

The Effectiveness of Value Style Investing in South Africa



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Abstract

Style investing is a well-documented global phenomenon that refers to the manner in which investors formulate their capital allocation decisions. The two broad styles of investing to be discussed in this report are the 'value style' and the 'growth style' investing. Recent empirical research suggests that value style of investing outperforms growth style investing over the long term. Rational theories suggest that a value premium exist because value counters have higher unsystematic risk. However, theories such as behavioural finance attribute the value premium to more psychological social factors such as emotional and heuristic biases.

The aim of this study was to determine whether value style investing outperforms growth style investing in South Africa. For the purposes of this study, we evaluated the performance of various portfolios for the period of December 2000 to December 2015. In addition, the study determined the relative risk of the two styles, by testing whether value outperforms growth during periods of financial crisis, and during a period of slow economic growth.

In defining the parameters of our study, we divided the constituents of Financial Times and London Stock Exchange/Johannesburg Stock Exchange (FTSE /JSE) index into growth and value based on their relative Price to book (P/B) going back to December 2000. This created four portfolios; namely, Deep value, Relative value, Relative growth and Super growth. Portfolio Analytics were employed to determine which style outperforms over the period. Regression analyses was used to ascertain which portfolio generated abnormal risk adjusted returns over the period. Relative risk is also analysed.

The results of this research indicate that there is limited evidence of value premium in South Africa over the period of the study, albeit there are some periods where one style is dominant over the other. Regressions suggest that none of the portfolios constructed using market capital weighted generate abnormal returns. However, deep value, relative value and relative growth portfolios generate abnormal returns when constructed on equal-weighted basis. On a relative risk basis, deep value outperforms during the financial crisis, whereas relative value outperforms during economic slowdowns.

Declaration

I declare this research project is my own work. It is submitted in partial fulfilment of the requirement for degree in Masters of Management in Finance and Investment. It has not been submitted before for any degree or examination in any other University

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1 Introduction

Investment style refers to managers' adherence to a predetermined investment process, philosophy and asset allocation strategy (Ahmed & Nanda, 2001). Investment style is paramount to investors as it assists in differentiating investment managers. The two most popular investment styles globally are value and growth styles. Fabozzi (1998) defines value style as investing in stocks that have low price multiples (low price to earnings, low price to book), whereas the growth style is defined as investing in stocks with high past and expected future earnings growth.

The performance differences between the two styles is well researched globally, especially in developed markets; and most studies find that value outperforms growth stocks over the long term (Fama & French, 1992; Lakonishok et al., 1994). In South Africa (SA), style investing is often dismissed because the market is too small Blount (2014).

Moreover, the value style approach to investing has come under immense pressure recently in SA, on the back of poor performance against the benchmark (Friedrich, 2015). However, Friedrich (2015) believes that the recent underperformance of the value style is not a secular trend, but rather a function of a normal value alpha cycle that has persisted in the SA market for the past 40 years. In addition, institutional investors might prefer growth stocks because they are easy to justify to sponsors due to their great past performance (Lakonishok et al., 1992b).

Likewise, career concerns of money managers might also lead to a tilt towards growth stocks, as the value strategy usually takes about 3 to 5 years to payoff and thus, might underperform the market due to high tracking error against the benchmark, which in turn implies reporting negative excess returns for prolonged periods, putting the money manager at risk of being fired (Lakonishok et al., 1992b).

Portfolio managers may, therefore, suffer from behavioural biases that may influence their decision making process, which sometimes deviates from logic and reasoning (Baker & Ricciardi, 2014). This includes a familiarity bias (Baker & Ricciardi, 2014), which influences their asset allocation or stock selection despite following a

predetermined investment process, hence it is prudent to construct portfolios using strict rules to mitigate for such bias.

This research thesis provides a detailed analysis on: (1) how value stocks which are constructed without portfolio manager judgment overlay, perform in SA; and (2) how value stock performance is affected by different financial and economic conditions.

1.1 Background and Context

Investment style is a common principle used to analyse, classify and select equity portfolios. Multi manager firms or investment research firms classify equity funds for their clients for consideration for investment based on investment style. Institutional investors, consultants, financial advisors, and individuals use investment style as a criterion for selecting funds, either to achieve diversification or to make style bets (Kaplan 2003).

Definitions of investment style varies; however, the most common investing styles are growth and value investing styles. Most investors use P/B (price to book) and P/E (price to earnings) to label stocks as either value or growth. Value stocks are those perceived to be cheap on valuation metrics, i.e., low P/B and low P/E, relative to their history and industry. The risk to such a strategy is that the stock price never improves, which is known as a “value trap”.

Conversely, growth or glamour stocks are companies with high growth rate in earnings or sales, high P/E and high P/B, and pay very low or no dividends relative to history and industry. These stocks are priced for perfection and the risk to such a strategy is when future growth falls short of expectations, their stock price may plunge.

Figure 1-1: MSCI value versus Growth

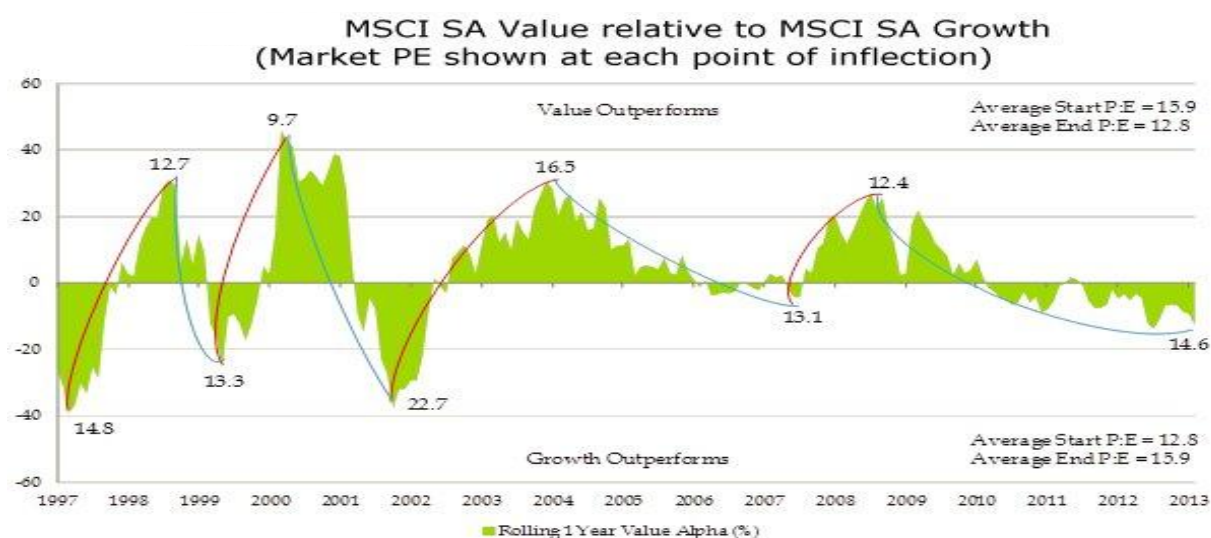


Figure 1-1 above indicates the inherent cyclical nature of value and growth styles from MSCI South African Indices, and it shows that currently we are in the longest growth cycle in the South Africa market since 1997. The graph also indicates the price to earnings multiple of the market at every peak and trough, which, as expected, surge when growth outperforms and pull back when value outperforms. Against this background, it was critical to investigate how value stocks perform and thus, attempt to understand these performance characteristics in different economic and financial market conditions.

1.2 Problem statement

We have established that style investing drives a lot of capital allocation decisions with institutional investors likely to prefer growth tilt as they can easily market such investments to sponsors. However, various studies suggest that the value investing approach may be superior to growth. Nevertheless in SA, value style investing has been out of favor for a long time. Therefore, this research helps to clarify this puzzle and assist capital allocators in SA to understand how value style, without portfolio manager overlay, performs in different economic and financial market conditions.

The Brandes Institute (2012) conducted research on value versus growth globally, focusing on the USA market and non USA market, including emerging market using

Lakonishok et al.'s (1994)¹ methodology. This methodology was used for developed markets and the outcome was that value outperforms growth over the term.

Auret and Sinclair (2006) investigated the price to book ratio, and results on the FTSE/JSE market and found that book to market/price has stronger significance than size and price to earnings ratio on the JSE.

According to Maginn et al. (2007), growth stocks typically do better during an economic contraction than expansion, on the back of the fact that there are few firms with growth prospects during the economic contractions, so growth stocks often see their valuation increase, whereas during an expansion phase, the valuation premium for growth stock is much smaller. Hence it is prudent to investigate how do value stocks perform during expansionary and contracting environments.

The primary aim of the study was to determine whether the mean excess returns of value style investing significantly exceed the mean excess returns of growth investing in SA, furthermore, to ascertain whether this outperformance is conditional on economic or financial market conditions.

1.3 Research objective and hypothesis

The main aim was to ascertain whether value investing has achieved superior returns in South Africa compared to growth investing. This was achieved by dividing the constituents of Financial Times and London Stock Exchange/Johannesburg Stock Exchange (FTSE /JSE) index into growth and value based on their relative P/B going back to December 2000. This helped in creating four portfolios namely Deep value, Relative value, Relative growth and Super growth. We then compared the respective portfolios risk adjusted returns relative to: (1) the other portfolios and (2) the overall market.

This also assisted in establishing whether evidence drawn from international evidence is applicable in South Africa given the challenges of South African market which includes but not limited to the smaller breadth and size of the market. We also investigated the characteristics of value stocks in different markets and economic

¹ Lakonishok et al. (1994), stocks were divided based on fundamentals (price to book, price to cash flow, price to earnings), where the aggregate of performance of each decile was tracked over time. The categorisation of stocks was repeated each year.

environments. This benefits all the capital allocations in South Africa, particularly institutional investors, consultants, financial advisors and retail investors.

1.3.1 Hypothesis I

H0: The mean excess return of value portfolios is equal to the mean excess return of growth portfolios.

This means that value stocks do not outperform growth stocks over the long term in South Africa. The common belief is that value counters outperform growth counters on risk adjusted basis (Fama & French 2006).

1.3.2 Hypothesis II

H0: The average performance of value portfolio is equal to the average performance of growth portfolio during a period of economic slowdown.

This means that value stocks do not outperform growth stocks during a period of economic contraction. The general belief is that value counters outperform growth counters in an economic expansion period, (Maginn et al. 2007)

1.3.3 Hypothesis III

H0: The average performance of value portfolio is equal to the average performance of growth portfolio during a period when overall market is negative, also known as bear market.

This means that value counters do not outperform growth counters during financial crisis or bear market. According to Lukonishok et al. (1994), this helps measure the relative riskiness of value versus growth styles, which helps verify the high fundamental risk claimed by Fama and French (1992).

1.4 Planned structure

The research report covers the following chapters:

- Literature review

This section covers theory behind style investing globally and locally in order to understand the theory behind style investing, particularly within the FTSE/JSE context.

- Data and Methodology

This chapter provides details on how the data was collected and processed given the research objectives and hypothesis including the research methodology. Additionally, this chapter covers how the portfolios were created.

- Findings

This chapter covers the outcome of the analysis of the data and is presented in an understandable and user friendly way.

- Conclusion

In this chapter the researcher shares his opinion on value investing performance compared to growth investing, including relevant performance under different market and economic environments.

2 Literature Review

2.1 Introduction

Many studies have been undertaken to examine value and growth style investing, with Fama and French (1992) and Lakonishok et al. (1994) arguing that value strategies outperforms growth strategies and the market. In the South African context, Robertson and Van Rensburg (2003) found that value strategies exhibit a positive relationship with equity returns within all industries, however, the value effect is much more pronounced in the financial and industrial sectors than in the resource sector.

The studies above challenge the two most famous theories of modern finance theory namely, Capital Asset Pricing Model (CAPM) and Efficient Market Hypothesis (EMH). The CAPM attempts to explain the risk - return relationship, where it describes the expected or required returns of a security by implying the expected return on a security is a linear function of its market beta (sensitivity of security compared to market). By implication, the market beta of the security is sufficient in explaining the expected return.

However, Fama and French (1992) argue that size (market equity), defined as market capitalisation of security, adds to the explanation of the cross section of average returns, with small caps average returns higher compared to large caps given that small caps have higher beta estimates.

Fama and French (1992) also argue that leverage, earnings to price (earnings relative to stock price) and book to market or price (book value relative to market value or price) are important in explaining expected returns; moreover, at times the combination of size (market equity) and book to market (price) are much more significant in explaining expected returns. As such, they also negate the roles of leverage and earning to price during the 1963 to 1990 sample period.

Additionally, their research results show that price to book has much more explanatory power on expected returns than size (market equity). Chan et al. (1991) studied the effects of four variables, namely size (market equity), book to market (price) ratio, earnings yield (earnings over price), and cash flow yield (cash flow over

price) in the Japanese market. The outcome was that book to market (price) and cash flow yield were most significant in explaining expected returns over the period from 1971 to 1988.

The purpose of this section is to introduce, outline and define investment style investing and theories in finance, highlighting global and local empirical studies and implication thereof. The next part of this section is organised as follows: In section 2.2 we describe and characterise value styles. In section 2.3 we discuss the Efficient Market Hypothesis (EMH) in relation to style investing. In section 2.4 we discuss behavioural finance and effects, including psychology, in the financial market. In section 2.5 we discuss CAPM. Here we inspect and clarify the key points of this model.

In section 2.6 we discuss the size (market equity) effects. In section 2.7 we understand the Lakonishok et al. (1994) methodology. In Section 2.8 we examine the value versus growth phenomenon, looking at empirical evidence that support each investment style global and in SA, with section 2.9 discussing the relative riskiness of value and growth strategy. Section 2.10 concludes the literature review.

2.2 Defining style investing

There exist three main groupings of investment styles: Value, growth and market-oriented. Lakonishok et al. (1994) defined value stock as counter that has underperformed at a previous time period and is expected to continue with this underperformance in the future. Typically a value investor desires counters that are trading at low financial ratio multiples, such as low price to book multiple and low price to earnings multiple, with a belief that although currently the firm's earnings are depressed, they expect them to rise in the future, in what they term reversion back to mean.

Fabozzi (1998) also define three other important styles within value investing; (1) Contrarian style, which entail looking for companies sell than book value i.e. stocks that are temporarily depressed; (2) high dividend yield, which favours stocks paying high dividends, (3) depressed price multiples, which favours stocks that are trading at low multiples compared to their history, with a hope that once the company recovers; the share will also recover.

Lakonishok et al. (1994) defined growth or attraction stocks as those that had stellar historic performance and are expected to continue performing well in the future. Growth investors typically focus on earnings, where they look for companies that have a high probability of increasing their earnings in the future, which in turn, should drive the share price performance higher. The danger for growth investors is when the growth in earnings surprises to the downside, causing the price to earnings multiple to fall, and as a result, the stock price plunges.

