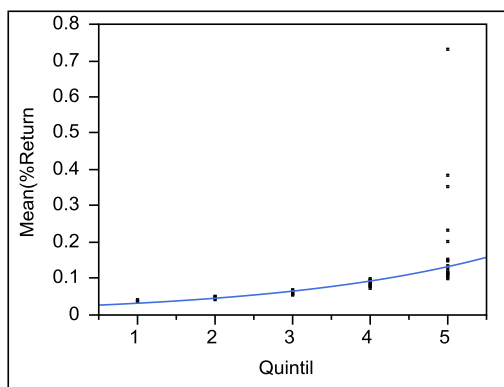
2005



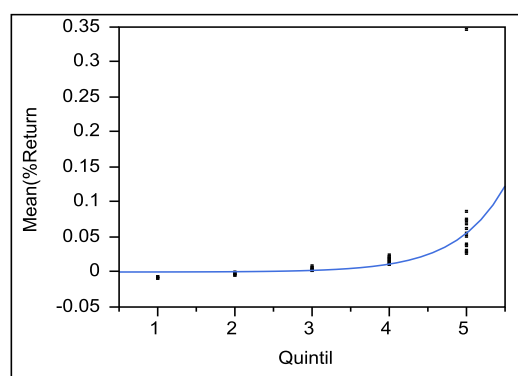
2006



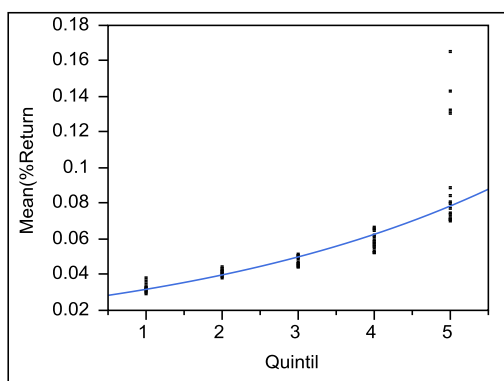
2007



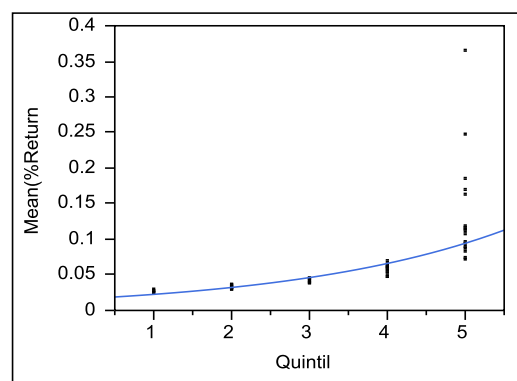
2008

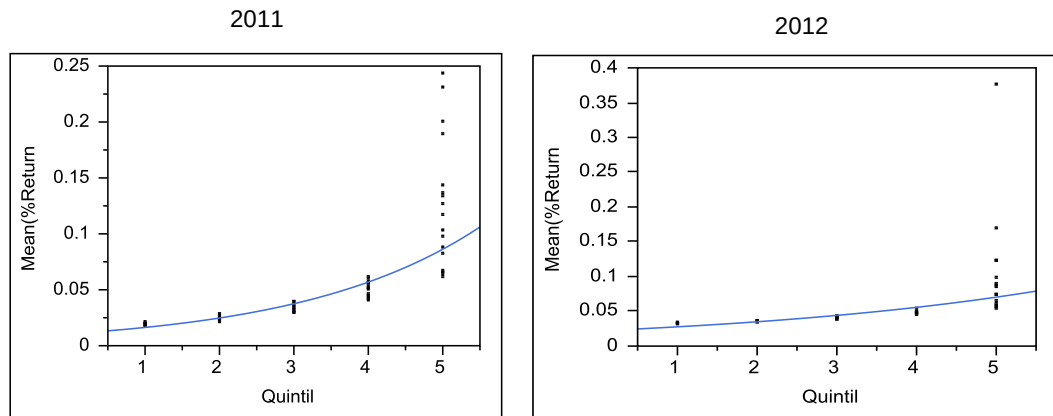


2009



2010





The figures above depict the mean monthly returns for each portfolio over a 12 month period post portfolio formation for all formation years (1999 – 2012). These figures clearly illustrate the incremental increase in performance of each successive portfolio. It is a truly astounding finding – that portfolio 1 (the portfolio with the least momentum) has the lowest mean return, followed by portfolio 2 then portfolio 3 and so on. Portfolio 5 (the portfolio with the greatest momentum) delivers the highest return. The upward trend that is observed in all 4 graphs illustrates this finding. This phenomenon – that each successive portfolio generates a higher mean monthly return than the previous portfolio – occurred every year of the measurement period.

