UNIVERSITY OF CAPE TOWN

THE PERFORMANCE OF VALUE VERSUS GROWTH STOCKS ON THE JSE DURING AND POST THE FINANCIAL CRISIS.

MASTERS DISSERTATION

BY

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Plagiarism Declaration

I Joyce Tinevimbo Mukandi declare that this Masters dissertation is my own work under the supervision of Associate Professor Kanshukan Rajaratnam. The dissertation was carried out and submitted in partial fulfillment of the Master of Commerce Finance, Investment Management degree at the University of Cape Town in 2018. All materials used in this research were fully cited in-text and acknowledged in the references.

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Dedication

This Masters dissertation is dedicated to my mother Mrs Tendai Mukandi and my father, the late Colonel Josiah Mapiye Mukandi, for all their love and inspiration in my life.

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I acknowledge my supervisor, Associate Professor Kanshukan Rajaratnam for giving me guidance in conducting this research study. I express my gratitude to my husband, Henry Munyanduki, for his consistent encouragement. I also want to appreciate my mother Mrs Mukandi, my in laws, Mr and Mrs Munyanduki for their moral and financial support. This work would not have been possible without their fundamental contribution. Above all, I would like to thank the Almighty God, for giving me the strength and grace to carry out this research study.

Abstract

The value-growth investment style is a popular strategy for obtaining abnormal returns. However, limited research has been done on how value and growth stocks perform during periods of economic downturn, particularly in emerging economies. The 2008 financial crisis has been named one of the worst recessions. By the end of February 2009, it accounted for a destruction of equity worth $29 trillion worldwide. This study focused on the performance of value versus growth stocks on the Johannesburg Stock Exchange (JSE), during and post the financial crisis period. This was done by evaluating the general performance of value versus growth stocks and the performance of these stocks based on market size. Value stocks were defined as those constituting the lowest 30% Price to Book ratios on the JSE All Shares Index (ALSI). On the other hand, growth stocks comprised of shares with the highest 30% Price to Book ratios. The stocks were further divided by market capitalisation (cap) using the ALSI Top 40 (Large cap), Medium cap and Small cap indices. A one year holding period was used such that portfolios were reconstructed annually using the relevant ALSI constituents. Total Returns were used in the analysis in order to capture the contribution of both capital gains and dividend income. The results from Student's t-test and the Mann-Whitney U test showed that there were no statistical significant differences between value and growth stocks returns on the JSE during the financial crisis period. Despite this, the trend implied that value stocks outperform growth stocks, but investing in the JSE ALSI produces relatively higher returns than value and growth stocks during crisis periods. This is useful to investors since small percentage differences may amount to significant monetary values. On the other hand, post the financial crisis period, overall return differences showed that growth stocks performed better than value stocks and the market. However, the results were statistically significant in only one of the three years. The study also found that the analysis of value versus growth stocks by size provides further explanations on their annual performance.

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Chapter 1

Introduction

1.1 Background to study

Many scholars have performed academic research on the value versus growth investment styles (see Arshanapalli & Nelson, 2007; Basu, 1977; Chan & Lakonishok, 2004; Fama & French, 1998; Hammar, 2014; Hoekjan, 2011; Vorwerg, 2015). The increased interest emerged from the observation by Fama & French (1992), that book to market ratio as well as size are the variables with the greatest explanatory power for cross-sectional average returns (Chan & Lakonishok, 2004).

Scholars define value stocks as those whose valuation multiples, for example Price to Earnings (PE), Price to Book (PB), Price to Dividends and Price to Cash flow ratios are low compared to the market average (see Athanassakos, 2011; Fama & French, 1998; Graham & Dodd, 1934). On the other hand, they regard growth stocks as those costing more relative to what is depicted by these accounting fundamentals.

The positive difference in returns by which value stocks outperform growth stocks is referred to as the value premium (Fama & French, 1998). The existence and magnitude of the value premium depends on the ratio used to classify stocks into value and growth portfolios (see Athanassakos, 2009; Bauman et al, 1998; Fama & French, 1998). PE and PB ratios are the most commonly used value multiples. However, there are conflicting results in literature on which of the two ratios yields higher average returns (see Fama & French, 1998; Pätäri & Leivo, 2017).

The findings on the performance of value versus growth stocks show a general outperformance of value stocks over growth stocks (see Athanassakos, 2009; 2011; Banz, 1981; Basu, 1977; Bauman et al, 1998; Chan & Lakonishok, 2004; Fama & French, 1998; Hammar, 2014). However, some of the scholars claim that the value premium is absent in short term periods of less than ten years (see Bauman et al, 1998; Chahine, 2008; Fama & French, 1998). There are also different opinions on the persistence of the value premium. Fama & French (1998) and Chahine (2008) hold that there is a universal long lasting value premium, whereas Yen et al (2004) argue that it lasts for a short time period.

Many scholars, especially in developed markets, have evaluated the performance of value and growth stocks by size (see Athanassakos, 2009; Bauman et al, 1998; De Villiers et al, 1986; Fama & French, 2006; Hammar, 2014; Phalippou, 2004). Some of the measures used to categorise stocks by size are market capitalisation, asset base and traded volume measures. The positive difference in returns by which smaller stocks outperform larger stocks is known as the small cap premium.

Contradictory results have been obtained in different markets with regards to the performance of value versus growth stocks by size. Some researchers observed a concentration of the value premium in the small cap stocks whilst others found the value premium in large cap stocks (see Athanassakos, 2009; Bauman et al, 1998; Chan & Lakonishok, 2004; Hammar, 2014; Phalippou, 2004). Moreover, some have reported that size has no significant impact on the performance value versus growth stocks (see Schwert, 2003).

Although considerable research has been undertaken on the general performance of value-growth investing styles, limited research has been done on how these stocks perform in periods of economic downturn, particularly in emerging economies. Hammar (2014) points out that there is need for research to be conducted on the effects of the 2008 financial crisis on value versus growth stocks in South Africa. According to Honkapohja (2009), a financial crisis is a sudden fall in the value of financial assets or institutions. This research compares the performance of value versus growth stocks during and post the 2008 financial crisis.

1.2 Research Problem Statement

Recessions result in highly negative returns and account for over sixty per cent of the variation in stock returns (DeStefano, 2004; Hamilton & Lin, 1996; Schwert, 1989). The 2008 financial crisis has been named one of the worst recessions (Bartram & Bodnar, 2009). Although financial crises occur less frequently, they have a significant impact on stock returns. For instance, during the financial crisis, between October 2007 and February 2009, the global equity market capitalisation fell from 51 trillion United States Dollars (USD) to approximately 22 trillion USD (Bartram & Bodnar, 2009). Investors are thus constantly faced with the risk of yielding poorer returns in economic downturns due to the absence of an appropriate investment strategy.

1.3 Aim of Study

According to Bourguignon & Jong (2003) and Bird & Casavecchia (2007), value versus growth is a common investment strategy. As such, this study determines how value and growth stocks listed on the JSE perform during and post the financial crisis period.

1.4 Research Objectives

i. To compare the overall performance of value versus growth stocks listed on the JSE during and post the financial crisis period.
ii. To compare the performance of value versus growth stocks listed on the JSE, by market capitalisation during and post the financial crisis period.

1.5 Research Question

How do the value versus growth stocks perform during and post the financial crisis period?

1.6 Justification of the study

Past research on value-growth investing on the JSE has focussed on the general performance of value versus growth stocks over specified sample periods between 1986 and 2012 (see Auret & Cline, 2011; Hammar, 2014; Robins et al, 1999; Strugnell et al, 2011). However, no prior reseach has been done to examine the value and size effects during periods of economic downturn, for example, financial crises or recessionary periods. This study is significant in that, to my knowledge, it is the first research in South Africa that compares value and growth stocks by market capitalisation during and post the financial crisis.

Although similar studies were conducted in developed markets (see Arshanapalli & Nelson, 2007; Athanassakos, 2009; Hoekjan, 2011; Switzer, 2010; Vaari, 2012; Vorwerg, 2015), the results for South Africa are expected to be different since it is an emerging economy. The size and liquidity of companies in emerging economies differ from those in more developed economies and this may influence the research outcomes (Norton, 2013). Also, each country undergoes unique business cycle phases such that the timing, effects and severity of the recessions and crises are different. According to Chu (1997), outcomes on relationships between stock returns and accounting fundamental variables are determined by the characteristics of the market. Bauman et al (1998) similarly found that, the effect of an investment strategy is country specific.

This study is valuable to both South African and international investors, who are interested in investing in South Africa. The information will be useful in determining the appropriateness of value-growth investing in adverse economic conditions, in order to reduce investment losses. In addition, an explanation on the interaction of the value and size premiums will be beneficial in stock selection decisions. The research will add to existing literature especially in emerging markets and it also seeks to highlight areas of further research.

1.7 Scope of the study

The research covers shares constituting the JSE All shares index (ALSI) between 31 December 2006 and 31 December 2013. The ALSI was chosen because it represents ninety nine per cent of the market capitalisation on the JSE.

The rest of the paper is structured as follows, the relevant literature review on value versus growth and small versus large capitalisation stocks is discussed in Chapter 2. Chapter 3 presents the data sources and methodology used respectively. This is followed by Chapter 4 which provides a presentation of the data and results from the data analyses. Finally, Chapter 5 consists of the conclusion and final remarks.

Chapter 2

Literature Review

This chapter provides a review of available literature on value-growth investing. The discussion begins with a theoretical review in Section 2.1. Section 2.2 covers the empirical evidence on the existence of the value and size premiums both internationally and domestically. It encompasses a discussion on the availability of the value and size premiums in different economic conditions including the financial crisis period. This is followed by a review of risk compensation, analyst coverage and the January effect as sources of the value and size premiums. Finally, the chapter provides a comparison of the different methods of classifying value versus growth stocks and small versus large stocks.

2.1 Theoretical Review

This section explores the efficient market hypothesis and existence of market anomalies. It involves a discussion on market efficiency on the South African Stock market.

Market Efficiency

The Efficient Market Hypothesis (EMH) holds that, stock markets are efficient and existing stock prices fully incorporate all relevant information pertaining to a firm's value (Fama, 1970). Market efficiency advocates for passive investment strategies and rules out the possibility of generating abnormal returns through buying undervalued and selling overvalued shares. Jarrow & Larsson (2012) hold that efficient markets are characterised by absence of an arbitrage opportunity and dominated securities.

According to Fama (1970), EMH is classified into three categories namely weak form, semi-strong form and strong form efficiency hypotheses. The weak form efficiency holds that stock prices take into account all historical information. The semi strong form efficiency asserts that share prices rapidly adjust for newly published information. Finally, the strong form efficiency hypothesis suggests that stock prices fully price in both publicly and privately available information.

The JSE has been found to exhibit a constant weak form efficiency for almost two decades since 1990 (see Bonga-Bonga, 2012; Jefferis & Smith, 2005; Magnusson & Wydick, 2002). However, based on their 2002 to 2009 sample period, Kruger et al (2012) concluded that the JSE was largely efficient, with short periods of predictability. Smith & Dyakova (2014) similarly found that the South African stock market had successive periods of efficiency and inefficiency. Out of the eight countries in their sample, they found the JSE to be one of the stock markets with the greatest efficiency. Conversely, Morris et al. (2009) concluded that the JSE was not efficient based on their study covering the period between 2005 and 2007.

More recently, relatively greater market efficiency on the JSE has been observed in large cap and mid cap stocks respectively rather than small cap stocks (Noakes & Rajaratnam, 2016). However, during the financial crisis period, the majority of stocks exhibited increased levels of market inefficiency (Noakes & Rajaratnam, 2016).