Maginn et al. (2007) define two important styles within growth investing, namely: (1) steady earnings growth, which focuses on companies that have delivered strong earnings growth historically and are anticipated to persist in the future: (2) Momentum, which focuses on companies that have historically experienced an increase in their share price and are expected to continue to outperform going forward.

Maginn et al. (2007) defines the term market-oriented investing, which is sometimes referred to as core investing, as investing that is neither value nor growth. These portfolios usually resemble a broad market average over time. According to Maginn et al. (2007), the sub styles to market oriented investing are market oriented with a bias to, growth at reasonable price (GARP), market oriented with value tilt and style rotation. Value and growth tilting means the portfolio is much more diversified, and that it is not full-blown value or growth. GARP investors seek stocks with growth prospect that sell at moderate valuation, they do not want to overpay for earnings growth. Style rotators adopt a style that they view will be popular going forward.

2.3 Efficient Market Hypothesis

Fama (1970) defined a market where prices always “fully reflect” available information as efficient. However, the nature of the information is important in determining the level of efficiency in the market. As such, the market is said to be weak form efficient when the information in question reflects only historical prices, semi strong efficient when prices reflects all public information (announcement of earnings, stock splits, etc.) and strong form efficient when prices show or include all types of information, including insider trading.

The implication of the above is that neither technical analysis (which looks at historical prices to try to infer expected prices) nor fundamental analysis (which analyses

financial information in attempts to determine undervalued or cheap companies relative to their intrinsic value) would enable investors to generate abnormal returns, including a case where investors use insider information. Insider trading is illegal and makes this form of efficiency debatable. One of the most common belief in investments is that higher unsystematic risk is associated with higher expected or required return (Jain & Khan 2006); that said, holding all other factors constant, investors expect a higher risk adjusted return in an inefficient market.

Efficient market hypothesis is also known as "random walk theory", which entails that security price changes (successive one or multi period returns) are independent of each other. Allen et al. (2006) suggests that stock returns in one week do not affects stock returns the following week, post the criticism that one day was too short to spot a pattern.

Fama (1970) suggests that market conditions consistent with efficiency manifest in a market where:

- There are no transaction expenses when buying or selling stocks,
- Information is free and readily available to all participants in the market, and
- All investors interpret present information about future prices similarly.

Malkiel (2011) believes that EMH does not mean that prices are always accurate; rather it implies that no one knows whether prices are too high or too low. Additionally, EMH does not mean that bubbles are impossible and that factors such as behavioural finance and environmental issues do affect the required rate of return of a security.

Malkiel (2003) labels efficiency as markets that make it impossible for investors to achieve returns that are above average compared to the market without taking above average risks. He argues that market are not perfect but are efficient even during the time where there is a valuation mistake e.g. the Internet bubble late 1999-early 2000; additionally, markets are efficient even when agents that participate in the market are not rational and also efficient even when stock prices display higher volatility compared to what fundamentals can justify. This is because he views markets as a great device for reflecting new information quickly and accurately.

That said, if markets are efficient then no investment style should generate above average returns or abnormal returns compared to the market, without taking above

average risk. In other words, the price of share reflects fair value of share, which is equivalent to discounting the company future cash flow by the correct cost of capital.

However, Capaul et al. (1993) studied returns of value (low P/B) versus growth (high P/B) portfolios in six countries namely United Kingdom, Switzerland, United States, Germany, France, and Japan. Their results suggest that on average during the period studied (1981 to 1992), value outperforms growth stocks. Additionally, the cross country correlations on month-to-month value-growth spread were not big, signifying that a call to tilt the portfolio to value stocks would have been effective worldwide.

Lukonishok et al. (1994) on their paper on contrarian investments, extrapolation and risks, argue that value outperforms growth stocks in the US due to the behaviour of investors i.e. investors sometimes over-react or under-react to certain information, additionally value investors are contrarian and do not follow the herd, hence value stocks generate superior returns compared to growth stocks.

However, Fama (1998) argues that the long run above average returns anomaly due to the psychological behaviour by market participants are time and methodology dependent, with a minor change in time interval and methodology yielding a different result. He argues that this should not happen if markets were inefficient.

Fama and French (1992) also reached the same conclusion, however they attributed the outperformance by value stocks to higher risk by the strategy. Fama (1998) argued that the over-reaction and under-reaction by market participants to information, should cancel each other as the frequency of each reaction should be the same over the long term, hence impossible to achieve above normal returns over the long term.

However, this may not be true in emerging market such China; Liu (2003) examined weak form efficiency in the Chinese market (Shanghai Stock Exchange) for the period of April 1996 to April 2002 and rejected the theory on the back of contrarian strategies, also known as value strategies, that generated excess returns over the period. Chung (2006) also investigated weak form efficiency in Shenzhen and Shanghai, for the period of February 1992 to December 2006. He considered daily returns with an aim of also testing for the “day of the week effect”. What came out of this was that both Chinese markets were not weak form efficient.

Bo and Krige (2008) investigated value counters versus growth counters in the Hang Seng stock market. They found that value counters outperform growth counters on the Hang Seng market for the period from 1981 to 2005, which holds for periods pre and post the Asian crisis in 1997. This anomaly was found to be greater for equally weighted portfolios and still persisted after controlling for size effect. This challenges the legitimacy of the efficient market hypothesis in emerging markets.

Hoque et al. (2007) investigated weak form efficiency in eight Asian markets (namely, Singapore, Taiwan, Malaysia, Hong Kong, Indonesia, Korea, Philippines, and Thailand) for the periods between 1990 and 2004, splitting the data to pre and post Asian crisis in 1997. They found that stock prices do not conform to the “random walk” theory, leading to rejecting EMH in all countries except Korea and Taiwan.

Basiewicz and Auret (2010) investigated Fama and French (1993)’s three factor model to explain value and size premium for the period from December 1989 to July 2005 in SA. In a time series test on grouped data, they found time-series variation in most assets, whereas in data that was not grouped, the three factor models explains the value and size effect on the Johannesburg Stock Exchange (JSE).

Graham and Uliana (2001) investigated the support of growth and value observable fact on industrial companies listed on the JSE for the period between 1987 through to 1996. They found that in the period 1987-1992, industrial growth stocks outperform industrial value stocks; however value stocks outperformed for the period after 1992.

The EMH has been challenged globally and in SA, with the majority of empirical evidence supporting the notion that value counters outperform counters over the long term, and thus achieve abnormal returns compared to the overall market when returns are adjusted for risk.

Shiller (2013) deems the EMH a half-truth and argues that if the theory said that it is not likely that the typical non-professional investor will generate excess profit by trading in the market on the strength of public information, then the premise will be spot on, due to his high level scepticism on investment tips. Woolley (2014) argues that EHM has failed to explain market behaviour and asset pricing of recent years on the back of theory failing to fully address the principal agent problem and asymmetry of information.

That said, the jury is still out on the reasons behind such as anomaly, hence it is prudent to investigate the theory that attempt to explain the return-risk relationship of securities, the CAPM, in order to assess whether investors who achieve excess return do so with or without taking additional risks.

The section below address the arguments on risk return within the context of CAPM.

2.4 Capital asset pricing model (CAPM)

The independent work by Sharpe (1964), Lintner (1965) and Black (1972), stemming from the early work of mean variance portfolio theory by Markowitz (1959), coined the term CAPM, which has played a crucial role in quantifying the required or expected rate of return for an investor. CAPM links the expected return of the security with the securities' measure of risk. Thus the expected return is a function of two prices: (1) price of time (risk free rate); and (2) price of risk (market risk premium,)

The CAPM is identified by the equation below:

Equation 2-1: The CAPM equation

$$R = R_f + \beta(R_m - R_f)$$

Where;

R = the required or expected return of a portfolio or security;

β = the securities (portfolio) measure of risk (non-diversifiable or systematic risk);

R_f = anticipated return of a risk free asset; and

R_m = anticipated return on the market portfolio

The three main assumptions of the model are markets are in equilibrium (frictionless market, unlimited risk-free borrowing and lending), mean variance investors (to create optimal portfolios, investors only need to know expected returns, variance and covariance) and homogenous belief about mean variance, which entail investors have the same forecasts on expected returns, variance and covariance. The implication of CAPM model is that beta (systematic risk) is sufficient in explaining the cross section of expected return on asset.

However, Banz (1981), in his examination of the connection between total market value of ordinary stock and returns, argues that “size effect” (small caps stocks in New York Stock exchange (NYSE)) typically achieved higher risk adjusted returns than large caps stock, in the 1936-1975 period.

Fama and French (1992) also argue that size (market equity) and book to market capitalisation offer an important explanation of the cross section of average returns for the period 1963-1990.

Bhandari (1998) also found beta to be inadequate in explaining the expected returns of a common stock and argued that leverage also is important in explaining expected returns. He offers that a rise in leverage of a company also causes the risk to common equity to rise, although not cross sectional, the common stock equity of higher leverage firm has higher risk compared to common stock with lower leverage, since firms have varying levels of leverage, hence it is expected that leverage has a positive correlation with common stock equity.

Another implication of CAPM is that investors can all identify the same “market portfolio” given that they have the same expectations and use mean variance analysis and thus combine a risky portfolio with risk free asset when creating their desired portfolio.

Fama and French (2006) investigated whether the CAPM explains the value premium and whether regular returns are explained by market beta, as suggested by CAPM, for the period 1923 to 2004. Noteworthy, 1963 is the start date for Fama and French (1992, 1993)’s work, so the period 1926 to 1963 is out of sample relative to earlier studies. They found average value premium in the US is similar pre and post 1963.

However, they also found that the market betas change significantly, with value stocks market beta coming out lower than growth stocks, which is opposite of what CAPM suggests, hence is unsuccessful at explaining the value premium for the period 1963 to 2004. For the period 1926 to 1963, the CAPM explains the value premium perfectly. Additionally, they concluded CAPM fails to explain portfolio pricing formed on size (Market equity), book to market (price) and market beta (systematic risk) for 1928 to 2004, and find that it is size (market equity) and book to market (price) or risk linked to them that explains average returns, not the market beta.

Basu and Chalwa (2010) investigated CAPM in Indian stock market for the period January 2003 to February 2008. They examined 10 portfolios with 50 stocks each and the outcome was that CAPM fails completely within the Indian context for the period of the study.

They found the intercept term to be significantly different to zero and was very large in all portfolios. Additionally, there was a negative association between market beta and excess return, which is contrary to CAPM theory, indicating an inefficient capital market. They also found significant unsystematic risk through significant residual variance, with the regression also showing poor explanatory power.

Xhu and Zhou (2001) also investigated the CAPM on the Shanghai stock exchange for the period 1995 to 2001; they found that beta failed to explain the average returns of the securities for three periods, namely, June 1995 to June 1998, June 1996 to June 1999 and June 1997 to June 2000. However, CAPM holds true for period from June 1996 to June 2001, citing investors becoming more rational as the main reason.

Ning and Liu (2004) also updated this research, focusing on cross sectional and time-series regressions, testing the Capital Asset Pricing Model in the Shanghai Stock Exchange for the period from 1996 to 2002. They established that CAPM failed during this period, with the relationship between beta and expected return being nonlinear and with significant residual errors, which implies nonsystematic risk has an effect on expected return.

Van Rensburg (2001) investigated a presence of style based effect using JSE industrials for the period 1983 to 1999 and found eleven effects existed on risk adjusted basis, namely value (dividend yield, earnings yield, price to net asset value (NAV) and historic five year earnings growth), quality (sales or revenue, leverage, cash flow to debt and size (market equity) and momentum (historic three, six and twelve months prices). Robertson and Van Rensburg (2003b) also found that stocks with low price to earnings (value stocks) outperformed those with high price to earnings (growth stocks); additionally value stocks had lower sensitivity to the market compared to growth shares, which contradicts the CAPM model.

Auret and Sinclair (2006) also established that on the JSE, book to market (price) is more superior in explaining expected returns than size and price to earnings as per

Robersons and Van Rensburg (2003). He argues that price to book (price) subsumes the significance of both size (market equity) and price to earnings in the three-variable regression, however the inclusion of price to book fails to improve Van Rensburg and Roberson model due to high correlation with the two attributes, which have high explanatory power. This also challenges CAPM model.

2.5 Behavioural Finance

Shiller (2003) labels behavioural finance as “finance from a broader social science perspective including psychology and sociology”. This entails that its focus on how investors behave and make decisions. This theory contradicts the efficient market hypothesis despite drawing some of its concepts from traditional finance.

He notes, from understanding behavioural finance and applying the right standard, that there is no expectation of making a quick and reliable profit off market inefficiency. However the market can be wrong in some other senses such as major stock market bubbles, which present opportunities for making profits.

Bryne and Brooks (2008) contrast the main difference between traditional finance and behaviour finance. They define traditional finance as a model where individuals are assumed to be rational and risk averse, which entail they have perfect information and they process the information accurately and instantly, without biases, with the main focus on maximising their personal utility function.

Nevertheless, they note that this framework fails to address some of the essential facts concerning the market including cross section of average returns and personal trading behaviour. Then again, they argue that behavioural finance is founded on the notion that individuals, or at least a minority of them, are less rational and subject to behavioural predispositions in processing information and decision making. This can results in markets that deviate from market efficiency, temporally or persistently.

They argue that framing or how information is shown can influence decision making, leading to both cognitive and emotional biases. Cognitive errors or biases are due to the investor's faulty reasoning or lack of understanding or incorrect information processing e.g. investors may suffer from overconfidence, where they overrate their capacity and precision with which they process information resulting in making a suboptimal decision, which is not rational.

On the other hand, emotional errors are not related to conscious thoughts; they originate from impulse or intuition and feelings. These biases could lead to individuals processing information quicker or slower than others, which could lead to the market deviating from efficiency, at least temporally.

Fama (1998) investigated market efficiency, long term returns and behavioural finance partly in response to Lakanoshok et al.'s (1994) justification of why value stocks outperform growth stocks, which Lakanoshok et al. (1994) cited as one of the reasons being that investors overreact or under-react to information presented.

Fama (1998) argues that abnormal returns on how the market reacts to information, which is consistent with market efficiency, are chance results, with the frequency of overreaction as common as under-reaction, hence cancelling out. Additionally, the abnormal returns are sensitive to the methodology and time period used in the study.

Shiller (2003) responded to the findings in Fama's (1998) literature review on behavioural finance. Shiller (2003) argues that the assertion made by Fama (1998) regarding the anomaly that there seem to be as much underreacting by investors to information as over reactors is incorrect, since this assertion is not backed by any fundamental psychological principle. Additionally, the second criticism regarding an anomaly which disappears due to change in methodology or time interval is also weak as the model has been tested in multiple geographies.

Barberis and Thaler (2003) argues that efficient market hypothesis proponents based on arbitragers, force the market back to efficiency, as a result of some investors being irrational, are incorrect due to limits to arbitrage, which can permit substantial mispricing. They also note that prices can be wrong without creating profit opportunity, as mispriced assets can lack a fairly close substitute, which exposes the arbitrageurs from effectively hedging their position in the case of unfavourable changes in fundamentals. They also argue that, from the traditional finance framework point of view, it is difficult to understand the fundamental facts about total stock market, the cross section of average and individual stock behaviour.