Once again, these graphs provide robust evidence in support of the principles of momentum investing. Investing in stocks with the greatest momentum (the highest return over the past 12 months i.e. quintile 5) yields the greatest returns over the subsequent 12 months.

Based on the analysis provided above, it is necessary to conclude that momentum investing is a worthwhile investment strategy that delivers superior returns in the JSE. Portfolio 5 (the portfolio with the greatest) momentum outperformed the other 4 portfolios and the benchmark every year during the measurement period. Furthermore, by using test for differences in means, the results proved to be statistically significant. Hence,

hypothesis H_{20} is true and cannot be rejected based on the evidence provided above.

4.4 Results of the Performance of Value and Momentum Investing during Bull and Bear Markets

A bull market is defined as a stock market that has generated positive annual returns for at least two consecutive years whereas a bear market is defined a stock market that has generated negative annual returns for at least two consecutive years (Gonzalez, Powell, Shi & Wilson, 2005). A neutral market occurs when a stock market generates a positive annual return and then a negative annual return the following year (or vice versa).

Table 3 contains the mean returns for both investment strategies under different market conditions

Year	Market Condition	Value Investing	Momentum Investing	T-Stat	P-Value
1999	Neutral	0.026034	0.110344	57.5866	<.0001
2000	Neutral	0.029406	0.06908	12.4586	<.0001
2001	Neutral	0.04327	0.154484	78.4713	<.0001
2002	Neutral	0.052946	0.217311	13.6697	<.0001
2003	Bull	0.044179	0.16159	59.4324	<.0001
2004	Bull	0.051465	0.204722	89.4632	<.0001
2005	Bull	0.042158	0.339941	25.6528	<.0001
2006	Bull	0.015578	0.175364	56.4863	<.0001
2007	Bull	0.022104	0.185703	65.3247	<.0001
2008	Neutral	0.003993	0.06123	42.8521	<.0001
2009	Bull	0.017597	0.089145	55.1278	<.0001
2010	Bull	0.005192	0.126623	69.2459	<.0001

Table 3 above displays the mean returns generated by each investment strategy (value and momentum) during differing market conditions from 1999 – 2010. Portfolio 1 represents the mean returns generated by value investing for every year of the study period as portfolio 1 is the portfolio with the greatest value (as described in section 4.2). With respect to momentum investing, the portfolio 5 represents the mean returns for momentum investing for every year of the study period as portfolio 5 is the portfolio with the greatest momentum (as described in section 4.3).

From the data contained in Table 3 above, it is absolutely clear that momentum investing is by far the superior investment strategy. Whilst both strategies yielded a positive mean return for every year of measurement period, momentum investing significantly outperformed value investing. In 1999, the momentum investing portfolio generated a mean monthly return of 11.03% whilst the value investing portfolio delivered a return of 2.60%. Hence, the momentum portfolio outperformed the value portfolio by 8.43% per month or 101.16% for the entire year. In 2000, the momentum portfolio produced a mean monthly return of 6.91% whilst the value portfolio generated a mean monthly return of 2.94%. Therefore, the momentum portfolio generated an excess mean monthly return of 3.97% over the value portfolio or 47.64% for the whole year. In 2010, the momentum portfolio delivered a mean monthly return of 12.66% whilst the value portfolio produced a monthly mean return of 0.52%. This implies that the momentum portfolio outperformed the value portfolio by 12.14% per month or 145.68% for the year. This trend (of momentum investing outperforming value investing) occurred every year for the entire study period.

The results stated above were validated by a t-test and the results are clearly significant at the 5% level.

From the analysis provided above, it can be concluded that momentum investing clearly outperforms value investing during bull and bear market conditions. Furthermore, it is worth noting that the margin of outperformance is significant. Therefore, hypothesis $H3_0$ is indeed true.

Chapter Summary

The empirical results of the study provide clear evidence that value investing is a reliable investment strategy that outperforms the benchmark on a consistent basis. The results also indicate that momentum investing is an extremely robust investment strategy that yields high returns that were significantly greater than the benchmark for every year of this study. Lastly, momentum investing produces superior returns to value investing during bull and bear market conditions.