Fama & French (1992) showed that the majority of the differences in portfolio returns can be explained by the small cap, value and market risk premiums. The existence of the value and size premiums contends with the notion that markets are efficient. According to Dimson & Marsh (1999), the small cap premium is the leading anomaly in contradicting market efficiency. The value anomaly particularly challenges the semi-strong form market efficiency since it shows that abnormal returns are yielded from fundamental analysis. However, Phalippou (2004) concluded that the value premium is small and concentrated in seven per cent of the United States stock market leaving the bulk of the market efficient.

In efficient markets, pricing anomalies should disappear soon after they have been discovered (Becchetti & Cavallo, 2000; Dimson & Marsh, 1999; Israel & Moskowitz, 2013). Schwert (2003) argues that the size and value effects have disappeared already because of investment strategies implemented in response to published research findings about their existence. Arshanapalli & Nelson (2007) however, contend that there is insufficient empirical evidence to validate the claim that the value and size effects disappear in the long run. An extension on the work of Fama & French (1992) on similar portfolios showed evidence that the value premium did not disappear after publications of the initial research. In addition, recent researchers continue to report the persistence of the value and size premiums (Athanassakos, 2009; Hammar, 2014).

2.2 Value and size premiums

Below is a discussion on the presence of the value and size premiums in different settings. Firstly, the focus is on international and domestic markets, followed by performance of value and growth stocks in different economic conditions.

2.2.1 International Evidence

There is vast literature on the existence of the value and small cap premiums over different time periods and across various markets worldwide. According to Fama & French (1998) ninety per cent of portfolio return differences are attributable to the small cap, value and the market risk premiums. Value investing dates back to the 1920s with Graham and Dodd (1934) regarded to be the founders of this investment strategy. However, Basu (1977) was the first to document a value premium in the United States (US) stock market. Rosenberg et al (1985), Porta et al (1997) and Chan & Lakonishok (2004) amongst others provided further evidence on the persistence and pervasiveness of the value and size premiums in the US.

In an international study, Blount (2010) found that value stocks performed better than both growth stocks and the market, while growth stocks performed poorer than the market. Outside the US, Fama and French (1998) also found the value premium to be pervasive in a sample of 12 Europe, Australia, and the Far East countries between 1975 and 1995. Bauman et al. (1998) confirmed the general outperformance of value and small firms over growth and large cap firms respectively, in developed international markets, outside the US. However, growth stocks outperformed value stocks in the portfolio with the smallest firms. In instances where growth stocks outperformed, the difference was relatively smaller. This was observed when value and growth stocks were defined by Dividend Yield, Price to Earnings and Price to Cash flow multiples.

In contrast, Phalippou (2004) found that the value premium is mostly concentrated in small cap stocks. Other studies prove that small cap stocks tend to benefit more from value investing as compared to large cap stocks (see Athanassakos, 2009; Chan & Lakonishok, 2004). Blount (2010) agrees to this, stating that this is because small cap stocks have a greater opportunity to grow. However, the small cap effect is refuted by some scholars (see Horowitz et al, 2000; Schwert, 2003).

The findings by Chan et al (1991) in the Japanese stock market confirm value stocks' outperformance. Also, Dimson et al (2003) observed a strong value premium in both small and large capitalisation stocks on the London Stock Exchange whilst, Athanassakos (2009) reported a strong value premium in the Canadian Stock markets. A similar conclusion was also reached for emerging markets (see Drew & Veeraraghavan, 2002; Rouwenhorst, 1999).

Some scholars claim that the value premium only exists over long periods of time greater than ten years (see Bauman et al, 1998; Bird & Casavecchia, 2007; Chahine, 2008; Fama & French, 1998). However, others show that it may be found over short time periods, for example monthly or quarterly, although not consistently (see Bauman et al, 1998; Capaul et al, 1993).

2.2.2 Domestic Evidence

There have also been several studies on value and size premiums domestically. However inconsistent results have been obtained. Some studies have provided evidence of a value premium on the South African stock market (see Hodnett et al, 2012; Rensburg & Robertson, 2003; Strugnell et al, 2011). In contrast, Robins et al (1999) and Auret & Cline (2011) found no significant value or size effects on the JSE in their sample periods**.**

Graham & Uliana (2001) found conflicting results on the value premium in their study covering the period 1987- 1996. Value stocks underperformed growth stocks in periods before 1992. However, a value premium was observed in periods after 1992. These changes are suspected to have been caused by political and economic factors (Graham & Uliana, 2001). More recently, Hammar (2014) evaluated the performance of value versus growth stocks over a 14 year horizon. The study found a value premium on the JSE when stocks were defined by Price to Earnings and Price to Cash flow ratios and observed a growth premium when stocks were defined by Price to Book and Price to Dividend ratios.

On the other hand, De Villers et al., (1986) reported an absence of the small firm effect on the JSE. Their study examined the size premium using market capitalisation, asset base and traded volume as size measures. In contrast, Hammar (2014) found significant evidence of a small firm premium, regardless of the valuation multiple used. The study showed that small-cap value stocks generated the highest mean returns over the period 1999 to 2012. This is consistent with the findings of Phalippou (2004), Athanassakos (2009) and Chan &

Lakonishok (2004). In addition, Strugnell et al (2011) found a concentration of the size premium in the smallest stocks on the JSE. However, this was assumed to diminish over time.

2.2.3 Economic conditions

Value stocks were found to provide protection for diversified portfolios in poor economic conditions (see Arshanapalli & Nelson, 2007; Chan & Lakonishok, 2004). Arshanapalli & Nelson (2007) used market performance and recessionary periods as an indication of undesirable market conditions. They defined a down market as a phase where the risk free return exceeded the stock market return. Their results showed that growth investing performs relatively better in bull markets, whilst, value stocks perform better in bear markets. Similarly, Chan & Lakonishok (2004) observed that growth portfolios suffered more severely than value stocks in bear markets and economic downturns. However, they conclude that value investors outperform growth investors in both recessionary and non-recessionary periods as defined by the National Bureau of Economic Research. In contrast, Athanassakos (2009) observed a consistent strong value premium in Canada, prevailing in both bull and bear markets as well as recessions and recoveries.

Kim & Burnie (2002) hold that the firm size effect is dependent on the business cycle. In their 1976 to 1995 sample, they show small cap firm outperformance during economic expansions and underperformance over economic contractions. A study by Switzer (2010) in the US and Canada found some evidence of a small cap premium in the year following a business cycle trough and large capitalisation firms outperformance over peaks. In addition, the US small cap premium was found to be mostly pronounced in the small value rather than growth stocks. However, Switzer (2010) concluded that on average, the small cap premium is a result of risk determinants that are not necessarily related to the business cycle turning points.

The financial Crisis

Financial crises are largely associated with falling asset prices and international financial crises go beyond national borders (Eichengreen et al, 1987). The 2008 financial crisis is suspected to be one of the worst ever since (Allen et al, 2009; Bartram & Bodnar, 2009). The global severity of the financial crisis is a result of the linkage and interdependence of economies worldwide (Baumol & Blinder, 2010).

Hoekjan (2011) carried out research on the performance of value versus growth stocks in developed economies during the 2008 financial crisis. The focus was specifically on the United States, United Kingdom, France, Germany and Chinese stock markets. Although the results show that average monthly returns as well as risk adjusted returns from value portfolios were often relatively higher, the differences are not statistically significant. Vaari (2012) found similar results in a study on the performance of value versus growth stocks during the financial crisis in Finland. In contrast, Vorwerg (2015) confirms the existence of a value premium on the German stock market between 2005 and 2014, a period which encompasses the financial crisis.

2.3 Sources of the premiums

The sources of the value and size premiums are interrogated in this section. The following possible reasons namely, systematic risk compensation, stocks mispricing, analyst coverage, small firm risks and the January effect are explored.

Risk Compensation

Some scholars agree that the value premium is a reward for the high risk associated with value stocks (see Fama & French, 1992, 1998). The risk is believed to emanate from various factors, for instance, poor performance, financial distress, overcapacity and uncertainty of future prospects (Athanassakos, 2009; Chen & Zhang, 1998; Fama & French, 1998; Graham & Dodd, 1934).

According to the Capital Asset Pricing Model (CAPM), which supposes that markets are efficient, expected returns are directly proportional to the portfolio beta which represents market risk (Lintner, 1965; Sharpe, 1964). In contrast, others find a consistent outperformance of value portfolios on average despite their relatively lower systematic risk (see Arshanapalli & Nelson, 2007; Athanassakos, 2009). Lakonishok et al (1994) also found that value portfolios outperform growth portfolios regardless of whether or not risk adjustments are made.

Phalippou (2004) discards risk based explanations of the value premium. Lettau & Wachter (2007) similarly found that value stocks have lesser standard deviations and betas relative to growth stocks. Simultaneously, value stocks had relatively higher expected excess returns and hence higher returns per unit of risk. This is consistent with Bauman et al. (1998)'s finding that value stocks not only outperform growth stocks on a total return basis but on a risk adjusted basis as well.

Chan & Lakonishok (2004) also observed higher risk adjusted returns for low price to book and small cap portfolios. They agree that the return differential is not due to risk but to investor behavioural patterns and the associated agency costs. The superior return on value stocks can specifically be attributed to errors in investors' expectations (Porta et al, 1997).

Arshanapalli & Nelson (2007) suggested that if the value stocks outperformance is based on risk, value stocks should underperform during periods of unfavourable economic conditions.

However, if the performance of value stocks is not influenced by risk, their returns should not be worsened but may be improved during periods of poor economic conditions.

Investors also dispute whether a small cap premium is associated with small firm risks (see Reinganum, 1982; Roll, 1981). Some have found the difference in performance of different sized stocks to be specifically associated with default risk factors (see Switzer, 2010; Vassalou & Xing, 2004). Switzer (2010) holds that, on average, recessions do not have an effect on the small firm premium.

Mispricing of stocks

The value premium may occur as a result of over or under valuation of stocks (Phalippou, 2004; Vorwerg, 2015). However, for this anomaly to exist, there must be a cost attached to the exploitation of arbitrage opportunities (Phalippou, 2004; Shleifer & Vishny, 1997). According to Lakonishok et al (1994), investors' inaccuracies in stock valuation are caused by behavioural tendencies and institutional rigidities.

Investors often depend on short term, as compared to long term earnings and dividends information when pricing stocks (Bauman & Miller, 1997). They tend to invest in the prevailing high profit companies regardless of the stock price (Phalippou, 2004; Vorwerg, 2015). On the other hand, the low profit companies are a less attractive investment. Furthermore, investors have future expectations that cannot be reliably predicted by the available data (Vorwerg, 2015). This over and under reaction causes growth stocks to be overvalued whilst value stocks are undervalued. The value premium becomes apparent when value stocks produce higher than expected returns whilst growth stocks produce lower returns than anticipated (Porta et al, 1997).

Value investing promises to remain a successful long-term investment strategy since investors tend to continually overrate growth stocks whilst underestimating the future growth rate of value stocks (Chan & Lakonishok, 2004). This implies that systematic risk does not entirely capture the value premium contrary to the CAPM assumptions. In addition, the persistence of the value premium in different markets over a long period of time also raises another argument against market efficiency (Athanassakos, 2009).

Analyst Coverage

There is a strong relationship between the availability of a company's information and its returns (Arbel & Strebel, 1982). The lesser a company is covered by investment analysts, the greater the returns. This is because a higher premium is required to match the uncertainty surrounding neglected companies. Arbel and Strebel (1982) found that small-caps were generally more neglected in comparison to large caps, hence the reason for a small caps premium. Another explanation for the outperformance of small firms is that they are advantageous because they have greater potential for growth than large firms (Blount, 2010). According to Phalippou (2004), the value anomaly is small and concentrated in stocks with little or no analyst coverage.

