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Dividend yield as a superior investment strategy

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Abstract

Individual investors and professional fund managers who deploy capital into equity markets are looking to achieve investment returns that outperform the general market. In order to achieve this, the ability to identify and implement strategies and trading rules that are consistently able to outperform the market is critical. It is against this backdrop that this study will attempt to determine whether a trading strategy based on dividend yield can be used to outperform the general market in South Africa. Specifically, this study proposes to test a dividend yield strategy to create portfolios based on historical data on the JSE, and test whether these portfolios have outperformed the JSE Top 40 Index over the period of the study between 2004 and 2012, after adjusting for risk and taxes. This study will also further test whether high yield portfolios outperform low yield portfolios over the same period on the JSE. These trading strategies have proven to be successful in other markets by Dimson *et al*. (2011) and Visscher and Filbeck, (2003), and this study aims to investigate whether the same holds in South Africa.

Keywords:

Dividend yield, JSE, investment strategy

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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Rashaad Fakir

11 November 2013

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1.1 Research Title

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1.2.1 Background and context

Investing in equity markets is both a rewarding and risky proposition for anyone looking for a place to invest their money.

Individual investors and professional fund managers who deploy capital into equity markets are looking to achieve investment returns that outperform the general market. In order to achieve this, the ability to identify and implement strategies and trading rules that are consistently able to outperform the market is critical.

This task is not one that is easily achieved, and it is extremely challenging for a unit trust manager to beat the JSE ALSI Index consistently over a period of time.

This has implications not only for the wealthy in society, but for every working person who has some sort of pension fund or investment scheme that will be relied upon in the event of retirement or retrenchment. The risk of underperformance of pension funds also has the potential to add an extra burden on the already stretched resources of the state by creating more pensioners dependant on state resources. The Telegraph (2012) reports that in the UK, just 3 out of the 20 largest pension funds have beaten the market over the past decade.

The search for yield is even more critical today due to the response by governments to the 2008 financial crises, which has driven interest rates to historically low levels. While this is great for those looking to borrow money, for savers, the equity market is the only alternative to achieve respectable returns in a low interest rate environment (Financial Times, 2013).

It is against this backdrop that this study will attempt to determine whether a trading strategy based on dividend yield can be used to outperform the general market in South Africa. Specifically, this study proposes to test a dividend yield strategy to

create portfolios based on historical data on the JSE, and test whether these portfolios have outperformed the JSE Top 40 Index over the period of the study between 2004 and 2012, after adjusting for risk and taxes. This study will also further test whether high yield portfolios outperform low yield portfolios over the period of the study on the JSE.

These trading strategies have proven to be successful in other markets by Dimson *et al*. (2011) and Visscher and Filbeck, (2003), and this study aims to investigate whether the same holds in South Africa.

1.2.2 Motivation for research and problem identification

Dividends should not matter in the valuation of a company and investors should be indifferent as to the dividend payout policy of any listed company (Miller and Modigliani, 1961). In their now classic theory Miller and Modigliani (1961) stated that under the conditions of a.) perfect capital markets, b.) rational behaviour and c.) perfect certainty, a firm's dividend policy was irrelevant to its current market valuation. The value of a firm was determined by its earning power and Miller and Modigliani (1961) argued that dividend policy had no impact on the wealth of the investor.

Miller and Modigliani (1961) further stated that an investor, who was looking for cash in the form of dividends, was able to sell shares in a company that paid no dividends, and was able to achieve the same outcome as if the company had paid the dividend. Since dividends had no affect either on the value of a company or to the returns of investors, using a dividend yield strategy should not enable the investor to outperform the market in producing abnormal returns (Miller and Modigliani, 1961).

Dimson *et al*. (2011), doing research for Credit Suisse, found that despite the arguments of Miller and Modigliani (1961), US researches had documented a return premium associated with stock portfolios that had an above average dividend yield.

Dimson *et al*. (2011) cited the most up to date US analysis done by Professor Kenneth French (2010), which demonstrated superior performance of a high dividend yield strategy between 1927 and 2010. This result was in the context of a developed economy which is structurally different to emerging economies. This study will aim to determine whether this relationship exists in the South African market and

whether the dividend yield strategy can add value to practitioners of this strategy in South Africa.