Bryne and Brooks (2008) also explain two theories falling under behavioural finance, namely behavioural asset pricing and behavioural portfolio theory.

Behavioural portfolio theory (BPT) is based on empirical evidence and the observation that individuals construct a portfolio by layers, where each layer represent a different expected risk and return. Allocation of funds on each layer depends on the importance of each goal to investors. If an investor believes they hold an information advantage, then a highly concentrated portfolio is possible, which is in contrast to traditional finance and efficient market hypothesis.

Additionally, if an investor suffering from loss aversion (investors who strongly prefer to avoid losses to acquiring gain, where the pain felt on loss is more painful than the equivalent satisfaction on the gain), would hold larger positions in cash to mitigate the risk of selling assets at low prices in case liquidity is required.

One of the most common cognitive errors that investors make is to confuse a good company with a good investment, due to the fact that most of the good news about such a company is already factored in the price. Anderson and Smith (2006) investigated this mistake by looking at companies identified as great companies by Fortune magazine in the United States for the period 1983 through to 2004. They found that the portfolio of these shares provided better returns than the market by a considerable margin, which is also against the efficient market hypothesis.

According to Bryne and Brooks (2008), the behavioural asset pricing model which is drawn from capital asset pricing models, adds a sentiment premium to the discount rate, which entails that the required or expected return on an asset is the risk-free rate, plus a fundamental risk premium, plus a sentiment premium. The sentiment premium can be estimated by considering the dispersion of analysts' forecasts. A high dispersion suggests a higher sentiment premium. This is also in contradiction to CAPM as it argues that market beta sufficiently covers all risk in the security.

Barker and Wurgler (2006) investigated investor sentiment and cross section of expected returns in the US for the period 1963 to 2001; they argue that sentiment affects security valuation and subsequent returns. When sentiment at the beginning of the period is low, subsequent returns are higher on small and young (new listed) versus old companies, highly volatile compared to low volatile stocks, non-payers versus dividend payers, unprofitable versus profitable ones. The reverse is true for these stocks when the beginning of period sentiment is high.

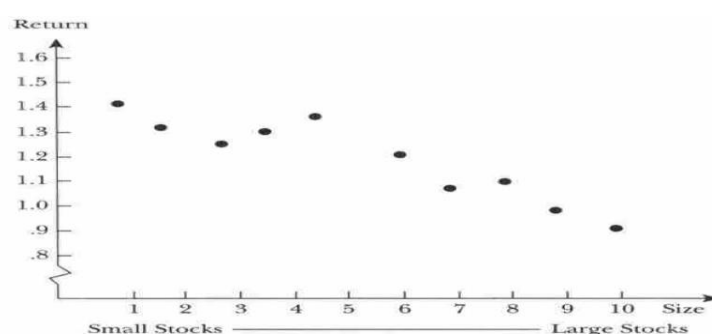
Oprean and Tanasescu (2014) investigated the effects on behavioural finance in emerging markets, namely Brazil and Romania for the period June 2009 to June 2013. Their aim was to analyse investor behaviour on trading volume for investors based on rational theories versus an investor that follows behavioural finance. They used daily index levels or values on both market and daily volumes and found that trading is influenced by the behavioural finance (irrational behaviour), thus rejecting traditional finance in both markets.

This behaviour influences the money manager's portfolio construction decision making, which sometimes lead to not being true to the desired style by omitting stocks based on heuristics, which also affects the portfolio composition and the subsequent portfolio style returns.

2.6 Size Effect

One of the anomalies that challenges the CAPM model is the tendency of companies with small capitalisation to outperform companies with large capitalisation over the long term. Fama and French (1993) did a study in the United States using data from 1963 to 1999, where they created ten portfolios based on their size. Stocks were divided into deciles with decile one representing smallest 10% of all stocks and decile ten representing largest stocks.

Figure 2-1: The size effect



Source: Fama and French (1992).

The results show that stocks with small market capitalisation in the United States represented by decile one outperform stocks with large market capitalisation represented by decile ten. Fama and French (1993) state that the relationship between market betas (systematic risk) was flat and not upward sloping as CAPM suggest. Additionally, they created ten portfolios based on their beta and size which

yielded similar results as figure 2-1. They argue that size may be a better measure for risks compared to beta, and that their results should not be viewed as anomaly.

Milkier (2003) argued that the size anomaly is still questionable given that from mid 1980s through to mid-1990s, stocks with large market capitalisation in most of the world's markets outperformed stocks with smaller market capitalisation. He argues that one of the reasons was the growing institutionalisation of the market led portfolio managers who prefers larger companies on the back of liquidity requirements, with stocks with small capitalisation posing a challenge to liquidate significant blocks of stocks. He also note that survivorship bias also poses a risk to the studies of "size effect" as most data of small companies who have failed are not captured on the returns, thus skewing the results to those who survived, hence the great performance from small stocks.

Damodaran (2012) also examined performance of small capitalisation stocks in the US, from 1927 to 2010. The outcome reaffirmed the existence of the small capitalisation premium, with small stock portfolios (value weighted) generating 20% return over the period compared to 11% return by large stock portfolios. Additionally, portfolios that were equally weighted increases the premium, which entails that the premium is earned by the smallest companies. He argues that success of this strategy is not guaranteed every period and that timing is important. He also notes that the small capitalisation premium is greatest in micro-capitalisation stocks (market cap less than \$250 million or lower), citing that these companies are low priced and illiquid and not followed by equity research analysts.

Damodaran (2012) also argues, through other studies, that "size effect" exists in other markets outside the United States to the tune of 7%, 8.8% and 5.1% in the United Kingdom, France and Japan respectively. However, Germany has a much smaller size effect. One of the explanations of small cap premium is transaction cost, with bid-ask spread tending to be higher for small companies, additionally they also have a high price impact due to the fact that they are less liquid. Governance risk can also explain the premium as these stocks are not followed by the investment analyst community; hence the lack of scrutiny poses additional risk to small stocks.

Cakici et al. (2012) examined the presence of momentum, size (market equity), and value in 18 emerging markets across Asia, Eastern Europe and Latin America for the

period January 1990 to December 2011, where size and value definition were consistent with Fama and French's (1992) definition. They defined momentum as portfolios of winners minus losers on a rolling twelve months period. The countries were split according to the Morgan Stanley Capital Index, namely: (1) Eastern Europe (Russia, Czech Republic, Turkey, Poland and Hungary); (2) Asia (India, Taiwan, Indonesia, Philippines, South Korea, Malaysia, Thailand and China); and (3) Latin America (Mexico, Colombia, Chile, Brazil and Argentina).

They found that both momentum and value effects are significant in all countries, except for Eastern Europe. The value effect was strong in both small and large caps, which contradict findings in developed markets; however, the momentum effects were larger for small capitalisation stocks compared to large capitalisation stocks, which is consistent with the developed market. Additionally, they also found that value and momentum effects are negatively correlated, which entail that they diversify each other well.

The size effect seem to be present in both developed and emerging markets, with small stocks believed to generate abnormal returns over the long term. As such, this provides high explanatory power to average returns in the stock market across the globe. Drawing from the literature above, size (market equity) and value factors from the Fama and French model seems have high explanatory power in variation of returns, thus it is prudent to revisit the value versus growth debate across the globe.

2.7 Understanding Lakonishok, Shleifer and Vishny (1994)

Lakonishok et al. (1994) used two methods to define value or growth companies. The first method used was a simple one-variable method where financial ratios are used as a basis for the style strategies. The four financial ratios are:

- Price to earnings
- Price to book;
- Price to Cash flow; and
- Growth in sales (Five year average growth in sales)

The sample covered in the study is from April 1963 to April 1990, covering stocks listed in New York Stock Exchange (NYSE) and American Stock Exchange

(AMEX). They only considered the largest 50% of the stocks ranked by full market capitalisation, which reflects the investable universe of institutional investors.

The remaining stocks were ranked according to the above mentioned financial ratios on a five year buy and hold view, which entail that the first portfolio was formed in 1968, rebalanced every year until 1989. Ten deciles were formed, where the highest decile represented stocks with the highest ratios relative to the four financial ratios (independently), which represents value stocks. Decile one, which represents growth stocks have low ratios relative to the four financial ratios quoted above. Upon completion of the portfolio creation process, they counted 22 sets of each financial ratio mentioned above.

The second method used by Lakonishok et al. (1994) employed a variety of two variable methods to categorise companies into value and growth portfolios. The combination of variables for their two variable methods is as follows:

- Growth in sales and price-to-book;
- Growth in sales and price-to-cash flow; and
- Growth in sales and price-to-earnings.

They independently formed three groups for each variable, where the first group contained 30% of the companies with the lowest five year average annual sales growth percentage. The second group contained the companies whose sales growth falls into the middle 40% and the third group contained the final 30% of companies whose sales growth is the highest.

A similar method was applied to the three financial ratios independently such that there are two sets of companies that are divided into three groups. As a result, the companies that have slow five year annual sales growth rates and lowest price multiples formed a value portfolio, whereas the companies with highest five year annual sales growth and high price multiples formed the growth portfolio.

2.8 Hypothesis I (Value versus Growth stocks)

The Brandes Institute (2012) conducted research on value versus growth globally, focusing on the USA market and non USA market including the emerging market. The main objective was to quantify the value premium and gauge its prevalence not to

resolve the prevalence or persistence of the premium, which is often a subject of debate.

They employed Lakonishok et al. (1994) on variable methodology, examining returns for US stocks from 1968 to 2012 and 1980 to 2012 for non US markets. They found that value outperforms growth globally from 1980 to 2012; however the magnitude of the premium has dropped from 2007, reflecting a difficult environment for value stocks from 2008 to 2012.

In the US, the long term value stocks represented by low price to book decile, returned 12.8% on a five year annualised return, compared to growth stocks return of 4.3%, an outperformance or premium of 8.5% for the period 1968 to 2012.

However, shorter term performance indicates that in the US, value counters have underperformed growth counters, weighing in on the recent underperformance of value stocks. Thus the average return over the last two rolling five year return periods for value is -6.9% compared to growth returns of 2.3% for the same period, indicating value underperformance.

However, non USA returns including emerging market returns over the recent years are still in favour of value stocks lifted by small caps recently. For emerging markets, they used Morgan Stanley Capital International (MSCI) emerging market definitions, which covers about 23 countries in the emerging market countries.

Using the Lakonishok et al. (1994) methodology, for the period 1980 to 2012, they found value stocks, represented by low price to book, annualised five year return was 20.3% compared to growth stocks return of only 4.6%; an outperformance or premium of 15.7%. Additionally, they also monitored the year on year persistence of the premium in order to account for the inherent high volatility in the emerging markets and they found the value premium to be highly persistent on a yearly basis.

Capaul et al. (1993) also investigated the existence of the value versus growth factor, from 1981 to 1992 in six major markets, namely, France, German, US, Japan, United Kingdom and Switzerland. They analysed returns from portfolios with low price to book ratio, defined as value portfolios and those with high price to book, defined as growth in the six major markets.

They found that growth and value factors exist in all countries except for one, with significant dispersion or variation in performance of value stocks and growth stocks on a month on month basis. It follows that value counters outperformed growth counters in each country on average over the studied period.

One of the criticisms of their study was the use of one classification of value stocks by one measure, which is price to book, which they justified as current security price represents the investor's outlook of future prospects and book to value represents the accountant's representation of its past costs, where the greater the company's prospects for future growth implies that the ratio of its future prospects to its embedded cost should be higher.

Fama and French (1998) also investigated value versus growth in thirteen developed major markets from 1975 through to 1995. They found by sorting on price to book, value style outperformed growth style in all countries except for one. The difference in returns of portfolios with low price to book was 7.68% per year. They also found a similar premium using price to earnings, price to cash flow and dividend yield. The evidence of existence of the value premium was also found in emerging markets.

Graham and Juliana (2001) investigated growth and value in industrial companies listed on the JSE for the period between 1987 through to 1996. They found that in the period 1987-1992, industrial growth stocks outperformed industrial value stocks; however value stocks outperformed for the period after 1992. They also admit that the result could be affected by political and economic factors; including South Africa returning to the financial arena after a period of sanctions and a decrease in the inflation rate over the period.

Mutton and Muller (2007) investigated the benefit of equity style timing in the JSE for the period of 1986 to 2006 in the JSE Industrial sector. They found that value style reigns supreme over growth style in the long term, regardless of size effect, however there are periods where growth portfolios also outperform. They argue that there is a benefit in timing the style turning points rather than buying the index or keeping a fixed style.

Basiewicz and Auret (2009) examined the cross section of average returns on the JSE for all companies listed on the JSE from December 1989 to July 2005. They found the

presence of value and size premia on the JSE before and after adjusting for liquidity, however the size premium was more persistent. They also found that price to book has the stronger explanatory power to predict returns and price to earnings was weakest.

On the other hand, Auret and Cline (2011) updated a study done by Robins et al. (1999), where they tested for the existence of value (low price to book), size premiums and the January anomaly effect on the JSE. They separated the data into two periods similarly to the original study. They found no significant evidence of size premium (market equity), value (low price to book) or “January effects” in both periods, which is consistent with the original study.

2.9 Hypothesis II and III (Relative riskiness of Value and growth strategy)

Fama and French (1992) argued that value outperformed growth stocks because value stocks are fundamentally riskier. Patkova and Zhang (2005) studied relative risks of both value and growth for the period 1927 to 2001, using ex ante risks parameter measures, namely, credit default spreads and short term interest rate. The outcome was that value stocks are riskier; which is consistent with Fama and French (1992).

Lakonishok (1994) argued against two theories that explained why value strategies have outperformed growth strategies. Firstly, value strategy outperforms because they exploit the mistakes of naïve investors, which entails that some investors behaviourally read too much into what has transpired in the past, which often is not warranted or justified; hence growth strategy underperforms value style.

Secondly, value strategies outperform because they are fundamentally riskier. He argues that if value counters or strategy has a fundamentally higher risk than growth strategy, then value strategy needs to struggle against growth strategy in two bad states of the world. Moreover, those states of the world on average should be “bad states”, making the value strategy less attractive to investors with low risk tolerance.

To test for such, he looked at consistency of performance of value and growth strategy over time with the aim of establishing if value underperforms in recessions and during times of severe market decline. The results were that value strategy did about the same and sometimes better during recessions; in addition, value strategy

outperformed growth strategy during times of severe market declines; contradicting the assertion that value stocks are riskier.

2.10 Conclusion

The review of literature clearly indicates the persistence of value premium globally; particularly in emerging markets over the long term. Albeit growth stocks also outperform in certain periods, such as, post 2007 in the US.

The reasons on why the premium exists are still debatable, with Patkova and Zhang (2005), supporting Fama and French (1992), and arguing that value strategy's superior performance exists because of higher risk. However, Lakonishok et al. (1994), argue, from the behavioural finance point of view, that value stocks benefit from naïve investors, who follow the herd and extrapolate earnings too far into the future and fail to take advantage of out of favour stocks.