January effect

The January effect has also been used to explain the firm size anomaly (Reinganum, 1983). This is partly attributed to tax loss selling in December as investors tend to sell off small firm shares at year end in order to offset profits and reduce taxes (Chen & Singal, 2004; Reinganum, 1983). The share prices fall way too low, prompting investors to buy these shares again at the beginning of the year (Jones et al, 1987). The prices of small firm shares in turn rise and result in outperformance of these firms over large cap stocks in January.

According to Keim (1983) almost half of the small cap effect is realised in January. Contrary to this, Dhatt et al (1999) showed that for small-cap value stocks, most of the small cap premium arose outside of January. Similarly, Best et al (2000) found that the dominance of value versus growth stocks remains unchanged when January data is excluded. Bauman et al., (1998) agrees with this and adds that the value premium was found for reasonably liquid stocks. In a study performed in Germany, Vorwerg (2015) asserts that the January effect has disappeared since it was published. In South Africa, there is an ongoing debate on whether or not a January effect exists on the JSE (see Auret & Cline, 2011; Hodnett et al, 2012; Rensburg & Robertson, 2003; Strugnell et al, 2011).

2.4 Stock classification

This section provides details on the accounting fundamental ratios used to classify stocks as either value or growth stocks. In addition it covers the metrics used to divide stocks into different size categories.

2.4.1 Distinguishing between value and growth stocks

The Price to Book, Price to Earnings, Price to Cash flow and Price to Dividend accounting fundamentals can be used to classify stocks into value and growth portfolios. In general, value stocks trade at lower prices in comparison to their fundamental value, whereas growth stocks trade at higher prices than their fundamentals (Athanassakos, 2011; Fama & French, 1998; Graham & Dodd, 1934). The use of accounting fundamentals is based on the notion that a company's share price reflects the investor's perception of the company's future performance (Capaul et al, 1993). According to Athanassakos (2011), there is a further step in identifying value stocks. This involves screening the possibly undervalued stocks by individually valuing the stocks and using a margin of safety concept.

The most used valuation measures of value and growth stocks are Price to Earnings and Price to Book (Pätäri & Leivo, 2017). Fama & French (1998) hold that these value multiples in addition to Price to Cash flow produce the most consistent results in returns. The Price to Cash flow and Price to Earnings ratio are similar in that they both provide indications regarding the current and future performance of a firm (Yen et al, 2004). In the US, most studies have used the Price to Book ratio whilst the Price to Dividend ratio valuation method has been the least efficient (Athanassakos, 2009). Surprisingly, the latter has been reported as the best valuation method in some small European national markets (see Pätäri & Leivo, 2017). However, the shortcoming of using this ratio is the exclusion of zero dividend stocks which may result in small unrepresentative samples (Pätäri & Leivo, 2017).

Hammar (2014) showed that the outperformance of the value stocks over the growth stocks on the JSE was dependent on the way value was determined. Growth stocks outperformed value stocks when portfolios were determined by PB ratio and Dividend Yield, whereas a value premium existed when stocks were based on PE and Price to Cash flow ratios. Vorwerg (2015) found that value stocks on the German market significantly outperformed growth stocks when classified by Price to Cash flow and not when classified by PB and PE ratios.

There are arguments by several scholars on the price multiples that result in portfolios reaping the highest returns (see Athanassakos, 2009; Bauman et al, 1998; Fama & French, 1998). Some scholars debate that using the Price to Book ratio results in higher returns compared to other price multiples (see Athanassakos, 2009; Bauman et al, 1998; Fama & French, 1998). According to Fama & French (1998), using the book value multiple is reliable as is it more stable relative to earnings and cash flows. In contrast, Vorwerg (2015) holds that Price to Book ratio offers lesser value premium than Price to Earnings and Price to Cash flow price multiples. Athanassakos (2009) similarly asserts that PE ratios result in higher and more consistent value premium compared to PB ratios.

Past research has found that growth (value) stocks can transform into value (growth) stocks respectively (Fama & French, 2007). Davis and Lee (2008) estimate that within one year period, there is a fifty per cent chance that value stocks transform into growth stocks and vice versa. Value stocks transition into growth stocks when the companies' share prices rise in response to innovative strategies that yield greater profitability whilst minimising losses (Fama & French, 2007). These scholars also suggest that growth companies become value companies when their high profits and growth rates are reduced by aggressive competition.

2.4.2 Classifying small versus large stocks

Most scholars use market cap to divide stocks into different categories by size (see Athanassakos, 2009; Bauman et al, 1998; Brailsford et al, 2012; Chan & Lakonishok, 2004). However, in addition to this, De Villers et al., (1986) also used asset base and traded volume measures to create groups of small, medium and large stocks. Market capitalisation refers to the total value of a listed company which is calculated by multiplying the number of outstanding shares by the prevailing share price (JSE, 2013). The asset base method involves ranking companies based on the level of total capital employed as at the financial year end (De Villiers et al, 1986). On the other hand, traded volume considers the liquidity of the stocks. It focuses on the number of shares sold within a specified period of time. Enterprise value, net annual sales and net working capital have also been used as measures of stock size (see Sehgal & Tripathi, 2005).

2.5 Conclusion

The availability of the value and size premiums contradicts the market efficiency hypothesis. The majority of the empirical evidence shows an average outperformance of value over growth stocks internationally. However, there is little and contradictory evidence on how these groups of stocks perform in different economic conditions. The sources of the value and size premiums are also debated by scholars. The value premium is believed to come from various sources including compensation for risk, behavioural patterns and agency costs. On the other hand, analyst coverage, small firm default risks and the January effect have been named as some of the reasons for the small cap premium.

The most common ratios used to classify stocks as value and growth stocks are the book to market and earnings to price multiples, whilst stock size is usually determined by market capitalisation. There are arguments by several scholars on the price multiples that result in portfolios reaping the highest returns. Research also shows that value and growth stocks do not remain in the same category but alternate overtime.

Chapter 3

Methodology

3.1 Data

The research was conducted using the JSE All Shares Index (ALSI) constituents. These shares are representative of the universe of listed shares in South Africa given that the ALSI is comprised of shares that make up ninety-nine per cent of the total market capitalisation of the JSE (JSE, 2013). The ALSI was used as the market in this research. The information on the ALSI members, Price to Book ratios and market capitalisation, as at each portfolio sorting date was obtained from the Bloomberg terminal.

The monthly total return price data for the relevant companies and ALSI during the sample period was extracted from the Datastream terminal. The total returns assume the reinvestment of dividends to buy additional units of shares. The sample data covers a financial crisis and post financial crisis period.

There is also a debate regarding the time frame of the global financial crisis. Bartram & Bodnar (2009) show that global market averages were down 40% at the close of 2006 and believe that the crisis ended around February 2009. On the other hand, others believe that the financial crisis began at the end of 2007 and ended at the close of 2009 (see Necker & Ziegelmeyer, 2016). This study covers this entire period from 1 January 2007 to 31 December 2009 as the financial crisis period. The post financial crisis period from 1 January 2011 to 31 December 2013 was chosen to match the same number of years of the financial crisis period. The year 2010 was intentionally excluded from the study to provide a distinct separation between the two periods.

3.2 Research Method

In order to answer a research question, either a qualitative or quantitative research approach is employed. The qualitative research method involves dealing with nonnumeric data to understand the reasoning behind a phenomenon in a subjective manner (Gall et al, 1996). In contrast, quantitative research entails statistically testing a hypothesis in order to make inferences about the population. It assumes the availability of an objective truth that does not change across time and settings (Gall et al, 1996). The quantitative research method was adopted for this study because it is more appropriate for analysing stocks returns.

3.2.1 Portfolio Construction

The portfolio construction method that was used in this research is comparable to that employed by other researchers (see Bauman et al, 1998; Black & McMillan, 2004; Fama & French, 1998). The ALSI stocks were grouped into value and growth stocks using the Price to Book ratio at the commencement of each holding period. For example, the ALSI constituents as at the 31 December 2006 were used to create the 2007 value and growth portfolios.

The value and growth portfolios were created by firstly ranking all the stocks in consecutive order according to their PB ratios as at the portfolio construction date. PE and PB ratios are the most commonly used valuation measures and they produce the most consistent results (see Fama & French, 1998; Pätäri & Leivo, 2017). The PB ratio was chosen over the PE ratio because it is relatively more stable over time (see Bauman et al, 1998). Thirty per cent of the stocks with the highest PB ratios were classified as growth stocks and the bottom thirty per cent stocks as value stocks. Some scholars use a 25% index cut off, however the 30% index cut off was adopted for the purpose of this study so as to incorporate more stocks in the analysis. Where 30% of the number of stocks in an index resulted in a decimal number, this was rounded up to a whole number. For instance, if the index had 125 stocks, 30% of 125 would be rounded up to 38 instead of 37.5 stocks.

The value and growth stocks were further divided by market capitalisation in order to evaluate their performance by size. Six different sized portfolios were formed for each year by dividing both the value and growth stocks into small, medium and large stocks. Specifically, the JSE Top 40, Mid Cap and Small Cap indices were used to determine the large, medium and small stocks respectively.

The Top 40 index is made up of the forty largest stocks that are part of the ALSI, whilst the Mid Cap index represents the next sixty largest stocks. Finally, the Small Cap index is constituted by the remaining stocks outside the top 100 ALSI stocks (JSE, 2013). This classification resulted in six portfolios sorted according to PB ratio and size. The portfolios include small value, medium value, large value, small growth, medium growth and large growth stocks, see for example Appendix A.

3.2.2 Performance Evaluation

Consistent to prior research on value-growth investing, a one year holding period was used in order to account for changes in price multiples over time (see Bauman et al, 1998; Chan & Lakonishok, 2004; Fama & French, 1998; Lakonishok et al, 1994; Vorwerg, 2015). Scholars on value-growth investing use either monthly or annual returns in their analyses (see Bauman et al, 1998). This study used monthly returns given the limited number of years in the sample period.

Total Returns

In line with the majority of available literature, total returns were used in assessing the performance of value vs growth stocks (see Chahine, 2008; Chan & Lakonishok, 2004; Fama & French, 1998). These returns include both the capital gains and reinvestment of dividends over a specified time period. The monthly total return price data was used for calculating monthly total returns using the formulae below;

$R_i = \ln\left(\frac{P_t}{P_t - 1}\right)$,

where: R_i = company monthly return,

P_t = share price (including dividends) at month t,

P_{t-1}= share price (including dividends) at month t-1.

Average Portfolio Returns

Two methods namely, equal weighted and value weighted approach can be used in the calculation of average portfolio returns. According to Fama & French (1998), the equal weighted method means that the stocks in a portfolio are given equivalent weights, whereas with the value weighted approach, stocks are weighted by market capitalisation.

Fama & French (1992) hold that the value-weighted approach resembles portfolios that capture the return behaviours of different sized stocks in a realistic manner. In contrast, Black & McMillan (2004), argue that the equal weighted method is a better approach as it allows every stock in the portfolio to have the same impact on the overall return. This research adopted the equal weighted approach to prevent the larger stocks from distorting portfolio returns. Some researchers have obtained similar results from using the value and equal weighted approaches (see Athanassakos, 2009; Brailsford et al, 2012). The formulae for calculating the equally weighted portfolio monthly average return is calculated as follows;

$$R_p = \frac{\sum_{i=1}^{n} R_i}{n}$$

where: R_p = Average monthly portfolio return,

R_i = individual company monthly return,

n = number of companies in the portfolio.