French (2010) created portfolios using dividend yield at the beginning of year, and ranked the stocks in the categories as shown below to create the portfolios:

I. highest 30%,
II. middle 40%,
III. lowest 30%,
IV. zero dividend yield.

The results were returns of I.) 11.2%, II.) 10.3%, III.) 9.1%, and IV.) 8.4% per annum respectively which demonstrated superior returns based on dividend yield.

Dimson *et al*. (2002), also documented the dividend yield effect in the longest study of its kind, which took 111 years of data using the largest 100 UK shares and ranked them by their dividend yield at the beginning of the year. The shares were subsequently divided into two portfolios, a 50:50 split into a high yield, and a low yield portfolio.

The return was then calculated for each portfolio over the following year, and the procedure was repeated for each of the 111 years. The results of this analysis showed that an investment of GBP 1 in the low yield portfolio in 1900 would have grown to GBP 5 122 by the end of 2010, an annualised return of 8.0%. The same investment placed in the high yield portfolio would have grown to GBP 100 160 at an annualised rate of 10.9%, which was a 20 times greater than the low yield portfolio.

Despite the fact that the investment horizon of 111 years was not reflective of the investment horizon of the average investor, the difference in returns was large enough to warrant further investigation as to whether such a strategy in the South African context could generate superior returns for investors. To the best of the researcher's knowledge, no peer reviewed study has been conducted in South Africa to establish whether this relationship holds on the Johannesburg Stock Exchange.

Dimson *et al*. (2002), similarly demonstrated the dividend yield effect in a further 20 countries, using data from 1975 to 2010, representing 36 years of data where high dividend yielding portfolios outperformed low dividend yielding portfolios over the

period of study. The one exception was New Zealand, where the low dividend yield portfolio outperformed the high dividend yield portfolio which the authors ascribed to the low number of stocks sampled (20), and the fact that New Zealand was a very small market. The evidence above focused on comparing high dividend yield portfolios versus low dividend yield portfolios, without specifically benchmarking the returns observed to any specific index or rate of return (Dimson *et al*. 2002).

In an article published by the Wall Street Journal in August 1988, Slatter (1988) first demonstrated that the 10 highest yielding stocks on the Dow Jones Industrial Average (DJIA) outperformed the DJIA index with returns of 18.4% and 10.8% respectively. This strategy later became known as the “Dogs of the Dow” strategy (Rinne & Vähämaa, 2011).

The DJIA is a major index that is used as a proxy for returns on the New York Stock Exchange, and is a common benchmark that is used to determine whether a portfolio is achieving superior returns as compared to the market (Slatter, 1988).

Rinne & Vähämaa (2011) state that the first peer reviewed academic study of the effect demonstrated by Slatter (1988), was published almost 10 years after Slatter’s (1988) article appeared in the Wall Street Journal. In this study, McQueen *et al*. (1997) investigated whether a dividend yield portfolio that was selected using the top 10 dividend yield stocks of the DJIA produced superior returns against all 30 stocks in the DJIA.

McQueen *et al*. (1997) went further and adjusted the dividend yield portfolio for factors such as risk, transaction costs and taxes, as the authors questioned whether any superior performance if found, would still be evident after these adjustments were made. The authors used data from 1946 to 1995, which represented almost 50 years of observations to determine if any superior performance could be found using the dividend yield portfolio.

The method used was to create equally weighted Dow 10 and Dow 30 portfolios at the beginning of the year, and hold them for the entire year. The Dow 10 portfolio would be rebalanced each year, and the Dow 30 would be rebalanced only if stocks fell out of the DJIA, and were replaced by others.

McQueen *et al*. (1997) found that during the period of study, the Dow 10 portfolio outperformed the Dow 30 portfolio by 300 basis points. The Dow 10 portfolio was unequivocally superior to the benchmark of the Dow 30 portfolio; however the picture changed somewhat when adjustments were made for risk, transaction costs and taxes.

When these adjustments were taken into account, the authors found that the Dow 10 portfolio outperformed the Dow 30 portfolio only during certain sub periods. They concluded that although statistically the Dow 10 portfolio was significantly superior to the Dow 30 portfolio, the Dow 10 portfolio had higher risk (less diversification with higher standard deviation), higher transaction costs (30% portfolio turnover rate), and was subject to higher taxes(dividends taxed at a higher rate than capital gains). The reason for the higher risk was that the smaller number of shares in the portfolio did not fully diversify unsystematic risk and the higher transaction costs were associated with the annual rebalancing of the portfolio. Thus the authors were unable to definitively say that the dividend yield strategy outperformed the market as a general rule (McQueen *et al.* 1997).