CHAPTER 5

5 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This research report set out to establish whether value and momentum investing generate excess returns. Furthermore, the report set out to determine whether momentum investing outperforms value investing during bull and bear market conditions. Section 5.2 interprets and discusses the results of the study. This is followed by section 5.3 which concludes the study. Lastly, section 5.4 provides recommendations for future studies.

5.2 Discussion

The results of this study are consistent with Fraser and Page (1999) and Bird and Whitaker (2003) who found that value investing would have performed well in South Africa and across several European markets over the study period. Similarly, the results are consistent with Fama and French (1998) and Lakonishok, Schleifer and Vishny (1994) who showed that the highest ranked (value) portfolio generated excess returns when compared to the lowest ranked (glamour) portfolio. With respect to value investing, this study provides clear evidence that value investing generates excess returns on a consistent basis. The results proved to be statistically significant based on the test for difference in means that was carried out. Value investing is a widely used investment strategy adopted by investment managers around the world (Chan and Lakonishok, 2004). The results of this study provide further evidence of the merits of value investing in the JSE to investment managers around the world.

The momentum investing analysis carried out in this study provides results that are unquestionable and conclusive. During the study period, the quintile

portfolio 5 (the portfolio with the greatest momentum) generated excess returns when compared to the other 4 portfolios every year. The results are consistent Urrutia and Vu (2004) who showed that momentum strategy profits are especially large for emerging markets (including South Africa). Similarly Chan, Jegadeesh and Lakonishok (1996) and Bird and Whitaker (2003) illustrated that superior returns would have been generated by deploying momentum investing strategies in European and emerging markets. Rouwenhorst (1999) and Chan, Hameed and Tong (2000) found that emerging markets exhibit momentum which is consistent with the findings in this report. The significance of the results was confirmed by the test for difference in means. These results serve as concrete evidence of the excess returns generated by momentum investing in the JSE. Investment managers have incorporated some form of momentum investing into their investment processes (Bird and Whitaker, 2003). This study will provide further evidence to investment managers to vindicate a robust momentum investing strategy in their investment mandates.

Investment managers are uncertain regarding which investment strategy yields the greatest returns during bull and bear market conditions. Hence, this study set out to determine which investment strategy delivers superior performance during different market conditions. The results of the study are conclusive and clearly indicate that momentum investing outperforms value investing by a significant margin in the JSE. Hence, investment managers now have robust evidence to employ momentum investing in the JSE during precarious market conditions.

5.3 Conclusion

This research report has analysed the performance of value and momentum investing in the JSE. The results of the research conducted shows that both value and momentum investing are investment strategies that generate excess returns in the JSE. However, with respect to which investment strategy produced the greatest returns during bull and bear market conditions, momentum investing proved to be the superior investment

strategy by outperforming value investing in every year of the study period. Investment managers can incorporate the findings of this study into their investment strategies in order to maximise portfolio returns. Specifically, investment managers should buy winners (shares with the greatest amount of momentum) and short losers (shares with the least momentum) or alternately buy shares that exhibit deep value in order to maximise returns.

5.4 Recommendations

Although the findings of this research report are consistent with the results evidence provided by Fraser and Page (2000) as well as Bird and Whitaker (2003), further study might be needed.

With respect to value investing, a more detailed analysis can be carried out to reinforce the results of this study. Stocks can be ranked every month of each year as opposed to this study (where stocks were ranked for the month of January each year). Furthermore, the measurement period post portfolio formation can be extended to five years rather than 3 years in order to test for value returns being extracted in later years. Also, other ratios can be used to identify value stocks. Such ratios include cash flow to price ratio and dividend to price ratio (Lakonishok, Schleifer and Vishny, 1994; Asness, 1997).

With respect to momentum investing, the returns generated from a longer measurement period post portfolio formation can be investigated (e.g. 18 or 24 months).

This study has focused on the performance of value and momentum investing with respect to the entire market. The performance of value and momentum investing can be evaluated in relation to specific sectors of the market. There may be a possibility that value or momentum investing could be more effective in certain sectors of the market.

Chapter Summary

This research report, as per the data extracted for this study, established that value and momentum investing produce excess returns on an annual basis. Furthermore, the report found that momentum investing outperformed value investing during bull and bear market conditions in the JSE.

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