Scatter plots were used to illustrate relationships between value and growth stocks returns versus the market returns (see De Veaux, 2007). A trend line was fit to the data and interpreted in order to ascertain the suitability of the linear model. In addition, the correlations were calculated to determine the strength of the linear relationships (see De Veaux, 2007).

3.2.3 Hypothesis Development

This study used two approaches in testing whether there were significant differences between value and growth portfolio total returns during and post the financial crisis period. Firstly, the general performance of value versus growth stocks was evaluated and secondly, the performance of the various portfolios divided according to market size was assessed.

The null and alternative hypotheses are stated below.

H_0: value portfolio returns = growth portfolio returns during or post the financial crisis period.

H_1: value portfolio returns ≠ growth portfolio returns during or post the financial crisis period.

Statistical Testing

Return data for 12 months was used to determine annual performance and 36 months return data was used for the entire financial crisis and non crisis periods. The IBM SPSS statistics 25 software package was used to perform the independent Student's t-test, Welch's t-test and Mann-Whitney U test where appropriate. According to Nachar (2008), despite a sample being small, it can be useful in inferring conclusions on the population if the adequate statistical test is applied.

Both the independent Student's t-test and Welch's t-test are parametric tests used to check for statistical significant differences between the means of two autonomous groups (Nachar, 2008; Ruxton, 2006). The difference between the two tests is that the Student's t-test is ideal in instances of homogeneity of variances whilst the Welch's t-test is used when variances of the two groups are unequal (Kim, 2015; Ruxton, 2006). However both tests require the sample variables to approximately follow a normal distribution (Razali & Wah, 2011; Ruxton, 2006).

Although Aparicio & Estrada (2001) postulate that the normal distribution is a reasonable approximation for monthly returns, the Shapiro-Wilk test of normality was performed to confirm if the data followed a normal distribution since crisis periods may affect the normalcy of monthly returns. The Shapiro-Wilk's test of normality is valid for small sample sizes of at least 3 (Royston, 1982). The Levene's test of homogeneity of variance was also performed and either a Student's t-test or Welch's t-test was used depending on its outcome. Zimmerman (2004) shows that this approach to testing for statistical significance poorly controls type I errors when sample sizes are unequal, however in this case the sample sizes for the two groups were the same.

The Mann-Whitney U test on the other hand was used in instances where the normality assumption was not met. This is a non parametric test which means that it does not assume a specific distribution (Nachar, 2008). However, a major weaknesses of the Mann-Whitney U test is that it becomes unreliable in instances where variances of the two groups differ (Kasuya, 2001; Nachar, 2008). According to Zimmerman (1987) if both the assumptions of normality and homogeneity of variance are not satisfied, the t-test provides better results than the Mann-Whitney U test provided that the sample sizes are equal.

In conclusion, the Student's t-test or the Welch's t-test were used in the study and these results were augmented by the Mann-Whitney U test in instances where the data failed the normality test. The hypotheses were tested at a 1%, 5% and 10% significance level to find out whether or not value and growth stocks average monthly returns differ significantly. This means that there is 99%, 95% and 90% probability respectively, that the results obtained in the research are reliable.

Chapter 4

Data Presentation and Analysis

This chapter provides details of the empirical results. It begins by providing an overview of the sample data used in the study. This is followed by a presentation, analysis and discussion of the observations.

4.1 Sample Overview

Table 1 below provides a summary of the median PB ratios and the number of value and growth companies constituting the sample each year.

Table 1: Portfolio sample sizes and median PB ratios

	Stocks	**Large**	**Medium**	**Small**	**Total**	**Original size**	**Median PB ratio**
Crisis Period							
2007	Value	9	18	16	43	45	1.87
	Growth	13	10	16	39	45	6.47
2008	Value	11	16	17	44	46	1.39
	Growth	9	17	15	41	46	6.14
2009	Value	8	11	27	46	47	0.8
	Growth	10	22	13	45	47	3.27
Total		**60**	**94**	**104**	**258**	**276**	
Non Crisis Period							
2011	Value	12	14	20	46	47	1.16
	Growth	17	20	10	47	47	4.31
2012	Value	11	15	20	46	47	1
	Growth	15	18	14	47	47	3.89
2013	Value	8	21	18	47	47	1.09
	Growth	15	16	16	47	47	5.59
Total		**78**	**104**	**98**	**280**	**282**	

Initially an equal number of companies were sampled for the value and growth portfolios. The companies represented the top and bottom 30% ALSI constituents by PB ratio as at the portfolio forming date. However, due to company closures in the year of assessment, the above statistics show differences in the original sample size and the actual number of companies included in the analysis. In addition, it shows the median PB ratios for the value and growth portfolios. During the financial crisis period the median PB ratios for the value and growth portfolios ranged from 0.8 to 1.87 and 3.27 to 6.47 respectively. Post the financial crisis period, the median PB ratios were between 1 and 1.16 for the value portfolios. During the same period, the median PB ratios for the growth portfolios ranged between 3.89 and 5.59.

The value and growth portfolios divided according to firm size had at least 8 companies and at most 27 companies during the financial crisis period and between 8 and 21 companies post the financial crisis period. The average number of companies in each portfolio was 14±5 and 16±4 companies in the crisis and non-crisis period respectively. Other scholars used portfolios of at least 7 companies in their study for the performance of value versus growth stocks by size (see Brailsford et al, 2012; Hoekjan, 2011).

4.2 Normality and Homogeneity of variance tests

Both the Student's t-test and Welch's t-test require data to meet the normality assumption (Razali & Wah, 2011; Ruxton, 2006). However, the Student's t-test is ideal in instances of homogeneity of variances whilst the Welch's t-test is used when the variances of two groups are unequal (Kim, 2015; Ruxton, 2006). On the other hand, the Mann-Whitney U test is used in instances where the normality assumption is not met.

The results of the Levene's test for homogeneity of variances showed that the variances were not significantly different in all cases for value and growth stocks, see Appendix B. The

Student's t-test was thus used to check for statistically significant differences. On the other hand, the majority of the data passed the Shapiro-Wilk's normality test. Appendix C shows the results for the normality test. The Mann-Whitney U test was performed to augment the t-test in instances where data did not meet the normality assumption, see Appendix D for the results.

4.3 Performance of Value versus Growth stocks

The general performance of the value versus growth stocks was first evaluated annually and then over the entire crisis and post crisis period.

4.31 Annual performance of Value versus Growth Stocks

Figure 1 below shows the annual performance of the value and growth stocks against the market return.

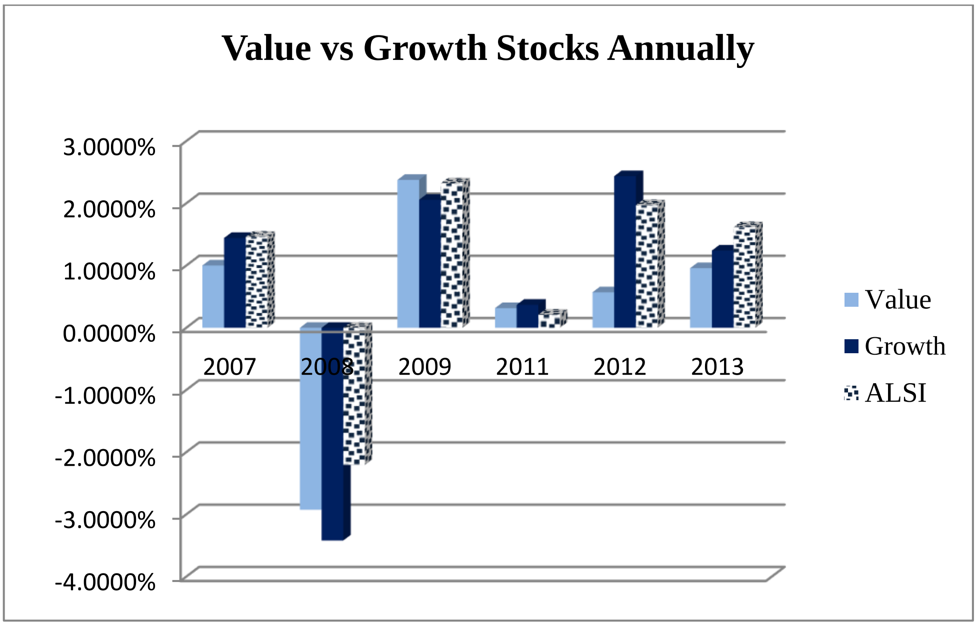

Figure 1: Value versus growth stocks annual performance

During the financial crisis period, the value portfolios outperformed the growth portfolio in two out of the three years. However, the market had the highest return twice, in 2007 and 2008. On the other hand, the growth portfolio outperformed the value portfolio in all the three years of the non-financial crisis period. However, in 2013 the growth portfolio underperformed the market. When the value-growth spreads were tested for statistical significance, only the 2012 return difference of -1.8657% was statistically significant at the 5% level. Table 2 below provides further details on the value-growth spreads.

Table 2: Annual value-growth spread

Year	**Value (V)**		**Growth (G)**		**Mean Difference**	**Market Return**		**Sig**
	Mean	Stdev	Mean	Stdev	V-G	Mean	Stdev	
2007	1.0019%	3.6932%	1.4434%	4.3918%	**-0.4415%**	1.4632%	3.1992%	**ns**
2008	-2.9231%	6.7839%	-3.4176%	6.9740%	**0.4945%**	-2.2035%	7.4748%	**ns**
2009	2.3773%	6.2072%	2.0586%	3.9985%	**0.3187%**	2.3220%	6.2500%	**ns**
2011	0.3166%	1.9430%	0.3702%	2.7811%	**-0.0536%**	0.2112%	3.4121%	**ns**
2012	0.5714%	2.7928%	2.4371%	1.6834%	**-1.8657%**	1.9709%	2.4194%	**
2013	0.9586%	2.8972%	1.2416%	1.8711%	**-0.2830%**	1.6184%	3.8531%	**ns**
Stdev - standard deviation			*** *significant at the 5% level**				**ns not significant**	

Standard Deviations of value versus growth stocks

Figure 2 below shows the standard deviations of the value and growth portfolio returns annually during and post the financial crisis period.

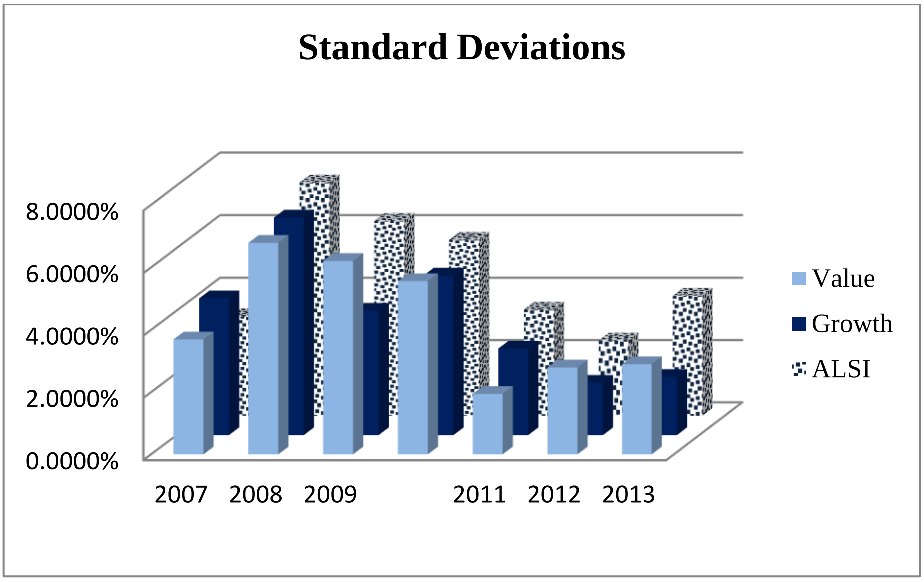

Figure 2: Standard deviations of value versus growth stocks

Standard deviation can be used as a measure of risk in value-growth investing (see Bauman et al, 1998; Capaul et al, 1993; Chan & Lakonishok, 2004). The standard deviations for all the portfolios, including the market, were relatively higher during the financial crisis period as compared to the post financial crisis period. The highest standard deviations were particularly seen in 2008. According to, Bartram & Bodnar (2009) the greatest impact of the financial crisis occurred between mid-September and end of October 2008. This may be the explanation for the high volatility in 2008.