Visscher and Filbeck (2003) undertook a similar study on the Canadian stock market and applied the high dividend yield strategy to the Toronto 35 index for the first 10 years of the index's existence between 1987 and 1997. The index was designed to largely track the broader Toronto Stock Exchange (TSE) 300 and represented a proxy for the returns on the Canadian stock market. The authors also adjusted the portfolios for risk and taxes, to mirror the earlier study by McQueen *et al*. (1997).

Visscher and Filbeck (2003) concluded that the high dividend yield strategy based on the Toronto 35 index produced superior investment returns during the first 10 years of the index's existence. The higher compound returns associated with the top 10 portfolio was enough to compensate for the effect of higher transaction costs and higher taxes. The authors found that the top 10 portfolio beat the Toronto 35 index even when taking these costs into account.

Visscher and Filbeck (2003) more importantly showed that even on a risk adjusted basis, the top 10 portfolio still outperformed the broader index. The authors concluded that a dividend yield strategy on the Canadian stock market was indeed a superior investment strategy during the period under review. The results of this study

provided a more definitive answer than the one by McQueen *et al*. (1997), and provided stronger support in favour of the dividend yield strategy.

Da Silva (2001) studied the dividend yield strategy across the Latin American equity markets of Argentina, Brazil, Chile, Columbia, Mexico, Peru and Venezuela over the period from 1994 to 1999. All the countries studied were emerging market economies some of whom have similarities to South Africa. The conclusion reached was that there was some evidence that the dividend yield strategy outperformed the market in all the countries except Brazil for the period under investigation. However the author found that the superior returns of the strategy was not statistically significant in most of the countries and was therefore unable to justify the claim of superior performance based on dividend yield.

Brzeszczyński and Gajdka (2008), in a study of the Polish stock market and Rinne & Vähämaa (2011), in a study of the Finnish stock market also documented evidence in favour of superior returns in comparison to the respective market indices by applying the dividend yield strategy. Both studies found that the superior returns achieved were statistically significant although transaction costs had the potential to limit the extent of the returns in the real world.

Rinne & Vähämaa (2011) however questioned whether the superior performance documented was likely to survive transaction costs and higher taxation in Finland, and postulated that the superior performance might be due to the winner-loser effect. The winner-loser effect was the finding that winners in one period tend to be to losers in the next period and losers in one period tend to be winners in the next period (De Bondt and Thaler, 1987). This effect was one of mean reversion, whereby the prices of under- or over-valued securities self correct towards the intrinsic mean value (Rinne & Vähämaa, 2011).

The evidence while slanted in favour of the dividend yield strategy was mixed, with some studies documenting a definite advantage of dividend yield portfolios, while others were a little more reserved and cautious about drawing firm conclusions.

While finance theory states that dividends should be irrelevant in making investment decisions, the evidence seemed to contradict this to some extent.

1.3 Research Aim

The aim of this research is to determine whether a dividend yield strategy such as that first employed by McQueen *et al*. (1997) and others, has the ability to produce superior portfolio returns as compared to the JSE Top 40 Index in the South African stock market. The JSE Top 40 Index is to be used as this index is made up of the 40 largest companies on the JSE and is the index most comparable to the Dow index as used in the Mcqueen *et al*. (1997) study. This research will also attempt to adjust the dividend yield portfolios by taking into account the effect of risk, and taxes to determine whether superior returns, if found are able to persist after these factors are accounted for.

Superior returns are defined as portfolio performance that is able to beat the JSE Top 40 Index mean return for the period being studied. The portfolio return would have to be adjusted for risk and taxes to enable a true comparison so as not to falsely find evidence in favour of superior return, when the return observed is merely a compensation for higher risk.

This research will also assess whether the findings of Dimson *et al*. (2002), are applicable in the South African stock market. The analysis will split the shares on the JSE ALSI into a high and low yield portfolio, and compare the returns to determine whether there is any statistical evidence in favour of superior performance. The JSE ALSI is composed of approximately 160 shares which together accounts for about 99% of the market cap of all shares listed on the JSE (Ward and Muller, 2012).