The return - risk relationship by CAPM was also challenged globally, with beta proven to be insufficient explanatory power in the US by Fama and French (1992). The same was done in emerging markets such as China, where Ning and Liu (2004) found CAPM failed on the Shanghai Stock Exchange and, importantly, Van Rensburg (2001) also found that value, size and momentum explains expected returns in South Africa, which contradict CAPM.

The efficient market hypothesis is also challenged by the empirical results favouring value stocks over growth stocks, with behavioural finance weighing in against the theory on the back of the fact that people are irrational and process information differently, which causes the market to be temporally or persistently inefficient. The size effect, which is present globally, also challenges the efficient market hypothesis theory.

However, Frederick (2015) suggests that recently value stocks have come under immense pressure locally and globally on the back of low interest rates following the global financial crisis, and Blount (2014) notes that style investing in South Africa is often dismissed due to the small market. As such, it is of utmost importance to investigate the value versus growth phenomenon on the FTSE/JSE.

3 Methodology

3.1 Introduction

The purpose of the study was to determine if mean excess returns of the value strategy outperform the mean excess returns of growth strategy for the period 31 December 2000 to 31 December 2014. We applied a revised Lakonishok et al. (1994) methodology, using one variable method, namely, the price to book to define value and growth stocks.

We split the primary and secondary objectives into three hypotheses. The general belief is that value stocks outperform growth stocks internationally, so the first objective was to prove if this is true in South Africa for the period of analysis.

3.2 Research Method

The design was quantitative in nature because the study analysed the comparative performance and attributes of four portfolios, using the revised one variable Lakonishok et al. (1994) methodology. The data used to create and analyse portfolios was obtained from Bloomberg.

To duplicate Lakonishok et al. (1994) in South Africa, we needed to acknowledge that there are major differences between a developed market, such as the United States of America and an emerging market, such as South Africa. Lakonishok et al. (1994)'s methodology only included the largest 50% of firms by market capitalisation.

On the other hand, South Africa has a lower number of stocks compared to the United States of America, hence we focused on all stocks listed on the FTSE/JSE main board, which largely represents the institutional investor's universe and represents about 99% of all companies by market cap. This also ensures we have enough sample size required to conduct this research. Portfolio construction is rules based per Board Notice 90 of 2014² relating to Collective Investment Scheme Control Act, 2002 (CISCA) which governs how institutional managers manage money.

² The Financial Service Board (FSB) regulates the asset management industry and thereby issues limits and types of securities that may be included in a portfolio via the Collective Investment Schemes Control Act, 2002 (CISCA) using Board Notice 90 of 2014.

For the purpose of the study, we evaluated the comparative performance of two investment styles that have been selected, based on one year buy and hold view.

Portfolio analysis was used to determine which style outperforms over time using one variable classification, specifically price to book ratio. This classification process created four portfolios, namely deep value (lowest 25% or quartile 1 on price to book ratio), relative value (quartile 2 on price to book ratio), relative growth (quartile 3 on price to book) or super growth (highest 25% or quartile 4 on price to book).

Upon portfolio creation, the performance of each portfolio was tracked and rebalanced over a one year period. This created a monthly series of returns for all portfolios rebalanced annually in December each year. The investment horizon is different to Lakonishok et al. (1994)'s of a five years buy and hold strategy, as we believe that in South Africa, there are very few institutional investors that rebalance their portfolio once in every five years.

This method is not without its disadvantages, which are including but not limited to higher trading cost. However the reality is that active managers do change their portfolios in order to reflect their current best view, hence stocks that have moved outside their investment style due to price movements and other stock specific issues tend to be traded.

This also gives new entrants the opportunity to be considered and thus also exclude suspended stocks or address stocks with corporate action in a correct manner. This method was also an effort to keep the definition or classification of style consistent every year, with portfolio turnover being monitored closely. Portfolio analysis was used to determine which styles reigns supreme over the period of study.

The study period for this analysis was from December 2000 to December 2015, with a one year buy and hold strategy, generating monthly returns based on the above methodology.

3.2.1 Returns process

The monthly returns for all companies were calculated using the formula:

Equation 3-1: Monthly returns formula

$$R_m = \frac{P_m - P_{m-1}}{P_{m-1}}$$

Where:

R_m = return on share in month m

P_m = share price at end of month m

P_{m-1} = share price at end of month m – 1

Excess return for each portfolio or company was calculated using the below formula;

Equation 3-2: Monthly Excess returns formula

$$X_M = R_p - R_f$$

Where:

X_M = Excess return for portfolio

R_p = Return on the portfolio

R_f = three months Jibar (Risk free rate)

3.2.2 Sharpe ratio Formula

The Sharpe ratio measures the reward obtained per unit of total risk assumed in the portfolio.

Equation 3-3: Sharpe Ratio

$$\text{Sharpe ratio} = \frac{R_p - R_f}{\sigma_p}$$

Where:

R_p – Expected return of the portfolio

R_f – Three months jibar rate (Risk free rate)

σ_p – Standard deviation of portfolio returns

3.2.3 Calculating the value Premium

Differences in four portfolios were determined in order to isolate the deep value premium and relative value premium. Deep value premium was calculated as the difference between deep value portfolio returns and super growth portfolio returns, denoted as (R_{DVSG}). Assuming statistical significance, a positive (R_{DVSG}) indicates that deep value shares on average outperform super growth shares. The second premium is relative value premium, calculated as the difference between relative value portfolio return minus relative growth portfolio returns, denoted as (R_{RVRG}). A positive R_{RVRG} means that on average, relative value shares outperform relative growth shares, assuming statistical significance.

Pairwise correlation was calculated between deep value premium and relative value premium, to ascertain if value premium from deep value has a strong relationship with relative value.

3.2.4 Statistical inference

Inference statistics help in drawing conclusion on a population based on a sample of data at hand. It is important to distinguish between analytical findings that indicate a relationship to those that are statistically significant. This study uses student t statistic and p values, which helps establish meaningful statistical relationships between variables being tested.

According to Brooks (2014), the p value represents the exact or measure of significance level. He further stated that, informally, the p value has the probability of being wrong when the null hypothesis is rejected. For example a $p < 0.05$ indicates there is a statistical relationship, at 5% significant level, hence rejecting the null hypothesis.

3.2.5 Abnormal risk adjusted returns

To test whether each portfolio produces abnormal risk adjusted return, we used classical regression model, ordinary least squares (OLS) estimators to test if each portfolio performance yields abnormal returns relative to the benchmark. This was done for each portfolio independently.

Equation 3-4: Ordinary least square equation (OLS)

$$Y_I = \beta_0 + \beta_1 X_{1i} + \varepsilon_I \text{ Where } \varepsilon_i \sim N(0, \sigma^2)$$

Y_I - Excess return of portfolio above risk free rate

β_0 - Abnormal return (Alpha)

β_1 - Market beta

X_{1i} - Market risk premium

ε_I - Error term

The CAPM intercept, also known as Jensen's alpha, representing the abnormal return, was coined by Jensen (1968), and is commonly used to measure portfolio performance. A biased alpha can lead to an erroneous and misleading conclusion about portfolios performance.

The function above is a univariate regression model where excess return of each of the four portfolios was regressed against market excess returns. The independent variable is the market excess return and dependent variable is each of the portfolios. The coefficient of determination, represented by R^2 represents the extent the independent variable (Market excess return) can explain the variation in dependent variable (Portfolio excess return). In this context, it represents the extent to which portfolio mean excess return variation can be explained by market mean excess returns.

Bhatnagar et al. (2010) used a similar method where he tested CAPM versus a three factor model in the UK for the period from April 2000 to June 2007. They established that value stocks outperform growth stocks. Additionally, they found a very low R^2 , which indicate that value stocks returns are not fully captured by the CAPM model.

The significance of the market beta and alpha will be tested using a Student two tail t-test. This tests if the slope (market beta) and intercept (alpha) is significantly different from zero. We used the p-value to test if these two on each portfolio are statistically significant.

For Ordinary least squares (OLS), there are five desirable properties that must be met in order to validly conduct the hypothesis tests.

1. The average value of the error term is zero, which, according to Brooks (2014), will never be violated if the regression has a constant term.
2. Homoscedasticity is assumed, which entails that variance of the error term should be constant
3. The covariance of error term over time should be zero. The errors are assumed to be uncorrelated
4. The explanatory variables or the independent variable must be non-stochastic.
5. The error term should be normally distributed.

According to Brooks (2014), homoscedasticity, where the error term is constant, can be tested using White's test. If errors are not constant over time, they are said to be heteroskedastic. OLS, in the presence of non-constant variance, still gives unbiased and consistent coefficient estimates; however, they no longer have the minimum variance, which could lead to incorrect inferences.

Similarly, when error terms are correlated with each other over time, which can be tested using Breusch-Godfrey test, the estimates are still unbiased and consistent, but the standard errors could be wrong, leading to the possibility of making incorrect inferences. Using robust standard errors corrects for both errors and leads to better standard errors (Brooks, 2014).

We used the three - months Johannesburg Interbank Agreed Rate (Jibar) as a risk free rate, as this is the reference rate mostly used in the futures market for cost of carry.

3.3 Secondary Research

Upon creation of the portfolios using the one variable method by Lakonishok et al. (1994), we determined the performance of each portfolio using portfolio analysis during periods of different states of the world.

To measure the states of the economy, we used the monthly market returns, i.e., FTSE/JSE returns from January 2001 to December 2015, sorting it into three periods namely, the best forty five monthly returns, the worst forty five monthly return and the intermediate 90 months. The average returns on those periods were calculated to measure the relative riskiness of each investment style. Lakonishok et al. (1994)

argued that for value counters to be riskier than growth counters, the former will underperform during the worst forty five monthly returns.

The second indicator to the states of the economy was the quarterly GDP, which was measured by quarterly growth rate. There are 59 quarters during the period January 2001 to December 2015. The Q4 2015 was released in March 2016. The 59 quarters were sorted by the best fourteen quarters, the worst fifteen and the intermediate thirty quarters. The average returns for each portfolio was calculated and contrasted to measure the relative riskiness of each style.

3.4 Population, Sample and Unit of Analysis

3.4.1 Population

The universe of the study was all counters listed on FTSE/JSE Index main board. This represents about 99% percent of the full market capitalization of the index, which represents institutional portfolio manager's investable universe. According to Bloomberg, there were 160 ordinary stocks listed on FTSE/JSE main board, with a total market capitalisation of ZAR 9 742 9179 million, as at December 2014.

3.4.2 Sample

The samples portfolio consists of stocks that are listed on the FTSE/JSE All Share Index from December 2000 through to December 2015. The FTSE/JSE Africa Index Series is well established in the local market, has been in existence since 2002 from the joint venture between the JSE Limited (JSE) and the FTSE group (FTSE). The FTSE/JSE Africa Index series replaced the JSE Actuaries Index.

The FTSE/JSE index series is based on free float adjustment methodology, whereas the JSE Actuaries Index was based on full market capitalisation of companies. The All Share benchmark methodology is based on the premise that it represents a broad market benchmark, reviewed annually in December and includes 99% of all eligible companies base of "gross market cap", measured by product of the number of outstanding shares and share price. However, before the companies that make up the index are selected, two eligibility screening criteria are employed FTSE/JSE (2015):

- The minimum liquidity screen

- The minimum free float screen

Minimum liquidity screen ensures that a company must trade at least 0.5% of its issued capital per month, for a minimum of 8/12 months, for it to remain in the index. This however does not mean the index is fully tradable in all scenarios; it is mainly used to exclude illiquid securities in order to ensure that a reliable price exists for all qualifying companies.

The minimum free float rule requires that companies maintain a free float³ of more than 5%. Any company with a free float of less than 5% is not eligible for inclusion. Additionally any company with free float of between 5% and 15% is not eligible for inclusion, unless the companies' investable market cap is greater than the average companies market cap in the All Share. The All Share index is subject to a minimum of 160 companies FTSE/JSE (2015).

Bloomberg has an agreement with the JSE to be a secondary data source provider, for data starting from 1995. However the quality of the data improves from year 2000. The JSE back tested the data using the FTSE methodology (Free float) from year 1995 to year 2000, and Bloomberg data quality starts improving from year 2000, hence our start date for this research.

3.4.3 Unit of Analysis

The unit of analysis was based on four portfolios that were created and rebalanced each year, namely Deep value; Relative value, Relative growth and Super growth drawn from Lakonishok et al. (1994)'s one variable method based on one year buy and hold strategy. The returns on each portfolio were then calculated to create a monthly time series data for the period of the study. This performance was then used to compare the performance of the four portfolios. Additionally, portfolio analysis was used to determine which portfolio performed better than the market, in an event where the overall market is negative or positive. As such, we also determined which portfolio outperformed during different economic regimes in South Africa.

³Issued shares that are available for trading after removing restricted investors such as directors, employee schemes, treasury shares, government holdings and cross holdings, among others.

3.5 Data Collection

Financial ratio information was obtained from the Bloomberg database of standardised financial accounts from December 2000 through to December 2015. For the period 2000 to 2002, the JSE provided back tested numbers of the FTSE/All share index using the free float adjustments and included dividends for the period, Bloomberg has this data in their database and the quality of fundamental data starts to improve from year 2000 as opposed to the 1995 start date.

For the period 2002 to 2015, the FTSE/All share index was fully functionally with Bloomberg getting real time updates on all the company prices and fundamental data. Book value per share is also known as common equity, defined as total assets minus total liabilities. The sample contains all stocks from the FTSE/ JSE main board.

The return data was also obtained from Bloomberg, adjusted from dividends and corporate events. The data shows missing values on delisted companies, which assist with survivorship bias. It is important to use Bloomberg PORT (portfolio and risk analytics) function to maintain, monitor and generate monthly total stock returns and monitor corporate actions.

3.6 Portfolio Analysis

The performance of the portfolios were tracked using Excel but the total returns of each stock was obtained from Bloomberg.

3.6.1 Portfolio creation

There are a number of methods that could be used to classify stocks according to style. Lakonishok et al. (1994) used both one variable and two variable methods to define growth or value stocks.

South Africa is an emerging market with some 160 companies in the All share compared to the 6000 stocks that Lakonishok et al. (1994) used for their analysis for the United States of America. That said, we opted to use the one variable method, particularly the price to book, which according to Aurret and Sinclair (2006), has superior explanatory power than price to earnings or size in South Africa.

Capual et al. (1993) also used price to book to categorise stocks into value or growth in six major markets, which was also used to test if the outcome in South Africa is consistent with international evidence.

For the purpose of this study, any company with negative book value was excluded as our definitions of each quartile remains true if the numbers are positive.

3.6.2 Portfolio Construction

We used the guidance from Board Notice 90 of 2014 relating to the Collective Investment Scheme Control Act, 2002. This assisted in determining security eligibility in the portfolio.

The following limits applied on portfolio construction.