The average standard deviations for the value and growth stocks were 5.5615% and 5.1214% during the financial crisis period. On the other hand, the standard deviations were 2.5443% and 2.1119% respectively, post the financial crisis period. Bauman et al (1998) similarly found that value portfolios tend to have higher variability of returns than the growth portfolios. Conversely, Chan & Lakonishok (2004) found international evidence that there were no notable differences between the volatilities of value and growth stocks. On average, the market had the highest standard deviations of 3.2282% and 5.6413% respectively during the crisis and non-crisis periods.

4.3.2 Overall Performance of Value versus Growth stocks

The overall performance of the value versus growth stocks was also assessed. Figure 3 below shows the performance of the portfolios over the entire financial and non-financial crisis period.

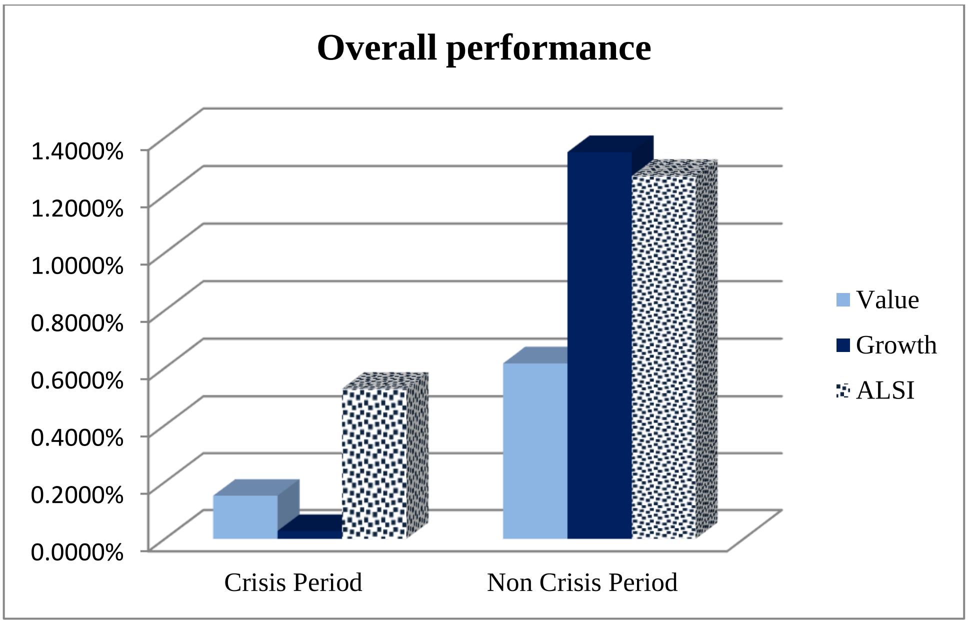

Figure 3: Value versus growth stocks overall performance

The value stocks outperformed the growth stocks during the financial crisis period but underperformed the market return. The value-growth spread of 0.1239% is statistically insignificant and can thus not be recognised as a value premium. Differences between the market and value or growth stocks returns were also statistically insignificant. Post the financial crisis period, the growth portfolio outperformed both the value and market portfolios. There was also no statistical significance found either in the differences between growth versus value average stock returns or when these were compared to the market performance.

Table 3 below provides more details on the differences between the value and growth stocks average returns.

Table 3: Overall value-growth spread

	Value (V)		**Growth (G)**		**Mean Difference**	**Market Return**		**Sig**
	Mean	Stdev	Mean	Stdev	V-G	Mean	Stdev	
Crisis Period	0.1520%	6.0040%	0.0281%	5.7047%	**0.1239%**	0.5772%	6.084%	**ns**
	Mean	Stdev	Mean	Stdev	V-G	Mean	Stdev	
Non-Crisis Period	0.6155%	2.5194%	1.3496%	2.2716%	**-0.7341%**	1.2668%	3.2801%	**ns**

Although return differences during the financial crisis period were insignificant, the general trend was that value stocks outperformed growth stocks but underperformed the market. Hoekjan (2011) and Vaari (2012) also found no statistically significant value premium during the financial crisis period. Post the financial crisis period, growth stocks outperformed value stocks and the market return. The return differences were also not significant except in 2012.

The general performance of value versus growth stocks over the entire sample period was illustrative of the performance of the stocks each year. In 2007, however, value stocks underperformed growth stocks. According to Bauman et al (1998) and Capaul et al (1993) value stocks do not consistently outperform growth stocks in each year of the crisis period.

Consistent to the findings of this study, Hoekjan (2011) found no statistical significant differences in both individual countries and global value and growth stocks during the financial crisis period. Vaari (2012) found similar results on a study of value versus growth stocks during the financial crisis in Finland. Conversely, Arshanapalli & Nelson (2007) found that value stocks consistently outperform growth stocks in down markets and growth stocks outperform value stocks in up markets. Similarly, in Athanassakos (2009)'s study performed in Canada, a consistent significant value premium was found in both crises and recession periods.

Some scholars hold that country specific results tend to show less favourable outcomes for value investing compared to global portfolios (see Bauman et al, 1998; Fama & French, 1998). This may be due to diversification benefits derived from international portfolios. However, Bartram & Bodnar (2009) argue that diversification yielded no benefit during the financial crisis as international markets were highly correlated due to the pervasiveness of the crisis.

4.3.3 Correlation of Value versus Growth Stocks

The correlations during the financial crisis period show strong positive relationships between value versus growth stocks and between these stocks and the market. This is consistent to observations by Bartram & Bodnar (2009). Growth stocks however moved relatively more closely with the market. Post the financial crisis period the positive correlation between value and growth stocks was relatively weaker. Similarly, the positive relationship between growth stocks and the market weakened. However, the strong positive association between value stocks and the market remained unchanged suggesting that value stocks consistently mirror market returns. The correlation matrices in table 4 below summarises these results.

Table 4: Correlation Matrices

Crisis Period				**Non Crisis Period**			
	Market	Value	Growth		Market	Value	Growth
Market	1			Market	1		
Value	0.739203	1		Value	0.74294	1	
Growth	0.830291	0.896435	1	Growth	0.662706	0.571594	1

4.3.4 Financial Beta of Value and Growth Stocks

The financial beta which is the gradient, shows the relative change in a stock or portfolio return due to changes in the market return. It is used as a measure of risk, whereby a beta of greater or lesser than one represents higher or lower risk than the market respectively. The scatter plots below illustrate the relationships between the market and value or growth stocks. The linear equation further describes these relationships and the coefficient of determination (R^2) shows how well the market explains the variation in value or growth stocks.

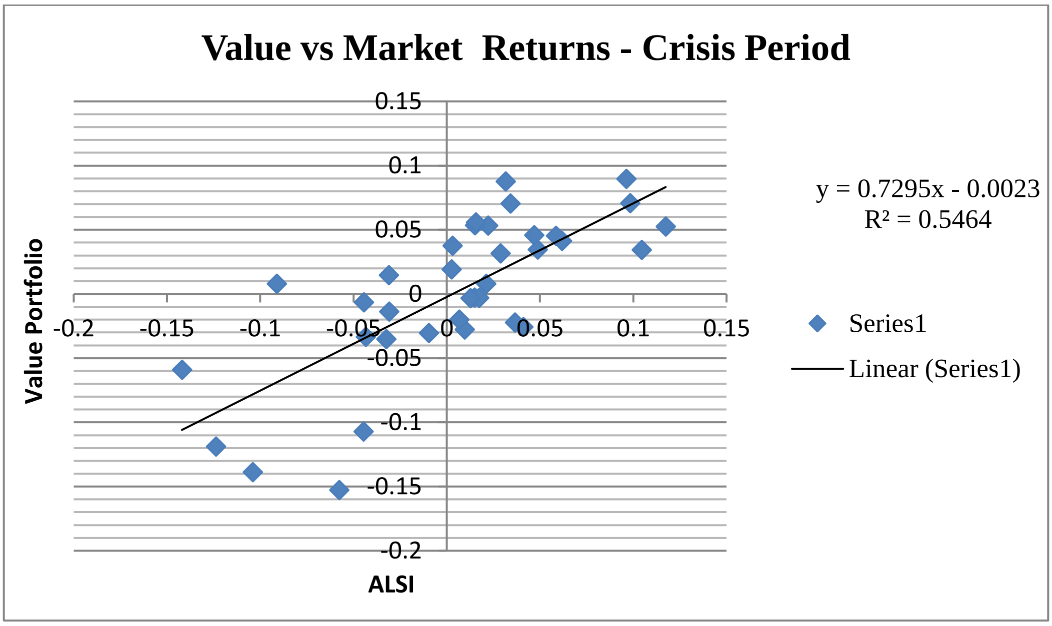

Figure 4: Value Stocks versus Market during the crisis

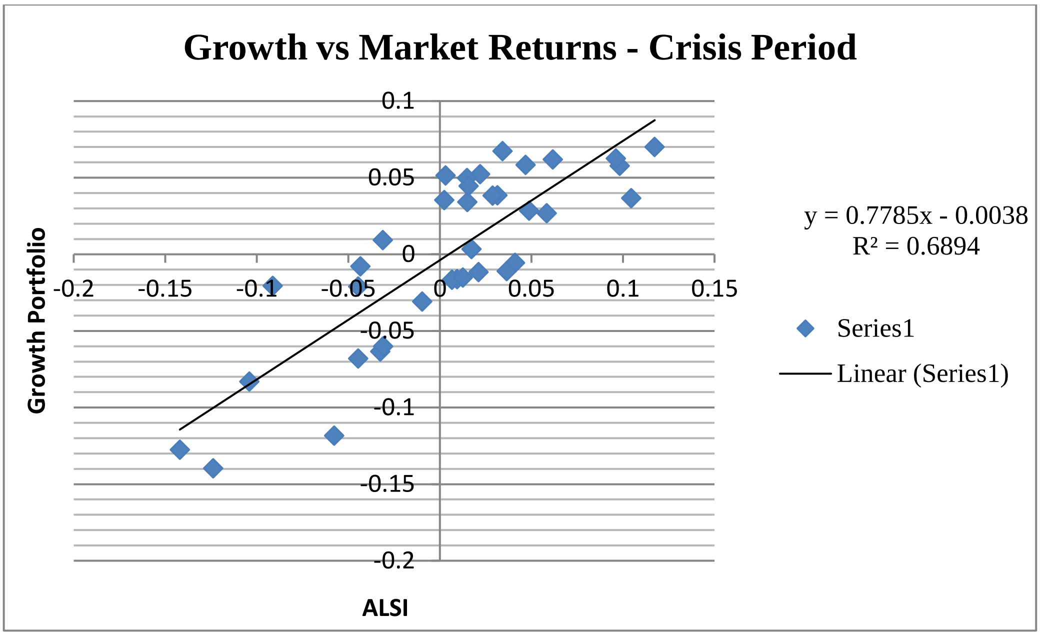

Figure 5: Growth stocks versus Market during the crisis

In all instances, the value and growth stocks were the dependent variables whilst the market was the independent variable. The value and growth stocks betas of 0.7295 and 0.7785 respectively were below 1 which shows that they were less risky than the market during the crisis period. This is consistent with the results from the standard deviations. In addition, the constant intercepts of -0.23% and -0.38% respectively, confirm that the value and growth stocks underperformed the market during this period. The coefficients of determination of 54.64% for value stocks and 68.94% for growth stocks show how much of the variation is explained by the market during the crisis period.