The ability for investors and professional fund managers to apply a relatively simple strategy in order to achieve superior returns is a very appealing concept. In the South African context an investment strategy that has the potential to provide both capital growth and dividend income while outperforming the general market is of interest to pension funds and individual investors alike.

The author is unaware of any peer reviewed studies that have attempted to demonstrate whether the results of Mcqueen *et al*. (1997), and Dimson *et al*. (2002), are applicable to shares on the JSE. Finding evidence either for or against the applicability of these results in the South African context can add value to the body of knowledge surrounding the practice of using dividend yield as an investment strategy and can provide evidence for use in its practical application.

1.4 Research Scope

The scope of this research is limited to shares traded on the Johannesburg Stock Exchange (JSE). This research is based on previous studies of the dividend yield phenomenon, and this has informed the criteria used in determining the appropriate sample to use on the JSE.

The first part of this study will use all the shares in the JSE ALSI (approximately 160 currently) and divide them in the beginning of each year of the study into high and low yield portfolios.

The second part of the study will use the top 10 dividend yield stocks from the JSE Top 40 Index at the beginning of each year of the period under investigation to create the dividend yield portfolio.

The period of study will be from 2004 to 2012 representing nine years of data sourced from the McGregor BFA database. The McGregor BFA database is a source of secondary data, and the data for the last 10 years is available. This time period was used by Visscher and Filbeck, (2003) and others successfully, and is long enough to determine whether the yield effect exists under the period of review.

2 Literature Review

2.1 Introduction

The literature lays the basis for the theoretical underpinning of this research, and addresses dividends from the conceptual viewpoint of capital structure and payout policies, to the practical application of using dividend yield as a trading strategy. The linkage between dividends as a company decision and using dividends as a trading strategy is shown to be one of sound fundamentals, and not an arbitrary strategy without justification. The literature provides clues as to why such a strategy could be successful, and provides a plausible framework on which to base such a strategy.

2.2 History of the Dividend Puzzle

The dividend puzzle has been a topic of debate ever since Miller and Modigliani (1961) declared that dividends were irrelevant in the valuation of a firm, and that a firm's valuation was only dependant on its ability to generate income. The argument was that the ability of a firm's assets to create revenue was what created value and not the way the firm chose to distribute its income (Miller and Modigliani, 1961).

Miller and Modigliani (1961) also stated that a firm's dividend policy had no impact on investor wealth irrespective of how well thought out the dividend policy was. Investors were able to achieve the same effect of a dividend payout themselves by selling shares and thus should be indifferent as to a firm's policy.

Black (1976) proclaimed dividends to be a puzzle. He questioned why firms paid dividends and why investors paid attention to dividends in light of the theory that dividends were irrelevant. The paper showed that in many cases, investors were worse off after receiving a dividend as dividends were taxed at a higher rate than capital gains. Firms were also worse off as they had to secure outside capital to fund investment while at the same time paying a dividend. Denis and Osobov (2008) also found that dividends were tax inefficient, and that investors were worse off after having received dividends.

Consensus regarding the dividend puzzle has not been reached even though Miller and Modigliani's (1961) theory has formed the foundation of modern corporate finance theory (DeAngelo and DeAngelo, 2006).

2.3 Are Dividends Disappearing?

The argument that dividends are irrelevant and that at best, investors should be indifferent about dividends should have encouraged firms to stop paying dividends or decrease dividends (Fama and French, 2001). This is because when taxation and outside financial funding was taken into consideration, investors and companies were in many cases at a disadvantage when companies paid dividends (Black, 1976).

Following this logic, the amount of firms paying dividends should be in decline, and dividend paying firms should disappear altogether in the long term if the theory is an accurate reflection of reality (Black, 1976). Baker and Wurgler (2004a) also asserted that the amount of dividend paying firms should be in decline and undertook a study to determine if this was indeed the case. The authors found that post 1977, the amount of dividend paying firms fell by more than 50%. However, Baker and Wurgler (2004a) also found that during the mid 1960's the amount of dividend paying firms increased. The authors postulated a reason for the fluctuation in dividend paying firms, and argued that dividends tended to disappear when there was a boom in growth stocks and tended to reappear after these growth stocks crashed.