- Equity securities issued by any one concern-
 - (i) Maximum 5% in a portfolio in a security with a market capitalisation of less than R2 billion,
 - (ii) Maximum 10% in a portfolio in a security with a market cap of greater than R2 billion, or maximum of 120% of the security weighting in the index, or
 - (iii) Maximum 20% in a portfolio where the index represents the broad or overall index, or
 - (iv) Maximum 35% in a portfolio where the index represents sub-set of the overall index.

3.6.3 Portfolio Maintenance

The portfolio construction was based on market cap weighted using the Board Notice 90 of 2014 relating to collective investment scheme control act, 2002, with twelve months buy and hold strategy, rebalanced annually to remain consistent or true to the style return. We used a total return approach, with dividend on the day of receipt, assuming no transaction costs and tax implications. The portfolio remained fully invested in equities with all the cash received from delisted or acquired shares or proportionally invested in the portfolio on date of receipt.

3.7 Data Management

The main data was obtained from the Bloomberg database, which takes into the account corporate actions such as delisting, mergers and acquisitions, initial public offering.

3.7.1 Survivorship bias

The issue of survivorship bias has been addressed by the following rules;

- Delisted company— the cash received was calculated using the closing price of last date the share was public and proceeds were invested in the remaining shares proportionally in the portfolio.
- Acquired company—the price accepted by majority of shareholders was used and proceeds were invested in the remaining shares proportionally in the portfolio
- Liquidated, suspended or bankrupt company-- we assumed zero valuation until rebalance date in December.
- Dividends (declared or special)—the proceeds were invested in the remaining shares proportionally in the portfolio
- Unbundled business unit –if the company was listed, then we added the new company into the portfolio however if there was a cash option, the proceeds were invested in the remaining shares proportionally in the portfolio.

3.8 Data validity and reliability

The main source of data is Bloomberg. They attempt to cover all available data issued in financial statements from January 2000 as a base, but for companies listed before that, they cover as much history as they could find available. They have fundamental data history for the major listed equities since IPO and complete coverage of JSE listed equities from January 2012.

For corporate actions, they monitor a variety of sources, including but not limited to JSE Stock Exchange News Service (SENS) releases, company websites and broker updates. All financial data is reported in Rand terms as per the standardised financial statements in Bloomberg.

3.9 Limitation of the study

The primary research is based on historical data from the period of December 2000 through to December 2015; the results of the study were accurate for the period under review. It is important to understand that past performances are not guaranteed into the future in the investment field due to the dynamic nature of the industry.

The markets are not always driven by fundamentals, other factors such as momentum and sentiment are also important drivers of market performance. The portfolios were created using fundamentals and could perform differently during extreme market conditions, such as bull markets or during a bear period that are not driven by fundamentals.

Most institutional portfolio managers exclude stocks that are not listed on the main board i.e. on AltX due to liquidity constraints, which means we needed to exclude the stocks in question.

4 Findings

The aim of this study was to determine if mean excess return of value style is superior to mean excess returns of growth style. Additionally, to test the relative risk of value versus growth in two states of the world, namely, economic contraction and financial crisis during the period of the study.

This chapter is divided into five sections. Section 4.1 presents the summary of the data. The second part presents the CAPM results on which portfolios generate abnormal risk adjusted returns. The third part covers the mean excess return of value versus growth and the fourth part covers performance of value and growth in different financial markets and economic conditions and the final section is the conclusion.

4.1 Summary of the data

We used Lakonishok et al. (1994)'s one variable method, namely, price to book to categorise stocks into different styles, namely deep value, relative value, relative growth and super growth.

Table 4-1: The number of stocks in each portfolio

Portfolio	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
DV	38	38	36	34	37	39	36	40	40	40	40	38	41	40	40
RV	38	37	36	34	37	39	36	39	38	38	40	39	40	40	40
RG	39	38	36	34	37	39	36	40	39	40	40	39	40	40	40
SG	39	37	36	34	37	39	36	40	40	40	40	39	41	40	40
Total	154	150	144	136	148	156	144	159	157	158	160	155	162	160	160
DV	Deep Value														
RV	Relative Value														
RG	Relative growth														
SG	Super growth														

Four portfolios were constructed annually based on price to book ratios, over the period of the study. Deep value(DV) represents the lowest 25% or quartile 1 on price to book ratio, relative value (quartile 2 on price to book ratio), relative growth (quartile 3 on price to book) or super growth (highest 25% or quartile 4 on price to book).Table 4-1 presents the results on number of stocks in each portfolio for the respective year.

Table 4-1 sets out the number of stocks in each portfolio over the period of the study. The deep value portfolio represents quartile 1 (the lowest 25%) of stocks ranked by price to book on the FTSE/JSE, relative value represent quartile 2 (the next 25% after quartile 1) of stocks, relative growth represent quartile 3 (the next 25% after

quartile 2) and quartile 4 represents the highest 25% of stocks ranked according to the price to book.

The year on year each refers to twelve months ending December 31 each year. The lowest total number of stocks occurred in 2003 due to a lot of corporate actions in 2002, to mention a few, Nedbank acquired BOE and Nedcor investment bank, with Investment Solutions Holdings and Siltek LTD also delisting in 2002.

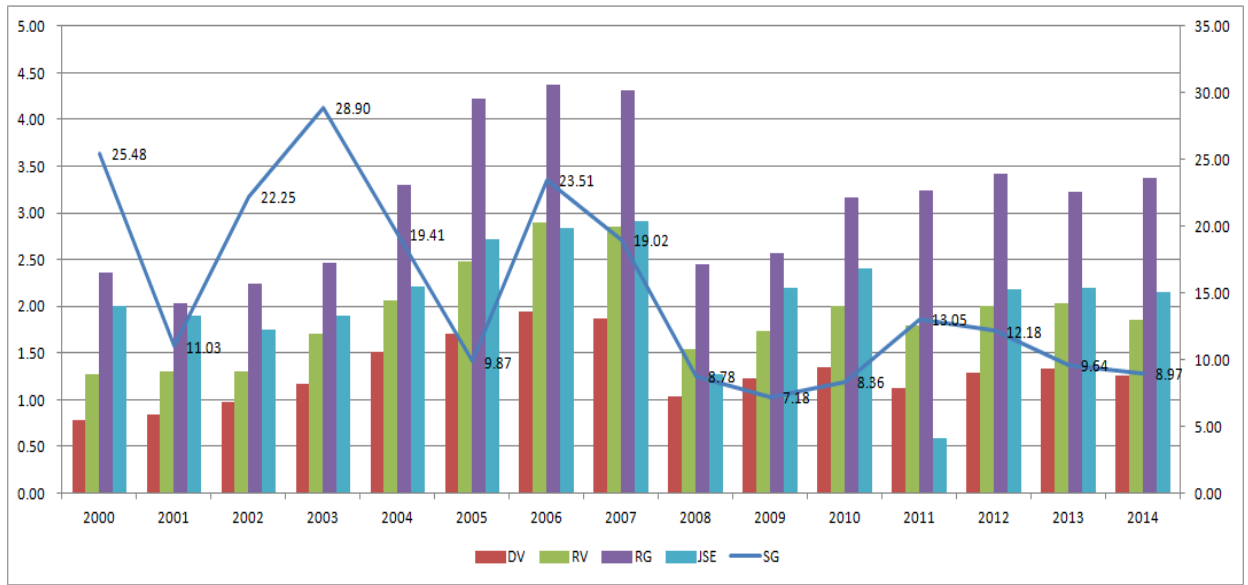


Figure 4-1 present the maximum price to book ratio for each portfolio, with deep value (DV), relative value (RV) and Relative growth (RG) reading from left axis and Super growth (SG), reading from the right axis. The JSE representing the market was also tracked over the period (reading from left axis)

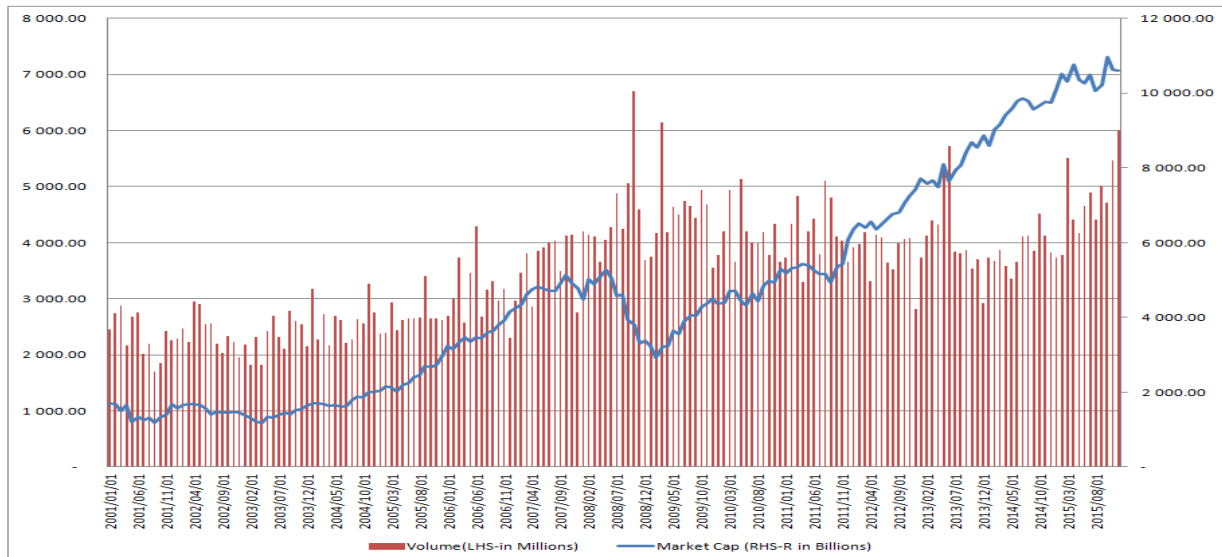
Figure 4-1: The price to book ratios of the portfolio over time

Figure 4-1 shows the price to book of the portfolios and the market. For DV (deep value) portfolio, price to book in 2014 for all the stocks was less than 1.26, with RV (relative value) portfolio price to book for all stocks in between 1.26 and 1.85, with RG relative growth price to book above 1.85 but less than 3.37, with SG (super growth) portfolio, represented by line graph (RHS axis), price to book above 3.37 but less than 8.97.

The price to book average on the JSE in 2014 was 2.14, which is slightly more than relative value portfolio price to book of 1.85 but lower than relative growth, which is expected, since relative growth stocks are priced higher than average stocks in the market. There is a significant decrease in price to book from 2007 to 2008, which

corresponds with the global financial crisis, however the price to book ratio has increased from 2009, symbolising a recovery in the financial market

Figure 4-2: The JSE Market cap and Volume traded from 2001



At the end of each month from December 2000 to December 2015, we tracked the volumes of shares traded in the JSE, represented by bar graphs. We also tracked the growth of the JSE market cap over the same period. Data source is Bloomberg. Figure 4-2 present the results.

Figure 4-2 shows that the volumes traded on the JSE has increased significantly from year 2000, peaked at 6.7 billion shares in 2008, however averaged less than 5 billion shared from 2008 to 2015. The market cap of the JSE has increased from R1 trillion in 2001 to above R10 trillion in 2015, which indicate that the market has grown massive over the period of study.

Table 4-2: The sector returns of JSE from 2001

Sector/Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Basic Materials	93%	21%	2%	36%	18%	49%	28%	-31%	38%	12%	-8%	5%	-2%	-13%	-21%
Industrials	13%	7%	23%	61%	26%	49%	18%	-26%	22%	24%	-3%	37%	22%	7%	-10%
Consumer Goods	15%	-25%	1%	28%	50%	44%	14%	-6%	37%	26%	15%	43%	42%	14%	31%
Health Care	48%	-9%	20%	41%	36%	45%	-3%	-17%	77%	21%	9%	60%	42%	36%	-10%
Consumer Services	-2%	17%	44%	69%	29%	34%	6%	-10%	45%	43%	9%	49%	34%	30%	27%
Telecommunication	-41%	3%	114%	47%	46%	33%	42%	-14%	10%	20%	11%	30%	27%	10%	-28%
Financials	-3%	-7%	18%	52%	35%	36%	3%	-26%	28%	17%	7%	38%	19%	27%	4%
Technology	-63%	-65%	49%	8%	30%	30%	24%	-36%	54%	42%	26%	29%	35%	13%	9%

At the end of each month from December 2000 to December 2015, we calculated calendar year performance (Total returns) of all the sectors in the JSE using the International Classification Benchmark (ICB) classification methodology. The returns were sourced from Bloomberg. Table 4-2 present the results.

Table 4-2 shows the sector breakdown of returns for all FTSE/JSE stocks listed on the main board using the International Classification Benchmark (ICB) methodology which is maintained by FTSE. The red color represents negative returns, which is much more evident in 2008, where all the sectors returned negative returns, partly due to the global financial crisis.

Post the global financial crisis, sectors such as consumer goods, consumer services, financials and technology have recovered strongly and have not registered any negative calendar year returns. Basic materials have struggled over the last three years, with the return of -21% in 2015 on the back of continued lower commodity prices. Telecommunication was the worst performing in 2015, largely driven by MTN on the back of the Nigerian Communication Commission setting a \$5.2 billion fine against MTN in November.

4.1.1 Portfolios by Sector

A sector breakdown by style using the one variable Lakonishok et al. (1994) methodology was classified using International Classification Benchmark (ICB)⁴ methodology which is maintained by FTSE. The sector breakdown indicates the percentage of stocks in each sector that met the respective portfolios criteria.

Table 4-3: Deep value portfolio sector exposure

Sector	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Basic Materials	33%	7%	18%	19%	39%	30%	19%	26%	24%	22%	20%	20%	31%	24%	45%
Industrials	23%	26%	26%	31%	18%	19%	24%	15%	17%	16%	11%	19%	10%	6%	6%
Financials	19%	24%	31%	24%	19%	29%	39%	44%	28%	48%	59%	49%	47%	53%	46%
Consumer Goods	11%	15%	13%	19%	11%	9%	4%	1%	16%	8%	6%	8%	8%	11%	0%
Consumer Services	10%	9%	4%	4%	2%	0%	0%	2%	1%	0%	0%	0%	2%	2%	1%
Technology	4%	19%	8%	3%	1%	2%	3%	2%	3%	2%	0%	1%	1%	2%	2%
Telecommunications	0%	0%	0%	0%	10%	10%	10%	10%	11%	5%	3%	3%	2%	2%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 4-3 present the results of deep value portfolio sector exposure using International Classification Benchmark (ICB) classification methodology. The sector classification was sourced from Bloomberg.

⁴ International Classification Benchmark (ICB) is an industry classification methodology that categorises markets into sectors worldwide.

Table 4-3 shows the percentage of stocks that met the criteria of lowest 25% of stocks sorted by price to book relative to other stocks in the market. Over the period of study, the deep value fund has a bias against consumer goods, consumer services and technology. The portfolio, on the other hand, has had reasonable exposure to basic materials, financials and industrials.