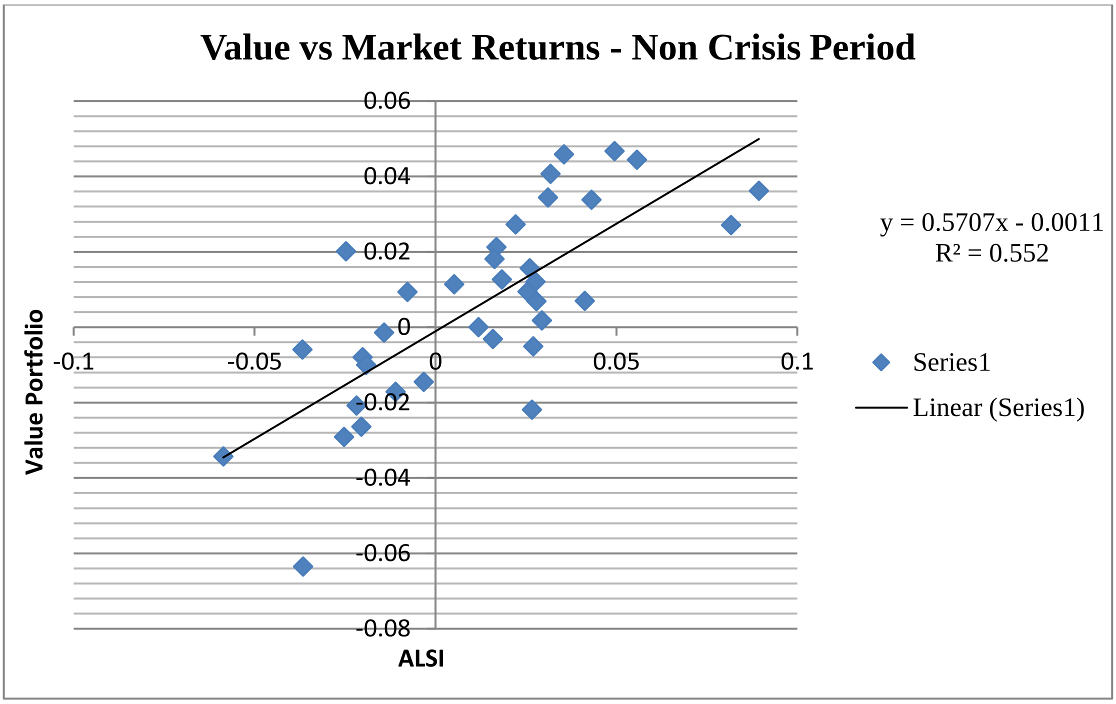

Figure 6: Value stocks versus Market post the crisis

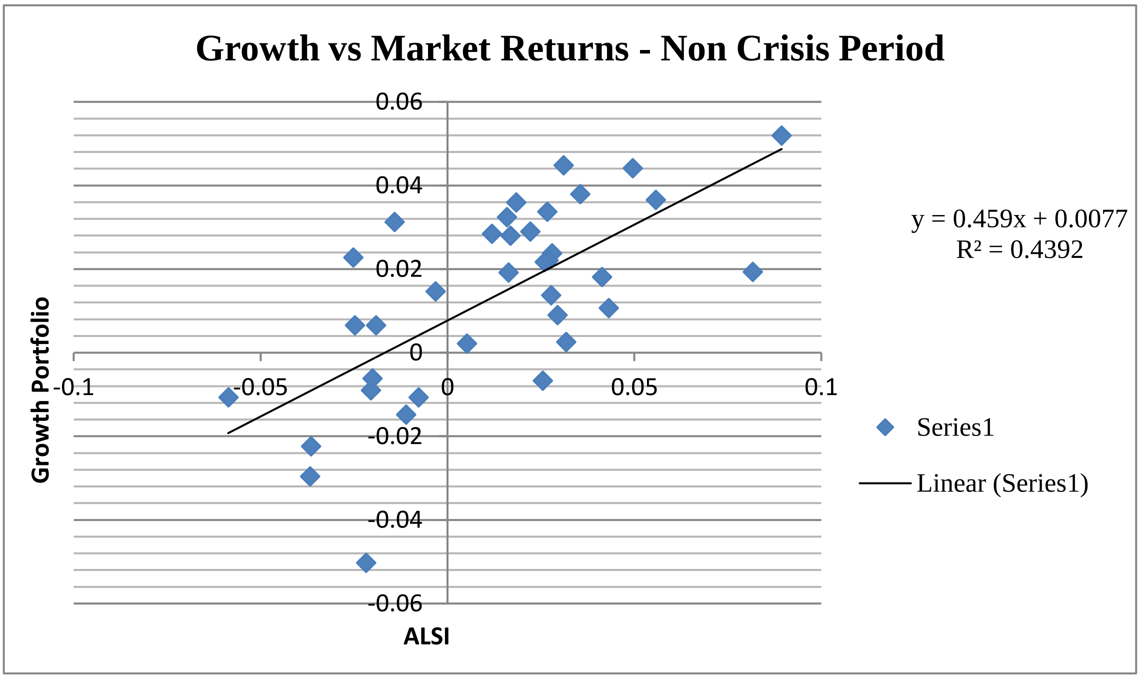

Figure 7: Growth stocks versus Market post the crisis

Post the financial crisis, the value and growth stocks' betas of 0.5707 and 0.459 respectively imply relatively lower risk than the market. A similar trend in terms of risk was observed from the standard deviations of the returns. Also, similar to the implication of the standard deviations, the financial betas show that the market had the highest volatility post the financial crisis period as well.

The value stocks intercept of -0.11% confirms the underperformance of the value stocks relative to the market. On the other hand, the growth stocks intercept of 0.77% confirms that growth stocks outperformed the market return post the financial crisis. According to the results of the regression analysis, this outperformance was statistically significant at the 5% level.

The coefficient of determination for value stocks was 55.2% which was slightly higher than in the crisis period. This shows that the relationship between the market return and value portfolio return did not change between the two periods. However, the coefficient of determination for the growth stocks fell from 68.94% to 43.92% between the two periods. This shows that the market has lesser predictive power in the non crisis period compared to the crisis period. The regression models were statistically significant in all instances meaning that the market notably explains the variation in the value and growth stocks returns, see Appendix E.

4.4 Value versus Growth stocks by size

The performance of the different size categories of the value versus growth stocks was also evaluated annually and over the entire financial crisis and post financial crisis period.

4.4.1 Annual performance of the stocks by market size

Figure 4 and 5 below show the annual performance of different sized value versus growth stocks.

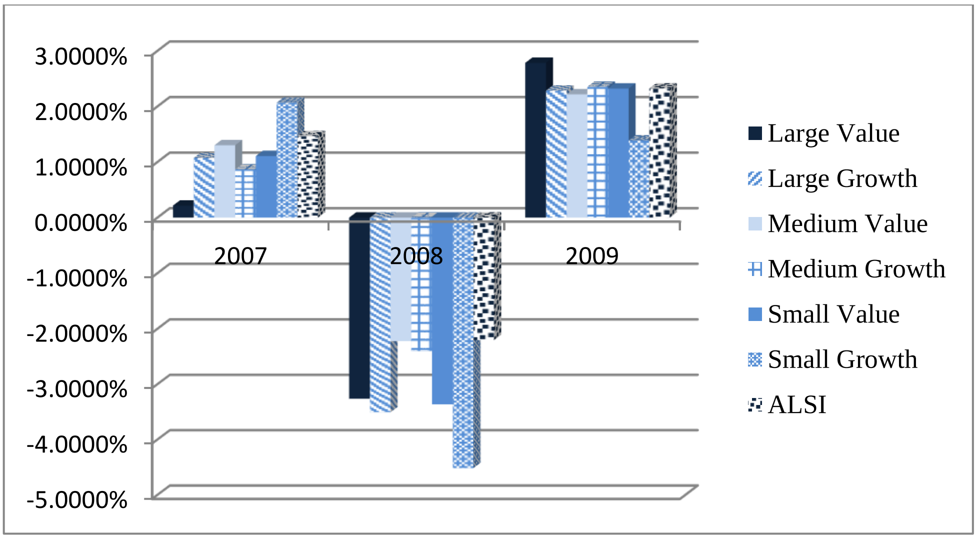

Figure 8: Annual performance of various size categories during the financial crisis

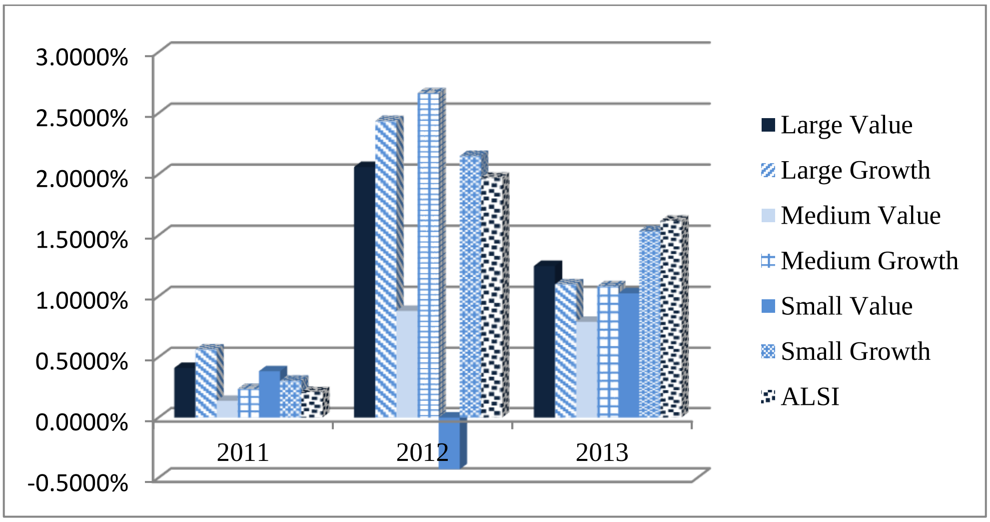

Figure 9: Annual performance of various size categories post the financial crisis

During the financial crisis period, there was no statistical significance within the different sized portfolios. However, value portfolios had higher returns than growth portfolios in six out of the nine instances (66.67%).

Despite observations of greater market inefficiency on the JSE during the financial crisis period, value and growth returns did not significantly differ from the market returns (see Noakes & Rajaratnam, 2016). The market had relatively higher returns than value and growth portfolios in most instances. For example, in 2007 the market performed better than all the portfolios with the exception of the small growth portfolio. Consistently, in 2008, it had the least loss of -2.2%. Finally, in 2009, the market return of 2.322% was the third highest after the large value (2.7835%) and medium growth portfolios (2.3526%).