Fama and French (2001) undertook a long term study of listed companies and the percentage of dividend paying firms between the years 1926 and 1999. The study focused particularly on the period after 1972. The data covered companies on the New York Stock Exchange (NYSE), the National Association of Securities Dealers Automated Quotations (NASDAQ), and the American Stock Exchange (AMEX).

Fama and French (2001) found that dividend paying firms were indeed in decline, and reported that in 1973, 52.8% of companies paid dividends which rose to a peak of 66.5% in 1978. However after 1978, the percentage of dividend paying firms fell significantly, and that by 1999, only 20.8% of firms paid dividends.

In the trying to understand the reason for the decline, Fama and French (2001) asked three questions:

I. What were the characteristics of dividend paying firms?
II. Was the decline in dividend paying firms due to a decline in the number of firms with these characteristics?

III. Had firms with the characteristics of dividend paying firms become less likely to pay dividends?

Fama and French (2001) found that dividend payers were more profitable than non dividend payers, that dividend payers invested less in R & D, and that dividend payers were on average 10 times as large as non dividend payers. They further found that the decline in the percentage of firms paying dividends after 1978 was partly due to new listings having the characteristics of firms that had never paid dividends, namely low earnings, high investments and small size. Finally and more importantly they found that firms had become less likely to pay dividends, regardless of their characteristics.

The findings lend some credibility to the theory of Miller and Modigliani (1961), with the percentage of firms paying dividends falling and more importantly, that firms have generally become less likely to pay dividends regardless of any characteristics. However not everyone was convinced, and further studies were done to determine whether Fama and French (2001) were correct in their assessment.

DeAngelo *et al*. (2004) countered the argument made by Fama and French (2001), and argued that the reduction in firms that paid dividends occurred almost entirely in firms that paid very small dividends. DeAngelo *et al*. (2004) also found that dividends among the larger firms actually increased in real and nominal terms. The authors went on to show that the largest dividend paying firms made up the vast majority of total dividends paid by all firms, and that the reduction in small firms that paid dividends had a negligible impact on the overall dividends paid in absolute terms.

DeAngelo *et al*. (2004) made the point that although a transformation was happening with regards to dividends, they were not disappearing. The authors came to the conclusion that dividends were becoming increasingly concentrated among high earning firms, with top earners exhibiting a strong tendency to pay dividends. The concentration of earning power and dividend payouts was highlighted by the finding that despite dividend paying firms reducing by such a large percentage between 1978 and 2000, aggregate dividends paid by industrial firms actually increased over that period in both nominal and real terms (by 224.5% and 22.7% respectively) (DeAngelo *et al*. 2004).

DeAngelo and DeAngelo (2006) went a step further and stated that Miller and Modigliani's (1961) theory of the irrelevance of dividends was itself irrelevant because its assumptions forced a 100% payout of free cash flow (FCF) in every period, which artificially constrained the feasible set of optimal policies. When these assumptions were relaxed, the authors found that payout policy (dividend yield) mattered, and that investment policy was not the only factor that determined value (DeAngelo and DeAngelo, 2006).

The evidence suggests that dividend paying firms are certainly in decline as a percentage of total listed equities. However this finding is not evidence that dividends are disappearing, as the large majority of firms that do not pay dividends are small companies that are in the growth phase with high investment needs. Amongst larger companies, dividends have increased which suggests that as companies become more profitable, they initiate dividend payments if they previously had not done so.

2.4 Why do Companies Pay Dividends?

The preceding discussion showed that while dividends had declined in the number of firms paying them, it also showed that highly profitable firms continued to pay dividends and furthermore had been increasing their dividend payouts (DeAngelo *et al*. 2004). If dividends were irrelevant, why were so many highly profitable firms still paying dividends?

Brav *et al*. (2005) conducted research with 384 financial executives in the US to determine the factors that drove dividend policy. The authors identified various factors in previous research that influenced firms in paying dividends, and set out to assess the importance of each of these factors. The factors that were identified are listed below:

I. Taxes
II. Clienteles
III. Agency Conflicts and Discipline
IV. Information and Signalling
V. Asymmetric Information

Brav *et al*. (2005) found that the clientele factor was important in determining dividend policy, and half of CFOs believed that paying dividends was important in

attracting retail investors into buying their stock. The authors also found and, contrary to other studies, that institutional investors did not have a stronger preference for dividends, and that dividends were paid mainly to cater to retail investors. This was a major reason given as to why companies paid dividends, and companies were more likely to pay dividends if management believed that attracting retail investors was important to the company.