The lowest basic material exposure was lowest in 2002, which is expected as basic materials returned 93% in 2001, which means most stocks migrated away from being deep value to more growth category. The highest exposure to basic materials was in 2015, which is expected as basic material stocks have struggled over the past three years, hence the higher exposure.

Table 4-4: Relative value portfolio sector exposure

Sector\Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Financials	35%	34%	29%	43%	46%	37%	37%	49%	33%	40%	40%	45%	45%	43%	38%
Consumer Goods	24%	15%	22%	15%	14%	18%	28%	27%	0%	13%	3%	5%	2%	4%	12%
Basic Materials	20%	5%	21%	26%	12%	16%	22%	4%	45%	21%	34%	35%	35%	31%	31%
Consumer Services	7%	12%	8%	4%	2%	4%	5%	8%	5%	7%	5%	2%	1%	0%	2%
Industrials	6%	30%	14%	9%	24%	21%	8%	12%	13%	18%	14%	10%	15%	21%	14%
Technology	6%	4%	1%	2%	1%	1%	0%	0%	2%	0%	1%	1%	1%	0%	0%
Health Care	2%	0%	0%	0%	2%	2%	0%	0%	2%	1%	1%	1%	1%	0%	0%
Telecommunications	0%	0%	5%	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 4-4 present the results of Relative value portfolio sector exposure using International Classification Benchmark (ICB) classification methodology. The sector classification was sourced from Bloomberg.

Table 4-4 shows relative value portfolio exposure, which represents stocks that met the criteria of the second highest 25% of stocks sorted by low price to book relative to other stocks in the market. The relative value portfolio has a bias against Consumer service, Technology stocks, Healthcare, and Telecommunication stocks.

It has reasonable exposure to consumer goods, which makes it different to the deep value portfolio. The highest basic material exposure in the relative portfolio was in 2009 at 45% from 4% in 2008, which it picked up after basic material stocks fell by 31% in 2008. The relative value fund has a bias towards the financial sector over the period of study.

Table 4-5: Relative growth portfolio sector exposure

Sector\Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Financials	30%	40%	44%	33%	32%	38%	23%	8%	41%	30%	22%	18%	22%	34%	36%
Consumer Goods	2%	4%	4%	9%	14%	16%	7%	7%	13%	17%	25%	22%	27%	14%	22%
Basic Materials	32%	31%	23%	26%	33%	19%	37%	55%	23%	35%	27%	37%	28%	31%	9%
Consumer Services	9%	10%	9%	15%	7%	13%	17%	12%	11%	5%	5%	7%	4%	5%	2%
Industrials	10%	5%	14%	13%	2%	8%	11%	12%	10%	7%	17%	10%	12%	12%	16%
Technology	14%	2%	1%	0%	1%	2%	3%	2%	0%	4%	3%	1%	2%	1%	0%
Health Care	1%	1%	4%	2%	1%	2%	0%	2%	2%	2%	2%	4%	4%	3%	6%
Telecommunications	0%	5%	1%	2%	10%	1%	2%	1%	1%	0%	0%	0%	0%	0%	10%
Total	99%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%	100%

Table 4-5 present the results of Relative Growth portfolio sector exposure using International Classification Benchmark (ICB) classification methodology. The sector classification was sourced from Bloomberg.

Table 4-5 shows the relative growth portfolio, which represents stocks that met the criteria of the third highest 25% of stocks sorted by low price to book relative to other stocks in the market. The highest basic material exposure came in 2008, which was a year after the sector returned 28% the previous year, which is expected given our methodology.

The portfolio occasionally has high exposure to Telecommunications in year 2005 and 2015. The portfolio has low exposure to technology and healthcare over the period of the study. The relative growth fund has a bias towards the financial sector over the period of study, similarly to the relative value fund.

Table 4-6: Super growth portfolio sector exposure

Sector\Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Financials	43%	15%	5%	6%	14%	11%	4%	5%	6%	3%	6%	8%	9%	7%	21%
Consumer Goods	14%	13%	6%	2%	4%	0%	0%	1%	9%	4%	5%	17%	16%	26%	21%
Basic Materials	18%	54%	65%	54%	16%	44%	43%	47%	34%	44%	40%	21%	8%	5%	0%
Consumer Services	7%	5%	12%	15%	38%	25%	23%	17%	27%	24%	27%	28%	33%	30%	34%
Industrials	6%	9%	9%	8%	20%	8%	14%	15%	8%	6%	2%	3%	9%	6%	4%
Technology	2%	2%	0%	3%	4%	0%	0%	0%	0%	0%	0%	1%	0%	1%	1%
Health Care	0%	1%	3%	4%	3%	2%	7%	4%	4%	5%	6%	5%	7%	9%	10%
Telecommunications	10%	1%	0%	7%	2%	10%	10%	11%	12%	13%	13%	17%	18%	16%	9%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 4-6 present the results of Super Growth portfolio sector exposure using International Classification Benchmark (ICB) classification methodology. The sector classification was sourced from Bloomberg.

Table 4-6 shows the super growth portfolio, which represents stocks that met the criteria of the highest 25% of stocks sorted by low price to book relative to other stocks

in the market. They have bias towards consumer service and consumer goods, additionally their lowest basic material exposure in 2015 of zero coincided with the highest exposure the deep value fund has on basic material. This fund is different to the deep value fund, and also has reasonable exposure to healthcare and telecommunications over the period of study.

4.1.2 Returns calculation results

Table 4-7: Results of return calculation

Market cap weighted				
Period	Deep value	Relative value	Relative growth	Super growth
1-month	-4.00%	0.51%	-3.25%	-2.17%
3-months	-7.04%	-1.03%	-1.69%	3.42%
6-months	-17.45%	-6.36%	-0.48%	0.86%
1-year	-22.24%	10.63%	8.04%	9.02%
3-year	-9.98%	6.18%	14.46%	14.54%
5-year	1.67%	6.18%	16.81%	15.04%
Since Inception (Jan 01)	18.13%	17.03%	18.87%	15.78%
Standard deviation(Annualised)	18.2%	15.1%	16.8%	16.5%
% positive months	65.6%	61.1%	65.6%	63.3%
Worth month	-10.47%	-14.23%	-16.40%	-15.38%
Best month	14.98%	12.24%	13.55%	15.86%
Equal weighted Portfolio				
1-month	-2.64%	3.91%	-4.39%	-3.18%
3-months	-2.66%	1.23%	-1.32%	-1.10%
6-months	-13.95%	-3.85%	-1.96%	-4.23%
1-year	-17.95%	22.25%	9.39%	2.02%
3-year	4.74%	11.95%	14.11%	11.75%
5-year	12.50%	10.27%	16.39%	14.58%
Since Inception (Jan 01)	26.66%	19.69%	20.37%	17.08%
Standard deviation(Annualised)	17.4%	15.0%	15.2%	14.8%
% positive months	67.2%	64.4%	68.9%	66.1%
Worth month	-10.48%	-15.12%	-12.84%	-12.75%
Best month	26.51%	19.17%	13.39%	10.88%

Table 4.8 presents the result for the portfolio returns using both market capitalization and equal weighted methodology.

Table 4-7 shows the returns calculation using both the market cap weighted (guidance from Board 90 Cisca regulation⁵) and portfolios constructed on an equal weighted basis. The results on market cap weighted basis shows that relative growth

⁵ The Financial Service Board (FSB) regulates the asset management industry and thereby issues limits and types of securities that may be included in a portfolio via the Collective Investment Schemes Control Act, 2002 (Cisca) using Board Notice 90 of 2014.

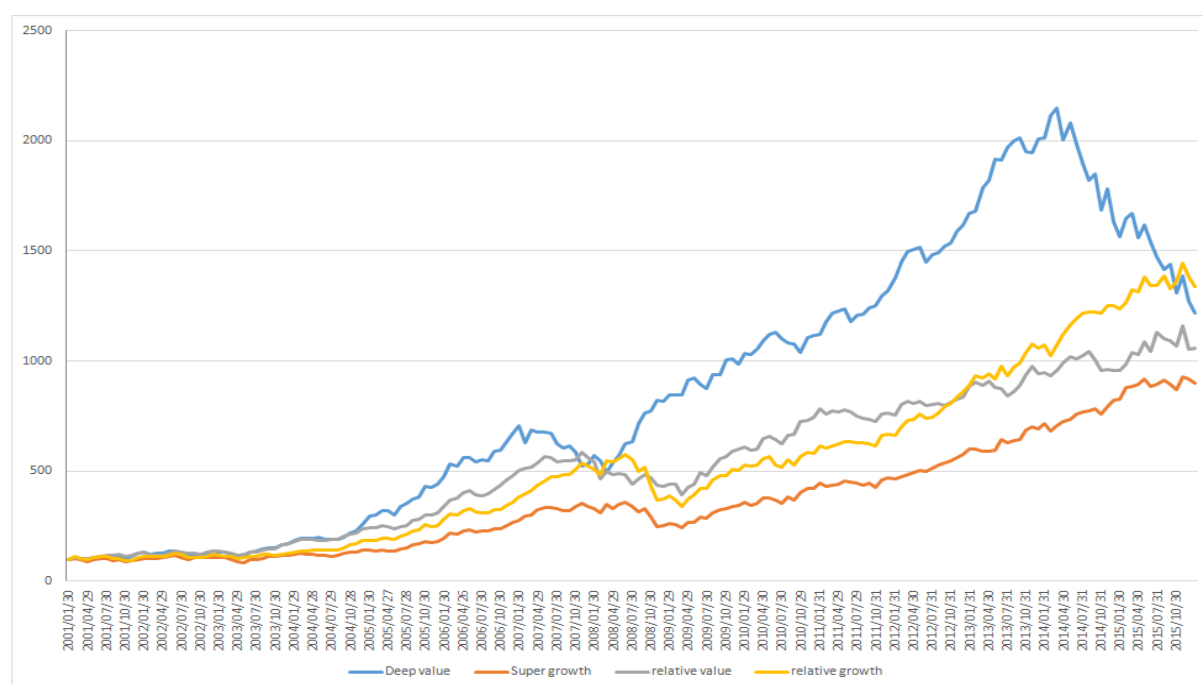
outperforms all the other portfolios, returning 18.87% per annum (since inception) with deep value coming a close second, returning 18.13% per annum. Super growth portfolio was the worst performer returning 15.78% per annum, which is 3.09% below relative growth portfolio. However, over the past five years, relative growth and super growth portfolios have outperformed deep value and relative value portfolio by an average of more than 10% per annum, which supports Friedrich (2015) that value as a style has come under immense pressure recently.

Relative growth also had the worst month of -16.4%, with deep value -10.47% being the best worst month out of the four portfolios, as expected; the best month came from super growth portfolios, returning 15.86%. On absolute risk basis, deep value has the worse volatility measured by a standard deviation of 18.2%, with the lowest volatility coming from relative value portfolio, with standard deviation of 15.1%. Deep value and relative growth were both positive 65.6% of the time, with relative value being the portfolio with the lowest monthly positive number at 61.1%.

On an equally weighted basis, the best performing portfolio was deep value, returning 26.66% since inception, relative value portfolio was a distant second with a return of 19.69%. The worst performer was the super growth portfolio, with a return of 17.08%, which is 9.58% below deep value. This symbolises that large cap value stocks have underperformed mid/small cap value stocks, which conforms with size premium. Over the past five years, relative growth and super growth has outperformed both deep value and relative value, which is consistent with the results above, however the magnitude is lower.

Relative value has the lowest worst month return of -15.12%, with deep value producing the best worst monthly return of -10.48%. On the other hand, deep value produced the highest monthly return of 26.51%, with Super growth generating the worst best month of 10.88%.

Figure 4-3: The cumulative value versus growth in South Africa



Four portfolios were constructed annually based on price to book ratios, over the period of the study. Deep value(DV) represents the lowest 25% or quartile 1 on price to book ratio, relative value (quartile 2 on price to book ratio), relative growth (quartile 3 on price to book) or super growth (highest 25% or quartile 4 on price to book).

Figure 4-3 shows the cumulative returns on R100 invested since inception for the four portfolios constructed on market cap weighted basis. The graph shows deep value outperformed the other portfolios from 2004 to 2008; however, relative growth was ahead briefly in February and March 2008, which was the period leading up to the global financial crisis.

The relative growth portfolio lost ground in mid 2008 to early 2009 during the global financial crisis, which is expected and deep value and relative value outperformed until 2012. The deep value portfolio has been underperforming since 2013, with relative growth outperforming all the strategies to December 2015, which we last saw in a build up to the financial crisis in 2008. Super growth portfolio is the worst performing portfolio over the period of this study.

Figure 4-4: The cumulative value versus growth in South Africa (Equal Weighted)

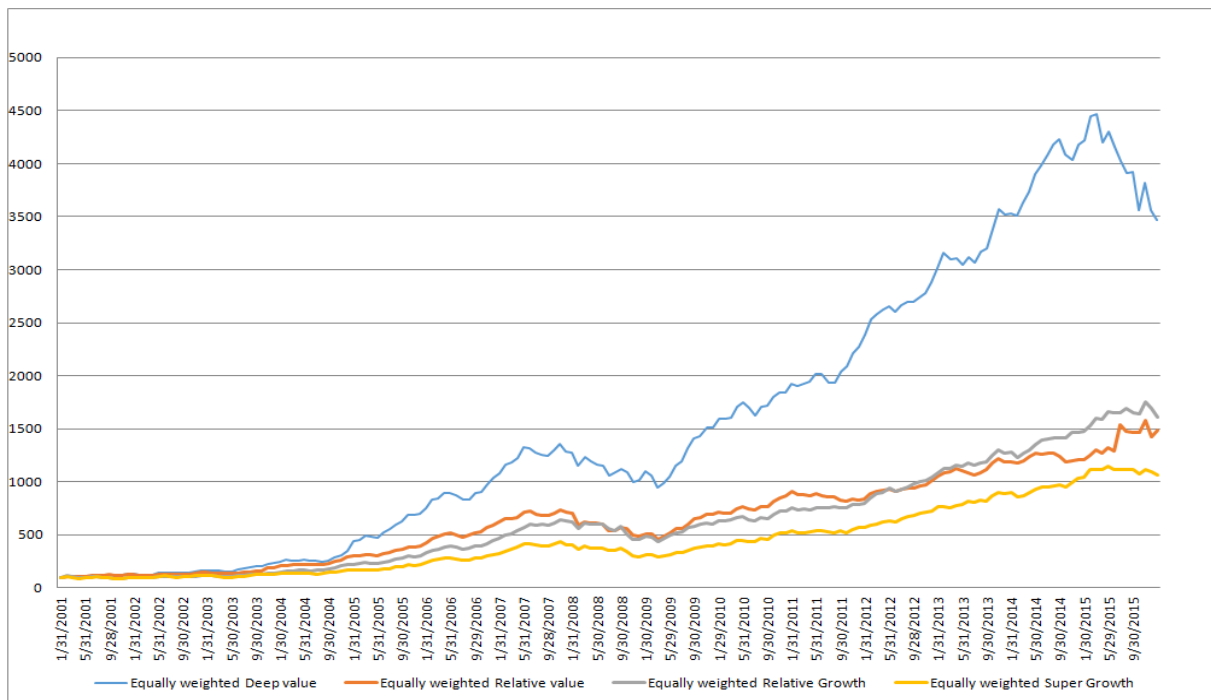


Figure 4-4 presents the cumulative returns for all portfolios for R100 invested since inception based on equally weighted portfolio construction methodology.