On the other hand, post the financial crisis period, growth portfolios outperformed value portfolios in seven out of the nine cases (77.78%). The value stocks only outperformed growth stocks by 0.0789% and 0.1493% in the 2011 small and 2013 large categories respectively. The growth stocks outperformed the value stocks by at least 0.0983% and at most 2.5783% post the financial crisis period. The 2012 small value portfolio had the least return of -0.4291% post the financial crisis period, whilst the 2012 medium growth portfolio had the best performance of 2.6622%. However, the majority of the results from the independent t-tests showed no significant differences in average monthly returns between the value and growth portfolios. Significant differences at the 5% and 10% levels were only noted in the 2012 small and medium portfolios respectively.

The performance of the value and growth portfolios post the financial crisis was also compared to the market return. In 2011, the market portfolio underperformed all the portfolios except the medium value portfolio. In 2012, it only outperformed the small value and medium value portfolios. Remarkably, in 2013, the market had a higher return than all value and growth portfolios. Table 4 and 5 below show details of the annual performance of the stocks within the same size categories during and post the financial crisis period respectively.

Table 5: Value versus Growth stocks by size during the financial crisis period

Crisis								
2007	Value (V)		Growth (G)		**Mean Difference**	Market Return		**Significance**
	Mean	Std Dev	Mean	Std Dev	**V-G**	Mean	Std Dev	
						1.46%	3.20%	
Small	1.11%	4.71%	2.07%	5.25%	**-0.96%**			**ns**
Medium	1.30%	3.24%	0.87%	4.98%	**0.44%**			**ns**
Large	0.22%	4.08%	1.07%	3.94%	**-0.86%**			**ns**
2008	Value		Growth		**Mean Difference**	Market Return		**Significance**
	Mean	Std Dev	Mean	Std Dev	**V-G**	Mean	Std Dev	
						-2.20%	7.47%	
Small	-3.36%	6.74%	-4.51%	7.64%	**1.15%**			**ns**
Medium	-2.22%	8.13%	-2.40%	6.80%	**0.18%**			**ns**
Large	-3.26%	7.55%	-3.51%	10.16%	**0.25%**			**ns**
2009	Value		Growth		**Mean Difference**	Market Return		**Significance**
	Mean	Std Dev	Mean	Std Dev	**V-G**	Mean	Std Dev	
						2.32%	6.25%	
Small	2.32%	6.99%	1.39%	3.97%	**0.93%**			**ns**
Medium	2.22%	4.88%	2.35%	4.78%	**-0.13%**			**ns**
Large	2.78%	8.54%	2.28%	5.71%	**0.50%**			**ns**
ns not significant								

Table 6: Value versus Growth stocks by size post the financial crisis period

Non Crisis								
2011	Value (V)		Growth (G)		Mean Difference	Market Return		Significance
	Mean	Std Dev	Mean	Std Dev	**V-G**	Mean	Std Dev	
						0.2112%	3.4121%	
Small	0.3842%	2.5569%	0.3053%	3.8382%	**0.0789%**			**ns**
Medium	0.1389%	1.6914%	0.2371%	2.6768%	**-0.0983%**			**ns**
Large	0.4114%	3.1788%	0.5650%	3.6102%	**-0.1536%**			**ns**
2012	Value		Growth		**Mean Difference**	Market Return		**Significance**
	Mean	Std Dev	Mean	Std Dev	**V-G**	Mean	Std Dev	
						1.9709%	2.4194%	
Small	-0.4291%	3.5456%	2.1492%	2.4091%	**-2.5783%**			**
Medium	0.8808%	2.2405%	2.6622%	2.3228%	**-1.7814%**			*
Large	2.0594%	3.6758%	2.4356%	2.1799%	**-0.3762%**			**ns**
2013	Value		Growth		**Mean Difference**	Market Return		**Significance**
	Mean	Std Dev	Mean	Std Dev	**V-G**	Mean	Std Dev	
						1.6184%	3.8531%	
Small	1.0249%	2.9686%	1.5339%	2.3154%	**-0.5090%**			**ns**
Medium	0.7914%	2.8309%	1.0829%	2.7534%	**-0.2914%**			**ns**
Large	1.2485%	5.8219%	1.0993%	3.5119%	**0.1493%**			**ns**
** significant at the 5% level					ns not significant			

4.4.2 Overall performance of the stocks by market size

The performance of value versus growth stocks was further investigated by observing the behaviour of different sized portfolios over the entire crisis and non-crisis period. Figure 6 below shows a summary of the outcomes.

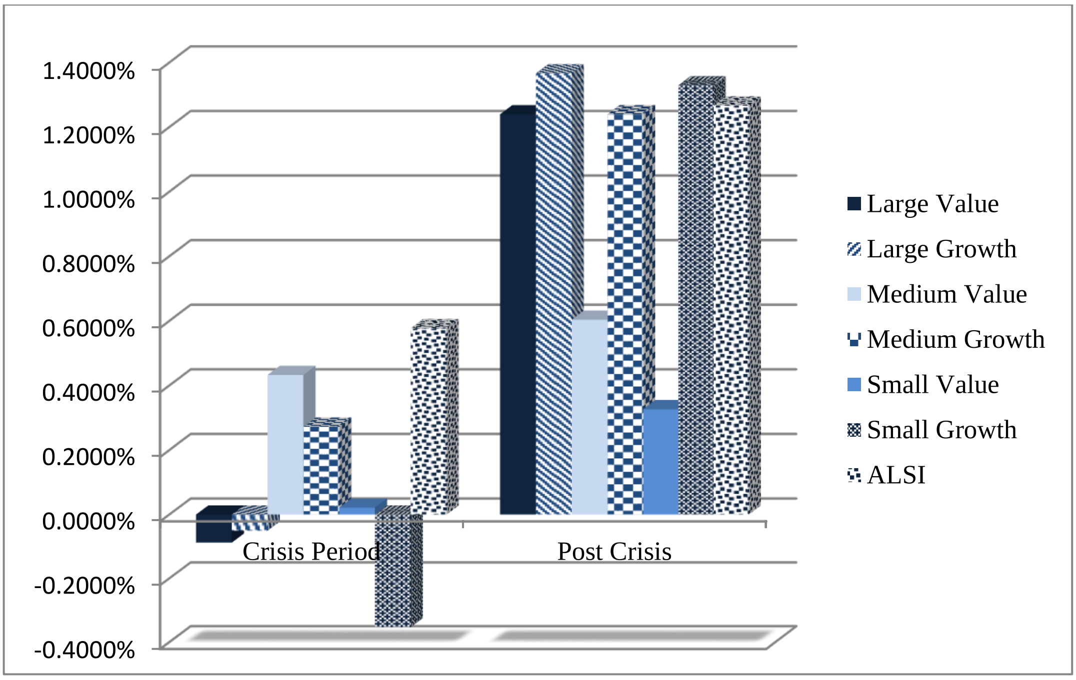

Figure 10: Overall performance of various size categories

As expected, all returns during the non-financial crisis period were higher than during the crisis period. The overall trend was that value portfolios performed better than growth portfolios during the financial crisis period but they failed to outperform the market return. Post the financial crisis period, the different sizes of the growth portfolios generally outperformed the value portfolios and the market return. The small growth portfolio had the greatest improvement between the two periods from a return of -0.3534% to 1.3294%. However, differences between value and growth portfolios of the same size over the sample period did not show any statistical significance. Table 6 below shows details of the statistical tests.

Table 7: Different sized portfolios value-growth spread

Crisis Period	Value (V)		Growth (G)		Mean Difference	Market Return		**Sig**
	Mean	Stdev	Mean	Stdev	V-G	Mean	Stdev	
						0.5772%	6.084%	
Small	0.0216%	6.5402%	-0.3534%	6.3985%	**0.3750%**			**ns**
Medium	0.4327%	5.9399%	0.2724%	5.7903%	**0.1603%**			**ns**
Large	-0.0879%	7.2341%	-0.0507%	7.3463%	**-0.0372%**			**ns**
Post Crisis Period	Value		Growth		Mean Difference	Market Return		**Sig**
	Mean	Stdev	Mean	Stdev	V-G	Mean	Stdev	
						1.2668%	3.2801%	
Small	0.3267%	3.0231%	1.3294%	2.9569%	**-1.0028%**			**ns**
Medium	0.6037%	2.2600%	1.2398%	4.3058%	**-0.6361%**			**ns**
Large	1.2398%	4.3058%	1.3666%	3.1784%	**-0.1269%**			**ns**
ns – not significant								

The performance of the different sized stock categories over the entire sample period was similar to their performance each year. The results also mirrored those obtained before dividing the stocks by size. During the financial crisis period, the value stocks outperformed the growth stocks with the exception of the large size category. However, the return differences were too small to represent a significant value premium. Overall, the market return had the highest performance. In contrast, Bauman et al (1998) found that value stocks outperform growth stocks except in the smallest category.

Generally, post the financial crisis period, all sizes of the growth stocks outperformed the value stocks. The market underperformed all sizes of the growth stocks except the medium size category return which it exceeded by 3 basis points. The return differences post the financial crisis period were also not significant except in the 2012 small and medium portfolios.

Arshanapalli & Nelson (2007) similarly found that all sizes of growth stocks performed better in bull markets and underperformed value stocks in bear markets. They defined a bear market as a period when the risk-free rate exceeded the market return. They also concluded that, value stocks outperform growth stocks both in recessionary and non-recessionary periods as classified by the National Bureau of Economic Research.

Chapter 5

Conclusion

This study examined the performance of value versus growth stocks on the JSE, during and post the financial crisis period. This was done by evaluating the performance of the stocks before and after dividing them into different size categories. The analysis was done using total returns, annually as well as over the entire crisis and non-crisis period.

During the financial crisis period, value stocks outperformed growth stocks but underperformed the market return. The outperformance of the value stocks over the growth stocks during the financial crisis period was small and did not amount to a statistically significant value premium. This may be due to the relatively higher variability in value stocks as shown by standard deviation. The value portfolios consisted of both well and poorly performing stocks such that there was a high standard deviation of returns. Practically, value-growth investors do not invest in all value or growth stocks, but pick specific stocks based on further analysis of individual companies. This means that value investors may benefit from significant value premium during the crisis period if the best value companies are selected.

Although the market performed better than value-growth investing during the financial crisis period, the returns were also not significantly different. This may be due to high correlations between stocks during crisis periods which result in minimal diversification benefits from holding the market portfolio (see Bartram & Bodnar, 2009). The higher market return may have been influenced by high risk as shown by a relatively higher standard deviation and beta compared to value or growth stocks.

The annual performance of the value versus growth stocks during the crisis period resembled the overall outcome and did not yield statistically significant results as well. The analysis of the stocks by size during the crisis period did not show any statistical significant differences either. This suggests that different size categories do not improve the performance of either value or growth stocks during the crisis period.

Although the results during the financial crisis period were not statistically significant, the trend is useful to investors. This is because small percentage differences yielded from investing in one portfolio over another may amount to significant monetary values. Overall, the results of this study imply that investors on the JSE obtain higher returns from investing in the ALSI compared to value and growth stocks during crisis periods. However, they should be prepared to tolerate the higher risk that comes with the market return.

Post the financial crisis period, growth stocks had higher returns than value stocks and the market overall. However, the growth stocks had the least standard deviation of returns and a lower beta relative to the market. This suggests that the outperformance was not due to a reward for high risk. The linear regression results showed that growth stocks significantly outperformed the market post the financial crisis.

The overall performance of value compared to growth stocks did not show statistically significant differences. However, the annual performance revealed that growth stocks significantly outperformed value stocks in one of the three years. The reason for this may be that, outperformance of growth stocks over value stocks does not occur each year. As such, a longer sample period of more than three years is speculated to realise more years of significant results.