Baker and Wurgler (2004b) also found that the clientele effect was a significant factor in the reason for firms to pay dividends. Baker and Wurgler (2004b) called this the catering theory of dividends in that firms gave investors what they wanted and catered to investors' wishes for dividends to be paid. The payment of dividends were more pronounced when investors placed a premium on dividend paying shares and declined when investors' preferred growth shares (Baker and Wurgler, 2004b).

Brav *et al*. (2005) also found that dividends conveyed information to investors, and that 80% of executives believed this to be true. The authors found that dividend payments conveyed information about management's confidence in the future prospects of the company. The findings showed that the perceived information conveyed related to the future earnings of the company and that dividends also helped to resolve uncertainty about a stocks risk.

Fuller and Goldstein (2011) support the information theory of dividends in a study of whether dividends mattered more in declining markets. The authors found that dividends do indeed matter more in declining markets evidenced by the fact that dividend payers outperformed non-dividend payers in declining markets. Fuller and Goldstein (2011) concluded that the information conveyed by a strong dividend payout policy gave the market reassurance that the company was financially strong and that management were confident in the future prospects of the company.

Brav *et al*. (2005) also found that asymmetric information between management and investors made firms less likely to cut dividends, as any attempt to do so might have conveyed information to investors that management had lost confidence or foresaw problems in the future, information which investors were not privy to.

Denis and Osobov (2008) found that firms pay dividends based on the life cycle theory of dividend payment. The authors found that as firms' mature, which was

determined by a greater earned than contributed equity, the propensity to pay dividends increased. The findings also showed that dividend payers tended to be larger, more profitable, and more successful companies and, that dividend payers made up 90% of the market capitalisation of the exchanges in the countries studied (US, Canada, UK, Germany, France, and Japan) (Denis and Osobov, 2008).

This view was consistent with the information theory of dividend payments, as a firm that paid dividends conveyed information to the market that they were a part of the club of companies that were successful enough to pay dividends and fund their internal needs based on the confidence of future earnings (Brav *et al.* 2005).

Grullon *et al*. (2002) supported the maturity theory and stated that as a firm moved from the growth phase to a more mature phase, dividend payouts increased as the number of positive Net Present Value (NPV) projects decreased within the company. Grullon *et al*. (2002) found that mature firms returned cash to shareholders as they were not able to invest the cash reserves at a rate greater than the cost of capital. The authors explained that management would be destroying value by investing in projects with low returns and the best alternative was to return the cash reserves to the shareholders.

While dividends might be irrelevant under the assumption of perfect markets and rational behaviour, markets are far from perfect and human beings are far from rational. Information is not available equally to all market participants and this asymmetry of information is highlighted by Brav *et al*. (2005) and Fuller and Goldstein (2011) in their findings around the information content of dividend payments.

Despite the claim that dividends should be irrelevant, firms continued to pay dividends with various reasons cited for this practice. The idea that dividends convey information to the market that was not otherwise available to individual investors is likely to persist into the future, and dividends are unlikely to completely disappear particularly amongst mature and highly profitable companies.

2.5 Can Dividend Yield Predict Stock Returns?

The observation that the largest and most profitable companies paid dividends, begged the question whether dividend yield was able to predict returns on the stock market.

Fama and French (1988) investigated using dividend yield to forecast returns on the value- and equal-weighted portfolios of NYSE stocks with return horizons from one month to four years. The authors found that over the short term, dividend yield was not able to predict returns and this finding was consistent with previous research of Fama and Schwert (1977), Fama (1981), Keim and Stambaugh (1986), and French, *et al*. (1987). These studies showed that the predictable component of returns was a small percentage of total returns over the short term.

Over the long term, Fama and French (1988) found that a significant portion of returns could be explained by dividend yield when using a regression model. The authors explained that this result was not necessarily because of the predictive power of dividend yields, and offered an explanation as to their findings. Fama and French (1988) explained that high autocorrelation caused the variance of expected returns, measured by the fitted values in the regression of returns on dividend yields, to grow faster than the return horizon and this was the reason that dividend yield appeared to have predictive power over returns. Autocorrelation of returns was the tendency for successive return observations to be similar as a function of time hence increasing the predictable component of returns based on a previous value (Fama and French 1988). Fama and French (1988) found that dividend yield explained more than 25% of return variances over two to four years.