Figure 4-4 shows the cumulative returns on R100 invested since inception for the four portfolios constructed on equal weighted basis. Deep value outperforms the other portfolio by a huge margin, however the outperformance has come down since 2014. Relative growth is outperforming relative value since 2012, which is testament that value has come under immense pressure in the past five years. Super growth portfolio is the worst performing portfolio since inception.

Table 4-8: Results of Value Premium

	Deep Value Premium	Relative Value Premium
Market Cap Weighted		
Mean	0.19%	-0.16%
Median	0.40%	-0.28%
Standard deviation	5.66%	3.18%
t statistics	0.45	-0.65
P value	0.65	0.51
Equally Weighted		
Mean	0.70%	-0.05%
Median	0.57%	-0.36%
Standard deviation	3.29%	2.87%
t statistics	2.83	-0.24
P value	-	0.81

Deep value premium is difference in returns between deep value and super growth, whereas relative value premium is difference in returns between relative value and relative growth portfolios. Table 4.8 presents the descriptive statistics of each premium.

Table 4-8 sets out the results for the two premiums calculated, namely, the deep value premium, which represents the difference between deep value portfolio returns and super growth portfolio returns. Relative value premium is the difference in relative value portfolio returns and relative growth portfolio returns.

The results on the market cap weighted basis shows that the Deep value premium is 0.19% per month, which entails that value counters outperform growth counters over the period of the study; however, the results are not statistically significant, represented by p value of 0.65 (which is greater than 0.05). Relative value premium is -0.16% per month, which entail that relative growth outperforms relative value, however the results were still not statistically significant.

On an equal weighted basis, deep value premium is 0.7% per month, which is statistically significant at 5% level, as evidence by p-value of 0.01 (less than p-value of 0.05). However, the relative value premium is -0.05% per month, which is not statistically significant at 5% level.

Table 4-9: Results of correlations

Correlation Variable	Deep Value Premium (Market Cap weighted and Equally Weighted)	Relative Value Premium (Market Cap weighted and Equally Weighted)
Pearson correlation coefficient	0.46	0.72
t statistic	6.96	14.02
p value	0	

Table 4.9 presents the correlation between deep value premium (i.e. correlation of deep value premium constructed using market cap methodology versus deep value premium based on equally weighted basis) and relative value premium (i.e. correlation of relative value premium constructed using market cap methodology versus relative value premium based on equally weighted basis)

Table 4-9 shows the results of the two correlations. Firstly, the correlation between deep value premiums on portfolio constructed on a market cap weighted basis and deep value premium of equally weighted basis. The results show that the correlation between the two premiums is positive, 0.46 and statistically significant, p-value less than 0.05.

This emphasises the importance of portfolio construction as the equally weighted deep value premium is statistically significant whereas the market cap weighted premium is not statistically significant, yet the two are positively correlated and statistically significant.

The same applies for the relative value premium, where the relationship between the two portfolio construction methodologies is highly positively correlated, 0.73 and statistically significant, p-value less than 0.05.

4.2 Abnormal risk adjusted returns

Bhatnagar (2010) tested CAPM versus three factor model in the UK for the period April 2000 to June 2007, where he found that value stocks outperform growth stocks. Additionally, he found a very low R^2 which indicates that value stocks returns are not fully captured by the CAPM model.

We only use the CAPM regression for our analysis on the back of the main aim interest being the significance of β_0 . According to Brooks (2014), the null hypothesis is: $H_0: \beta_0 = 0$. A positive and significant β_0 for a given portfolio would suggest that the portfolio is able to generate significant abnormal returns above the market; similarly a

negative and significant β_0 for a given portfolio would indicate that the portfolio is underperforming the market on a risk adjusted basis.

Table 4-10: CAPM regression model output

CAPM regression: $Y_i = \beta_0 + \beta_1 X_{1i} + \epsilon_i$					
January 2001-December 2015					
Market Cap weighted Portfolio					
	α coefficient	p-value	β_i coefficient	p value	R-squared
Deep Value	0.57%	0.12	0.43	<0.01 ***	16%
Relative Value	0.26%	0.25	0.69	<0.01 ***	60%
Relative Growth	0.25%	0.1	0.90	<0.01 ***	84%
Super Growth	0.04%	0.79	0.88	<0.01 ***	81%
Equal weighted Portfolio					
	α coefficient	p-value	β_i coefficient	p value	R-squared
Deep Value	0.96%	< 0.01 ***	0.67	<0.01 ***	44%
Relative Value	0.53%	0.04 **	0.57	<0.01 ***	42%
Relative Growth	0.48%	0.02 **	0.70	<0.01 ***	63%
Super Growth	0.25%	0.21	0.69	<0.01 ***	63%

Table 4-10 presents the results for the regression model using CAPM equation, Where Y_i represents the excess returns of the portfolio, β_0 represents the Jansen alpha or the intercept, β_i represent market beta, X_{1i} represents the marker excess returns and ϵ_i representing error term. The results are based on both market cap weighted and equal weighted portfolio construction methodology. ** represents significant at 5% level and *** represents significant at 1% level.

Table 4-10 sets out the CAPM regression results for the four respective portfolios using both market capitalisation and equal weighted portfolio construction methodology. We used robust standard errors for all regressions in order to eliminate autocorrelation and heteroscedasticity in the model, thus enabling us to make better inferences.

For deep value excess returns constructed using a market cap weighted basis against market excess return (equity risk premium), constant term (Jansen alpha) is not statistically significantly different from zero, as evidence by p value of 0.11. Thus the deep value portfolio means excess returns do not generate abnormal returns on a risk adjusted basis in a market cap weighted portfolio. The low R^2 of 16% also suggests that the deep value returns are not captured by CAPM. Similarly, for relative value portfolios constructed on a market cap basis, alpha is not statistically significant from zero; implying that relative value does not generate abnormal returns.

Likewise, relative growth portfolios constructed on a market cap basis, the constant term (Jensen alpha) is not statistically significant from zero. The same holds for super growth portfolios; they do not generate abnormal returns.

On the other hand, deep value portfolio excess returns constructed on an equal weighted basis constant term (Jensen alpha) is statistically significant from zero, as evidence by p value of 0.001, which is less than 0.05. This implies deep value abnormal returns of 0.96% per month as per the alpha coefficient on Table 4.10, for the period of the study.

The same holds for Relative value and Relative growth portfolios excess returns constructed on an equal weighted basis with abnormal risk adjusted returns of 0.53% and 0.48% per month respectively, as per the alpha coefficient in table 4.10.

However, for super growth portfolio excess returns constructed on an equally weighted basis, Jensen's alpha is not statistically significant from zero, as evidence by p value of 0.210, which is above 0.05. This implies that the Super growth portfolio does not generate abnormal returns over the period of the study

Table 4-11: CAPM regression model output (Controlling for Economic growth)

CAPM regression: $Y_i = \beta_0 + \beta_1 X_{1t} + DX_{2t} + \epsilon_i$							
January 2001-December 2015							
Market Cap weighted Portfolio							
	α coefficient	p-value	β_i coefficient	p value	D coefficient	p value	R-squared
Deep Value	0.4%	0.44	0.43	<0.01 ***	0.004	0.62	16.61%
Relative Value	0.5%	0.08 *	0.69	<0.01 ***	-0.006	0.16	60.23%
Relative Growth	0.2%	0.37	0.90	<0.01 ***	0.001	0.64	84.08%
Super Growth	0%	0.84	0.87	<0.01 ***	0.002	0.55	81.45%
Equal weighted Portfolio							
Deep Value	0.9%	<0.01 ***	0.67	<0.01 ***	0.002	0.75	44.11%
Relative Value	0.8%	0.03 **	0.57	<0.01 ***	-0.006	0.26	42.25%
Relative Growth	0.4%	0.13	0.70	<0.01 ***	0.001	0.73	62.63%
Super Growth	0.0%	0.94	0.69	<0.01 ***	0.005	0.23	63.59%

Table 4-11 presents the results for the regression model using CAPM equation, Where Y_i represents the excess returns of the portfolio, β_0 represents the Jansen alpha or the intercept, β_i represent market beta, X_{1t} represents the marker excess returns, D coefficient represent a Dummy variable of 0 and 1, where 0 represents a period where growth was less than 3% and 1 representing an environment where growth was higher than 3%, and ϵ_i representing error term. The results are based on both market cap weighted and equal weighted portfolio construction methodology. ** represents significant at 5% level and *** represents significant at 1% level.

Table 4-11 sets out the CAPM regression results for the four respective portfolios using both market capitalisation and equal weighted portfolio construction methodology controlling for economic growth over the period of study. The average growth in quarterly GDP from 2001 to 2015 is approximately 3%. As such, we created

a dummy variable, where 0 represents an environment where growth is below average, 3%, and 1 representing an environment where growth is above average.

The results for portfolios constructed on market cap weighted still shows no significant alpha for all portfolios except for relative value, which is significant at 10% significant level in an environment where growth is below average, as evidenced by non-significant Dummy variable coefficient.

The results are different for portfolios constructed on an equal weighted basis, where only relative value and deep value alpha is significant after controlling for economic conditions. Relative growth loses its significance when we control for economic conditions; suggesting that its outperformance may be conditional on a growing economy. In none of the regressions is the dummy variable significantly different from zero.

4.3 Mean excess returns of value versus growth

Table 4-12: Average means excess returns on Market cap based methodology

Panel A: Mean Excess returns (Deep value versus Super Growth)							Panel C: Mean Excess returns (Relative Value versus Relative Growth)						
Year	Deep Value	Super Growth	Return difference	Superior Portfolio	t stats	p-value	Year	Relative Value	Relative Growth	Return difference	Superior Portfolio	t stats	p-value
2001	1.72%	-0.38%	2.10%	DV	2.59	0.02	2001	1.53%	0.74%	0.79%	RV	0.61	0.55
2002	-0.69%	-0.28%	-0.41%	SG	-0.27	0.79	2002	-0.45%	-0.58%	0.13%	RV	0.15	0.88
2003	2.09%	0.51%	1.58%	DV	1.50	0.16	2003	1.57%	0.24%	1.32%	RV	2.21	0.05
2004	3.50%	0.42%	3.08%	DV	1.77	0.10	2004	2.02%	2.12%	-0.10%	RG	-0.17	0.87
2005	3.58%	2.41%	1.17%	DV	1.34	0.21	2005	2.37%	3.05%	-0.68%	RG	-1.23	0.25
2006	2.82%	2.35%	0.47%	DV	1.31	0.22	2006	2.73%	2.10%	0.63%	RV	1.43	0.18
2007	-2.36%	0.73%	-3.09%	SG	-1.25	0.24	2007	-0.19%	1.62%	-1.81%	RG	-3.23	0.01
2008	2.59%	-2.48%	5.07%	DV	1.55	0.15	2008	-2.38%	-2.74%	0.37%	RV	0.17	0.87
2009	1.09%	1.99%	-0.90%	SG	-0.69	0.50	2009	2.21%	2.08%	0.13%	RV	0.15	0.88
2010	0.19%	1.45%	-1.26%	SG	-0.85	0.41	2010	1.67%	0.82%	0.85%	RV	1.31	0.22
2011	1.30%	-0.10%	1.41%	DV	-1.47	0.25	2011	-0.73%	0.19%	-0.92%	RG	-3.37	0.01
2012	1.22%	1.74%	-0.52%	SG	-1.07	0.31	2012	0.91%	2.11%	-1.20%	RG	-2.22	0.05
2013	1.19%	1.12%	0.07%	DV	0.04	0.97	2013	0.21%	1.21%	-1.00%	RG	-1.43	0.18
2014	-2.43%	0.74%	-3.17%	SG	-1.82	0.10	2014	-0.37%	0.74%	-1.11%	RG	-1.76	0.11
2015	-2.45%	0.27%	-2.72%	SG	-2.50	0.03	2015	0.47%	0.21%	0.26%	RV	0.23	0.83
Panel B: Sharpe Ratio (Deep Value versus Super Growth)							Panel D: Sharpe Ratio (Relative Value versus Relative Growth)						
Year	Deep Value	Super Growth	Superior on Risk Adjusted				Year	Relative Value	Relative Growth	Superior on Risk Adjusted			
2001	0.24	-0.05	DV				2001	0.33	0.09	RV			
2002	-0.12	-0.06	SG				2002	-0.09	-0.11	RV			
2003	0.32	0.07	DV				2003	0.28	0.05	RV			
2004	0.62	0.09	DV				2004	0.64	0.67	RG			
2005	0.70	0.58	DV				2005	0.55	0.63	RG			
2006	0.59	0.55	DV				2006	0.80	0.51	RV			
2007	-0.39	0.18	SG				2007	-0.05	0.48	RG			
2008	0.42	-0.32	DV				2008	-0.37	-0.32	RG			
2009	0.27	0.43	SG				2009	0.37	0.38	RG			
2010	0.07	0.31	SG				2010	0.43	0.18	RV			
2011	0.52	-0.03	DV				2011	-0.33	0.07	RG			
2012	0.50	1.41	SG				2012	0.35	0.95	RG			
2013	0.45	0.38	DV				2013	0.07	0.34	RG			
2014	-0.46	0.28	SG				2014	-0.14	0.27	RG			
2015	-0.47	0.08	SG				2015	0.09	0.05	RV			

Table 4-12 presents the year by year average performance of mean excess returns of each portfolio, comparing deep value portfolio to super growth portfolio returns and relative value to relative growth on market capitalization basis. Student t- stats is used to test if the average mean returns are significantly different to zero, with p value representing the significance level.

Table 4-12 (Panel A) shows that deep value outperformed super growth in the period 2001 to 2008, with the exception of 2002 and 2007, whilst super growth showed superior performance from 2009 to 2015 with the exception of 2011 and 2013. The superior returns were statistically significant in two out of the fifteen years.

These results do not show outright evidence of the value premium, which is contradictory to international evidence by Fama and French (1992) and Lakonishok (1994). However, Brandes (2012) concedes that the value premium has dropped from 2007 to 2012, which bodes well with this research.

Panel B of table 4.1 shows the results of the Sharpe ratio for both portfolios and it still supports the notion that there is no outright evidence of the value premium, with deep value more outperforming from 2001 to 2008, with the exception of 2002 and 2007, while supergrowth outperforming from 2009 with the exception of 2011 and 2013.

Panel C show that relative value outperformed from 2001 to 2003, again in 2008 to 2010, whereas relative growth outperformed in 2004 to 2007, with the exception of 2006, moreover, relative growth outperformed from 2011 to 2014. The superior returns were statistically significant in three out of the fifteen years, with two times favouring relative growth and one time favouring relative value.