The analysis of value versus growth stocks by size further showed that the 2012 significant difference emanated from the outperformance of mainly small growth stocks and to a lesser extent, medium stocks rather than large stocks. This shows that, different size categories further explain the performance of value and growth stocks. In instances where there are significant differences, dividing the stocks by size helps identify the actual source of the difference. Overall, the results of this study imply that during non crisis periods, growth investing on the JSE yields higher returns than value and passive investing.

Previous studies on the performance of value versus growth stocks during economic downturns, have reported conflicting research findings. The results of this study are consistent with the findings of Hoekjan (2011) in developed economies and Vaari (2012)'s observations in Finland. They similarly found that during financial crisis periods, value and growth returns do not significantly outperform growth stocks. Similarly to this study, Noakes & Rajaratnam (2016) also observed that, during the 2008 financial crisis period, value and growth returns from the JSE did not significantly differ from the market. In contrast, Athanassakos (2009)'s study performed in Canada, showed a consistent significant value premium in both crises and recession periods. Arshanapalli & Nelson (2007), similarly found that, in the United States, value stocks consistently outperform growth stocks in down markets. They also conclude that growth stocks consistently outperform value stocks in up markets.

Additional research on the performance of value versus growth stocks may be done in other crisis periods which were not focussed on in this study for example historical bear markets and recessionary periods. This will help ascertain whether the observations remain consistent in each crisis period. Also, further studies may be done to explain the behaviour of value versus growth stocks during crisis and non-crisis periods in the South African context. Lastly, future research may be performed to ascertain whether there is any advantage in holding stocks that do not meet the definition of value and growth stocks used in this study. These would encompass stocks that form the middle 40% of the ALSI.

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Appendices

Appendix A: Sample - Value and Growth Portfolios (2007)

Large Value		Large Growth	
Ticker Symbol	**Company Name**	**Ticker Symbol**	**Company Name**
INP SJ Equity	Investec PLC	PIK SJ Equity	Pick n Pay Stores Ltd
INL SJ Equity	Investec Ltd	NTC SJ Equity	Netcare Ltd
ACL SJ Equity	ArcelorMittal South Africa Ltd	RLO SJ Equity	Reunert Ltd
EXX SJ Equity	Exxaro Resources Ltd	PPC SJ Equity	PPC Ltd
REM SJ Equity	Remgro Ltd	AMS SJ Equity	Anglo American Platinum Ltd
HAR SJ Equity	Harmony Gold Mining Co Ltd	LON SJ Equity	Lonmin PLC
SLM SJ Equity	Sanlam Ltd	IMP SJ Equity	Impala Platinum Holdings Ltd
ITU SJ Equity	Intu Properties PLC	AXL SJ Equity	African Bank/Phoenix Investments Ltd
OML SJ Equity	Old Mutual PLC	NPN SJ Equity	Naspers Ltd
		MTN SJ Equity	MTN Group Ltd
		TBS SJ Equity	Tiger Brands Ltd
		BIL SJ Equity	BHP Billiton PLC
		BVT SJ Equity	Bidvest Group Ltd/The

Medium Value		Medium Growth	
Ticker Symbol	**Company Name**	**Ticker Symbol**	**Company Name**
CAT SJ Equity	Caxton and CTP Publishers and Printers L	WHL SJ Equity	Woolworths Holdings Ltd/South Africa
TRE SJ Equity	Trencor Ltd	SPP SJ Equity	SPAR Group Ltd/The
PAP SJ Equity	Pangbourne Properties Ltd	MSM SJ Equity	Massmart Holdings Ltd
AFE SJ Equity	AECI Ltd	APN SJ Equity	Aspen Pharmacare Holdings Ltd
RCL SJ Equity	RCL Foods Ltd/South Africa	TRU SJ Equity	Truworths International Ltd
AFR SJ Equity	Afgri Ltd	NHM SJ Equity	Northam Platinum Ltd
ARI SJ Equity	African Rainbow Minerals Ltd	MRP SJ Equity	Mr Price Group Ltd
WES SJ Equity	Wesco Investments Ltd	MTX SJ Equity	Metorex Ltd
ELH SJ Equity	Ellerine Holdings Ltd	WBO SJ Equity	Wilson Bayly Holmes-Ovcon Ltd
SNT SJ Equity	Santam Ltd	MDC SJ Equity	Mediclinic International Ltd
MMI SJ Equity	MMI Holdings Ltd/South Africa		
DTC SJ Equity	DataTec Ltd		
HYP SJ Equity	Hyprop Investments Ltd		
SYC SJ Equity	Sycom Property Fund		
RDF SJ Equity	Redefine Properties Ltd		
FPT SJ Equity	Fountainhead Property Trust		
MVL SJ Equity	Mvelaphanda Resources Ltd		
NBC SJ Equity	New Bond Capital Ltd		

Small Value		Small Growth	
Ticker Symbol	**Company Name**	**Ticker Symbol**	**Company Name**
ACP SJ Equity	Acucap Properties Ltd	WEZ SJ Equity	Wesizwe Platinum Ltd
BAT SJ Equity	Brait SE	AFO SJ Equity	One Africa Ltd
PSG SJ Equity	PSG Group Ltd	CLE SJ Equity	Clientele Life Assurance Co Ltd
CMP SJ Equity	Cipla Medpro South Africa Ltd	ELD SJ Equity	Eland Platinum Holdings Ltd
ART SJ Equity	Argent Industrial Ltd	CML SJ Equity	Coronation Fund Managers Ltd
MRF SJ Equity	Merafe Resources Ltd	KGM SJ Equity	Kagiso Media Ltd
MTA SJ Equity	Metair Investments Ltd	GRF SJ Equity	Group Five Ltd/South Africa
KAP SJ Equity	KAP Industrial Holdings Ltd	DAW SJ Equity	Distribution and Warehousing Network Ltd
RES SJ Equity	Resilient REIT Ltd	CLH SJ Equity	City Lodge Hotels Ltd
IFR SJ Equity	iFour Properties Ltd	VKE SJ Equity	Vukile Property Fund Ltd
BCX SJ Equity	Business Connexion Group Ltd	TRT SJ Equity	Tourism Investment Corp Ltd
CPF SJ Equity	Capital Property Fund Ltd	ADR SJ Equity	Adcorp Holdings Ltd
SAC SJ Equity	SA Corporate Real Estate Ltd	CSB SJ Equity	Cashbuild Ltd
RAH SJ Equity	Real Africa Holdings Ltd	SNV SJ Equity	Santova Ltd
TSX SJ Equity	Trans Hex Group Ltd	CPI SJ Equity	Capitec Bank Holdings Ltd
DTA SJ Equity	Delta EMD Ltd	FBR SJ Equity	Famous Brands Ltd

Appendix B: Levene's Test for equality of variance output

Value versus (vs) Growth stocks

Value vs Growth	F	Sig.
2007	0.824	0.374
2008	0.057	0.813
2009	0.680	0.418
2011	0.701	0.411
2012	1.583	0.222
2013	3.565	0.072
Crisis Period	0.001	0.976
Post Crisis Period	0.280	0.598

Value versus Growth stocks by size

		Large Value vs Growth	Medium Value vs Growth	Small Value vs Growth
2007	F	0.108	1.067	0.430
	Sig.	0.745	0.313	0.519
2008	F	0.534	0.611	0.004
	Sig.	0.473	0.443	0.952
2009	F	1.501	0.020	1.394
	Sig.	0.233	0.889	0.250
2011	F	0.107	0.632	2.744
	Sig.	0.746	0.435	0.112
2012	F	2.298	0.010	1.812
	Sig.	0.144	0.920	0.192
2013	F	2.199	0.004	0.654
	Sig.	0.152	0.947	0.427
Crisis Period	F	0.022	0.074	0.001
	Sig.	0.882	0.786	0.972
Post Crisis Period	F	2.053	1.980	0.084
	Sig.	0.156	0.164	0.773

Appendix C: Shapiro-Wilk Test of normality results

	2007		2008		2009		2011		2012		2013	
	Statistic	Sig.	Statistic	Sig.	Statistic	Sig.	Statistic	Sig.	Statistic	Sig.	Statistic	Sig.
Value	0.904	0.181	0.929	0.370	0.844	0.031**	0.972	0.934	0.903	0.175	0.928	0.358
Growth	0.907	0.196	0.944	0.550	0.829	0.021**	0.986	0.998	0.795	0.008***	0.969	0.902
Large Value	0.899	0.153	0.935	0.442	0.971	0.917	0.950	0.640	0.935	0.436	0.948	0.603
Large Growth	0.943	0.544	0.951	0.648	0.945	0.570	0.940	0.504	0.851	0.038*	0.906	0.188
Medium Value	0.959	0.771	0.964	0.839	0.972	0.933	0.965	0.847	0.878	0.084	0.947	0.600
Medium Growth	0.945	0.563	0.956	0.731	0.912	0.224	0.952	0.668	0.971	0.917	0.933	0.412
Small Value	0.969	0.904	0.901	0.164	0.821	0.016**	0.930	0.382	0.948	0.610	0.744	0.002***
Small Growth	0.934	0.427	0.959	0.768	0.661	0.000***	0.977	0.967	0.966	0.867	0.959	0.774
ALSI	0.961	0.800	0.974	0.949	0.947	0.591	0.862	0.052**	0.874	0.074	0.967	0.875
*** significant at the 1% level				** significant at the 5% level								

	Crisis		Non crisis	
	Statistic	Sig.	Statistic	Sig.
Value	0.921	0.013***	0.975	0.582
Growth	0.904	0.004***	0.964	0.276
Large Value	0.980	0.739	0.969	0.390
Large Growth	0.922	0.014***	0.970	0.415
Medium Value	0.975	0.572	0.964	0.292
Medium Growth	0.940	0.051**	0.980	0.730
Small Value	0.934	0.034**	0.976	0.597
Small Growth	0.927	0.021**	0.985	0.906
ALSI	0.961	0.234	0.971	0.442
*** significant at the 1% level **significant at the 5% level				

Appendix D: Mann-Whitney U Test results

Year	Portfolio	Mean Rank	Portfolio	Mean Rank	U Value	Significance
2009	Value	13.00	Growth	12.00	66.00	0.755
2009	Small Value	14.17	Small Growth	10.83	52.00	0.266
2012	Value	9.08	Growth	15.92	31.00	0.017**
2012	Large Value	12.42	Large Growth	12.58	71.00	0.977
2013	Small Value	11.67	Small Growth	13.33	62.00	0.590
Crisis	Value	36.72	Growth	36.28	640.00	0.928
Crisis	Large Value	36.14	Large Growth	36.86	635.00	0.884
Crisis	Medium Value	36.5	Medium Growth	36.5	648.00	1.000
Crisis	Small Value	37.39	Small Growth	35.61	616.00	0.719
** significant at the 5% level						

Appendix E: Regression Analysis output

Crisis Period

Dependent Variable: Value Stocks

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.002	0.007		-0.339	0.737
AlSI Returns	0.729	0.114	0.739	6.400	0.000

Dependent Variable: Growth Stocks

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.004	0.005		-0.708	0.483
ALSI Returns	0.779	0.090	0.830	8.687	0.000

Non-Crisis Period

Dependent Variable: Value Stocks

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	-0.001	0.003		-0.351	0.728
ALSI Returns	0.571	0.088	0.743	6.472	0.000

Dependent Variable: Growth Stocks

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	0.008	0.003		2.487	0.018
ALSI Returns	0.459	0.089	0.663	5.160	0.000