The findings of Fama and French (1988) prompted further research, with both Campbell and Shiller (1988) and Nelson and Kim (1993) corroborating the findings of Fama and French (1988). These studies provided further support for dividend yields ability to predict returns.

Wolf (2000) argued that the findings of the previous studies cited above had several statistical problems, and named strong dependency structures and bias in the estimation of regression coefficients' as two of the more serious ones. The author applied a new statistical method called subsampling developed by Politis and Romano (1994) to correct for these errors, and analysed the same data with the new

method. This method had been shown to give better results than the method used by Fama and French (1988) under very weak conditions including those of dependency and heteroscedasticity. Wolf (2000) concluded that after these corrections, no case for the predictability of stock returns from dividend yields could be made.

Lewellen (2004) attacked the correction methods as employed by Wolf (2000) and others, and claimed that these methods understated the forecasting power of dividend yields. The author found that when these underestimations were corrected, dividend yield had power to predict returns not only in the long run as previously documented, but more importantly in the short run as well.

Ang and Bekaert (2006) found that dividend yield was able to predict returns in the short run but that dividend yield had no predictive power in the long run. This finding was the opposite of that of Fama and French (1988) , Campbell and Shiller (1988) and Nelson and Kim (1993). Ang and Bekaert (2006) concluded that in the long run, the predictive power of dividend yield was not statistically significant and not robust across countries or different time periods.

Goyal and Welch (2003) found that dividend yield had no predictive ability, and the authors stated that dividend yield only had the ability to forecast themselves. Goyal and Welch (2003) concluded humorously that a naive trader who used past returns as a guide to future returns would be able to "predict" returns better than a trader that used dividend yield to predict the same.

The evidence both for and against the predictive ability of dividend yield and stock returns was mixed, with argument and counter argument observed in the academic literature. The ability to predict returns based on dividend yield seems uncertain. However there exists evidence that dividends convey significant information about a firm, and that returns in the long run can be predicted, at least in part by dividend yield.

2.6 Can High Dividend Yield Portfolios Outperform the Market?

Dimson *et al*. (2011) looked at dividend yield from an investor and money manager perspective, and used it as a criterion to construct investment portfolios in order to assess whether portfolios formed using a high dividend yield strategy, outperformed portfolios formed on a low dividend yield. The authors looked at the top 100 UK

shares and divided them equally into high yield and low yield portfolios based on a ranking of their dividend yield. The authors found striking evidence of the superiority of dividend yield as a strategy, and reported that the high dividend yield portfolio outperformed the low dividend yield portfolio by 20 times over the 111 years of the study.

A replication of this study in a further 20 countries by Dimson *et al*. (2011) revealed that the high yield portfolio showed an average premium of 4.4% across the study period of 1975 to 2010. Even more striking, over a shorter period, between 2000 and 2011, the authors found this premium more than doubled to an average of 9.1%.

Dimson *et al*. (2011) offered possible explanations for this finding. The first was that dividend yield as a strategy could be a manifestation of the value effect. The authors defined value stocks as those that sold for relatively low multiples of earnings or some other fundamental variable such as book value. The fact that these stocks had a high dividend yield in the first place could be because they were undervalued by the market. Thus the superior returns were achieved because dividend yield was able to be used as a proxy in identifying undervalued shares (Dimson *et al*. 2011)

The other possibility considered was that the outperformance could have simply been a reward for taking on greater risk (Dimson *et al*. (2011), and that a portfolio of high dividend stocks was inherently riskier than one of low dividend paying stocks. This however was in contradiction to Brav *et al*. (2005) who argued that investors perceived high dividend paying stocks as being less risky.

The evidence that high yield portfolios substantially outperformed low yield portfolios was strong, and this finding was further corroborated by French (2010) in a study of US stocks between 1927 and 2010.

Slatter (1988) introduced the trading concept later popularly known as the “Dogs of the Dow” (DoD) strategy, which advocated using the 10 highest yielding stocks of the DJIA to form portfolios that would outperform the market index. In contrast to the strategy of comparing high yield and low yield portfolios to each other, Slatter’s (1988) strategy compared the returns of a high dividend yield strategy to a market index which was used as a benchmark in order to demonstrate the superior performance of the strategy.