This indicates that there is no outright evidence of value style outperforming. Additionally, value has been under pressure during the past five years, which is in line with Friedrich (2015). Panel D, shows the Sharp ratio and that relative value outperformed from 2001 to 2003 on a risk adjusted basis; however, relative growth outperformed from 2004 to 2015, with the exception of 2006, 2010 and 2015, which implies that relative growth has outperformed more times.

Table 4-13: Equally weighted portfolio

Panel A: Mean Excess returns (Deep value versus Super Growth)							Panel C: Mean Excess returns (Relative Value versus Relative Growth)						
Year	Deep Value	Super Growth	Return difference	Superior Portfolio	t stat	p-value	Year	Relative Value	Relative Growth	Return difference	Superior Portfolio	t stats	p-value
2001	1.74%	-0.75%	2.49%	DV	3.52	0.00	2001	1.25%	-0.59%	1.84%	RV	1.38	0.19
2002	1.02%	0.48%	0.54%	DV	0.57	0.58	2002	0.26%	0.53%	-0.27%	RG	-0.48	0.64
2003	2.74%	0.59%	2.15%	DV	3.64	0.00	2003	2.34%	1.37%	0.97%	RV	1.20	0.25
2004	4.64%	1.47%	3.16%	DV	1.36	0.10	2004	2.61%	2.84%	-0.23%	RG	-0.50	0.63
2005	3.99%	2.28%	1.71%	DV	2.02	0.07	2005	2.44%	2.82%	-0.38%	RG	-0.78	0.45
2006	2.54%	2.09%	0.44%	DV	1.29	0.22	2006	2.62%	2.39%	0.23%	RV	0.53	0.61
2007	0.68%	1.11%	-0.43%	SG	-0.98	0.35	2007	0.20%	1.61%	-1.40%	RG	-3.13	0.01
2008	-1.99%	-2.92%	0.93%	DV	0.99	0.15	2008	-3.39%	-2.73%	-0.66%	RG	-0.56	0.59
2009	2.65%	1.80%	0.85%	DV	1.04	0.32	2009	2.40%	1.63%	0.77%	RV	1.35	0.20
2010	1.08%	1.83%	-0.75%	SG	-1.23	0.25	2010	1.51%	1.05%	0.45%	RV	1.03	0.33
2011	1.42%	0.08%	1.33%	DV	1.92	0.08	2011	-1.12%	0.04%	-1.15%	RG	-5.98	0.00
2012	1.54%	2.00%	-0.46%	SG	-1.01	0.33	2012	1.54%	2.17%	-0.63%	RG	-1.67	0.12
2013	0.95%	0.97%	-0.03%	SG	-0.04	0.97	2013	0.61%	1.00%	-0.39%	RG	-0.81	0.43
2014	1.04%	0.81%	0.23%	DV	0.33	0.75	2014	-0.31%	0.72%	-1.03%	RG	-1.83	0.09
2015	-2.03%	-0.30%	-1.73%	SG	-2.00	0.07	2015	1.40%	0.31%	1.10%	RV	0.56	0.59
Panel B: Sharpe Ratio (Deep Value versus Super Growth)							Panel D: Sharpe Ratio (Relative Value versus Relative Growth)						
Year	Deep Value	Super Growth	Superior on Risk Adjusted				Year	Relative Value	Relative Growth	Superior on Risk Adjusted			
2001	0.28	-0.10	DV				2001	0.28	-0.07	RV			
2002	0.18	0.11	DV				2002	0.05	0.11	RG			
2003	0.57	0.11	DV				2003	0.49	0.26	RV			
2004	0.53	0.43	DV				2004	0.80	1.01	RG			
2005	0.92	0.58	DV				2005	0.62	0.63	RG			
2006	0.55	0.48	DV				2006	0.67	0.55	RV			
2007	0.17	0.24	SG				2007	0.06	0.49	RG			
2008	-0.33	-0.45	DV				2008	-0.56	-0.39	RG			
2009	0.45	0.47	SG				2009	0.46	0.38	RV			
2010	0.33	0.50	SG				2010	0.44	0.32	RV			
2011	0.47	0.03	DV				2011	-0.57	0.02	RG			
2012	0.75	1.21	SG				2012	0.75	1.00	RG			
2013	0.32	0.45	SG				2013	0.23	0.42	RG			
2014	0.46	0.30	DV				2014	-0.14	0.31	RG			
2015	-0.41	-0.10	SG				2015	0.20	0.08	RV			

Table 4.10 presents the year by year average performance of mean excess returns of each portfolio, comparing deep value portfolio to super growth portfolio returns and relative value to relative growth on equal weighted basis methodology. Student t- stats is used to test if the average mean returns are significantly different to zero, with p value representing the significance level.

Table 4-13 (Panel A) shows that deep value outperformed super growth from 2001 to 2006 and also in 2008 and 2009, with super growth outperforming from 2010 to 2015, with the exception of 2011 and 2014 period. The deep value superior returns were only statistically significant in two of the fifteen years.

This indicates that there is no outright evidence that deep value outperforms super growth over the period of the study even though this is stronger pre 2006. The results are the same on a risk adjusted basis, Panel B shows that Deep value outperforms from 2001 to 2006, however, post 2006 there is no clear pattern except for deep value coming under pressure from 2010.

Panel C shows no significant pattern between relative value and relative growth from 2001 to 2010, however post 2010, relative growth outperformed relative value, with the exception of 2015. The relative growth superior returns were only statistically significant in two of the fifteen years. Panel D, which is the Sharp ratio, also confirms that there is no significant pattern, however post 2010, relative growth outperformed relative value, with the exception of 2015 on a risk adjusted basis. Additionally, relative value outperformed relative growth in nine out of the fifteen calendar period mean excess returns.

4.4 Performance of value versus growth strategies in different financial market and economic conditions

Lakonishok et al. (1994) argued against the notion that value stocks outperform growth stocks because they are fundamentally riskier, by stating that if value shares are riskier than growth shares then they will underperform growth shares in periods of bad states of the economy and also during times of financial crisis.

Table 4.12 shows the analysis of mean excess returns in bad and good states of the economy, there are 59 quarters of GDP from 2001, so the returns were grouped into three categories namely worst (15 quarters), intermediate (45 quarters) and best (15 quarters). The results show that the best performing portfolio in the worst economic conditions is relative value, followed by deep value portfolio, which supports the view of Lakonishok et al. (1994), that value style is not riskier. This also contradicts Maginn et al. (2007) that growth stocks outperform value stocks during an economic contraction period.

Table 4-14: Market cap weighted mean excess returns of four portfolios , Janaury 2001 to December 2015

Measure	Deep value	Relative value	Relative growth	Super growth	Deep value premium	Relative Value premium
Returns in good and bad economic states						
Mean Excess return-15 worst economic quarters	0.67%	2.10%	-0.56%	-1.12%	1.79%	2.66%
Mean Excess return-29 intermediate economic quarters	2.78%	1.64%	3.20%	2.41%	0.36%	-1.56%
Mean Excess return-15 best economic quarters	5.89%	4.49%	6.00%	4.86%	1.03%	-1.51%
Returns in good and bad markets						
Mean Excess return-45 worst market conditions	-1.53%	-3.75%	-4.97%	-5.01%	3.48%	1.22%
Mean Excess return-90 intermediate market conditions	0.67%	0.82%	1.36%	0.99%	-0.32%	-0.54%
Mean Excess return-45 best market conditions	5.19%	5.95%	5.83%	6.94%	-1.75%	0.13%

Table 4-14 presents the performance of the portfolios in different economic and financial environment. Portfolios construction methodology was based on Market capitalization.

Table 4-14 tracked the performance of the porfolios during different financial market conditions, there are 180 monthly returns from 2001 to 2015, so the returns were grouped into three main categories, namely, the worse (45 months) market conditions, intermediate (90 months) conditions, and best (45 monthly) market conditions. The results clearly show that mean excess returns in deep value are the best during the worst market conditions, with relative growth and super growth mean excess returns outperforming during intermediate and best market conditions respectively.

Table 4-14 shows similar result on an equally weighted basis, with the best performing portfolio during the worst economic condition being relative value and deep value, however deep value also outperforms during intermediate economic periods, with relative growth outperforming in best economic conditions.

Table 4-15: Equally weighted mean excess returns of four portfolios , Janaury 2001 to December 2015

Measure	Deep value	Relative value	Relative growth	Super growth	Deep value premium	Relative Value premium
Returns in good and bad economic states						
Mean Excess return-15 worst economic quarters	1.87%	2.59%	0.58%	-0.35%	2.22%	2.01%
Mean Excess return-29 intermediate economic quarters	5.85%	2.57%	2.88%	2.55%	3.30%	-0.31%
Mean Excess return-15 best economic quarters	5.84%	4.55%	6.50%	5.23%	0.61%	-1.95%
Returns in good and bad markets						
Mean Excess return-45 worst market conditions	-2.78%	-3.06%	-3.79%	-4.01%	1.23%	0.73%
Mean Excess return-90 intermediate market conditions	1.38%	1.22%	1.45%	1.26%	0.11%	-0.23%
Mean Excess return-45 best market conditions	4.46%	4.92%	4.56%	5.19%	-0.74%	0.36%

Four portfolios were constructed annually based on price to book ratios, over the period of the study. Deep value(DV) represents the lowest 25% or quartile 1 on price to book ratio, relative value (quartile 2 on price to book ratio), relative growth (quartile 3 on price to book) or super growth (highest 25% or quartile 4 on price to book). Table 4-15 presents the performance of the portfolios in different economic and financial environment. Portfolios construction methodology was based on equal weighted basis.

Table 4-15 shows the portfolio that outperformed during the worse financial market conditions remains deep value, with relative growth and super growth portfolios outperforming during intermediate and best market conditions respectively. This supports Lakonishok et al. (1994) that value stocks are not riskier than growth styles.

4.5 Conclusion

In this chapter, we showed the results of which style reigns supreme between value and growth. The evidence shows that there is no outright significant dominant style in South Africa for the period 2001 to 2015, which is in line with Auret and Cline (2011). However, deep value premium constructed on equally weighted basis suggest that the value premium does exist.

We also tested which portfolio generates abnormal risk adjusted returns above the market. The results shows that no portfolio constructed using market capitalisation based methodology generated significant abnormal risk adjusted returns above the market. However, the results are different on portfolios constructed on an equally weighted basis, with deep value, relative value and relative growth portfolios generating abnormal risk adjusted risk returns above the market, which implies that the large caps on the market cap methodology have underperformed small caps over the period of the study, which may talk to size premium.

Furthermore the results on which portfolio generates abnormal risk adjusted returns when controlling for economic growth suggest that on a market cap weighted portfolio, relative value portfolio alpha is significant, however on portfolios constructed using equally weighted methodology, both deep value and relative value generates abnormal returns.

The results on mean excess returns of value stocks compared to growth stocks suggest that there is no outright evidence supporting a value premium, however on portfolios constructed on an equally weighted basis, deep value outperformed super growth from 2001 to 2006. However, value as a style has been out of favour since 2010, with the trend favouring relative growth portfolios constructed on both methods.

The results on value versus growth in different financial markets and economic conditions suggest that both deep value premium and relative value premium outperform during worse economic conditions over the period of study, with deep value portfolio outperforming all other portfolios in “bad markets” on portfolios constructed on both methods. Super growth portfolios, as expected, outperform other portfolios in “good market” on portfolios constructed on both methods.

5 Conclusion

5.1 Introduction

In Chapter two, this study introduced the arguments for value and growth stocks globally, including emerging markets and South Africa, with the arguments in favor of value stocks especially internationally, however there is contradicting evidence locally. We highlighted arguments on the efficient market hypothesis, which contradicts the existence of the two styles as the theory argues that it is not possible to outperform the market in the long term. CAPM, which argues that market beta is enough to explain the expected or average returns, is also in contradiction of the existence of these two styles, as Fama and French (1992) argued that there are other factors that explain the cross section of returns, such as size, leverage and value. Behavioural finance also argued against the efficient hypothesis, suggesting that factors like limit to arbitrage could lead to the market being inefficient for longer periods. Size premium was also discussed and evidence suggests that it exists both internationally and locally.

Chapter three covered the hypothesis questions, which stated the research hypothesis, namely, does mean excess return of value stocks equal to mean excess returns of growth stocks. The second hypothesis related to the performance of value stocks during different economic conditions. The final hypothesis related to performance of value stocks duration different financial market conditions. The chapter also discussed the methodology used to answer the research questions.

Chapter four discussed findings of the research based on the methodology and presented empirical results. This chapter concludes on the findings and recommends further research.

5.2 Summary of findings

The results show that there is limited evidence of the value premium in South Africa over the period 2001 to 2015, albeit there are some periods where one style is dominant over the other. However, deep value premium, which is difference in returns between deep value portfolio and super growth portfolio, suggests that the value premium exists in an equally weighted portfolio, implying that large caps have underperformed small caps over the period of study.

The regression results suggest that on portfolios constructed on a market cap weighted basis, none of the portfolios generates abnormal risk adjusted returns. However, relative value portfolio generates abnormal risk adjusted returns when we control for the economic growth. On portfolios constructed on an equal weighted basis, deep value, relative value and relative growth portfolios generated abnormal risk adjusted returns. However, only deep value and relative value generates abnormal returns when controlled for economic growth, suggesting that super growth outperformance may be conditional on a growing economy. This further emphasises the importance of portfolio construction in asset management.

The assessment of relative riskiness of value and growth portfolio as measured by returns of the portfolio in different financial and economic environments suggest that deep value portfolios protect during periods of financial crisis, with relative value portfolios outperforming during the worse economic period over the period of the study.

In conclusion, there is no outright evidence of the value premium in South Africa over the period of analysis; however there are periods where value style is dominant over growth style, particularly between 2001 and 2006. Value as a style has been under pressure since 2010, with relative growth becoming more dominant over the period. Relative growth could be likened with growth at reasonable price (GARP), which, according to Maginn (2007), GARP investors seek for stocks with growth prospects that sell at moderate valuation, they do not want to overpay for earnings growth.

5.3 Recommendation for further research

This study showed that there is no dominant style in South Africa, which entails those capital allocators who believe in one style, should expect cyclical performance portfolios. That said, portfolios created on a market cap weighted basis do not generate abnormal risk adjusted returns over the period of analysis, whereas the outcome on portfolios constructed on an equal weighted basis suggest that some portfolios generate abnormal returns. This suggests that either small caps stocks have outperformed large caps over the period of the study, or position sizing of the large caps were not optimal.

This warrants further research on size and optimal portfolio construction methodology, which will be beneficial to capital allocators and portfolio managers.

Index of Acronyms and Abbreviations

DV-Deep value

E/P-Earnings to Price

FTSE- Financial Times and London Stock Exchange

GARP- Growth at reasonable price

JSE-Johannesburg Stock Exchange

MSCI- Morgan Stanley Capital International

P/B-Price to Book

P/S-Price to Sale

RV-Relative Value

RG-Relative growth

SG-Super Growth

JSE-Johannesburg Stock Exchange

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