McQueen *et al*. (1997) tested this theory and in addition, adjusted the top 10 portfolio for risk, taxes and transaction costs in order to determine if any superior performance would still be evident after these factors were accounted for.

The authors found that the top 10 portfolio outperformed the DJIA statistically. However when the top 10 portfolio was adjusted for risk and transaction costs, the superior performance disappeared in all but a few sub periods.

Visscher and Filbeck, (2003) studied this strategy on the Canadian stock exchange, and found more convincing evidence for the ability of this strategy to create superior returns. They found that even after adjusting for risk and transaction costs, the performance of the high dividend yield strategy was still superior to the market index.

Da Silva (2001) however found different results in a broad study of several Latin American markets, where some evidence that the dividend yield strategy was able to add value was found, but the conclusion was that the statistical evidence was not strong enough to justify the claim of superior performance. The short period of investigation for this study should be noted, which was only between 1994 and 1999 and could explain the lack of significant statistical evidence found. The time period would have been too short to allow the effects of the dividend distribution to compound the returns by reinvestment of the dividend (Dimson *et al*. 2011). Dimson *et al.* (2011) noted that dividend yield affected long term returns more than short term returns.

Brzeszczyński and Gajdka, (2008) conducted a study in Poland using 10 years of data and reported that the superior performance of the strategy was large and that the annual return of the dividend yield portfolio was twice as large as the market index. The authors also found that over shorter periods the results were not as strong, and concluded that the strategy was suited to a longer term investment horizon.

A Finnish study by Rinne & Vähämaa (2011) showed a cumulative return of 817% for the top 10 portfolio versus a cumulative return of 243% on the market index. The superior performance was still evident after adjusting for risk and the authors stated that the performance could not be attributed to the portfolios being more risky with the returns attributed to the reward for a more risky portfolio. Rinne & Vähämaa

(2011) however expressed some reservations and noted that higher dividend taxes might have eroded the performance.

The evidence presented has a definite slant in favour of a high dividend yield strategy being able to outperform the market both before and after adjustments for risk and taxes. However the evidence is not overwhelming or unequivocal and whether this strategy can yield superior performance in a South African context is not certain. While there is evidence for nominal superior performance, the adjustments made for risk and taxes erode the superior performance in some studies.

2.7 Why do High Dividend Yield Portfolios Outperform?

While the literature on the ability of a high dividend yield strategy to outperform the market is not unanimous, there is evidence to suggest that such a strategy does indeed have some value as a portfolio selection tool. Several explanations were considered by various researchers, and a brief list of these is given below, each of which will be discussed in more detail:

I. Outperformance as a consequence of increased risk
II. Outperformance as a consequence of taxation policy
III. Outperformance as a consequence of the value effect
IV. Outperformance as a consequence of market inefficiency

2.7.1 Outperformance as a Consequence of Increased Risk

Dimson *et al*. (2011) considered the possibility that the reason for the outperformance of high dividend yield portfolios in their research, was that high dividend yield portfolios were inherently riskier than low dividend yield portfolios. The authors stated that the plausibility of this argument was based on the logic that high dividend yield stocks were often value stocks, which theoretically had a higher possibility of being distressed companies. Thus the increased return of high dividend yield portfolios was simply the reward for accepting higher risk.

Dimson *et al*. (2011) analysed the portfolios of high yield portfolios in all 21 countries of their study, but the authors could not find any evidence that the high yield portfolios were riskier than the low yield portfolios. The authors found that the standard deviation of the high yield portfolio was also only marginally higher than that of the market, and that compared to the low yield portfolios, the high yield

portfolios were actually less risky. After having considered risk as a reason for the superior performance, Dimson *et al*. (2011) did not find any evidence to support this theory, and concluded that increased risk was not the reason for the superior performance.

2.7.2 Outperformance as a Consequence of Taxation Policy

Dimson *et al*. (2011) also considered the possibility that taxation policy with regards to dividends were the reason that high dividend yield portfolios were able to achieve superior performance. The argument was counterintuitive in that unfavourable taxation policies on dividends caused high dividend yield stocks to trade at depressed values relative to intrinsic value, and that the outperformance of high dividend yield portfolios was as the result of the market correcting for these depressed values over time.

The authors however doubted whether the premium seen could solely be attributed to taxation, but acknowledged it was a possibility that could not be discounted. This argument in the South African context would be harder to make in a retrospective study, as a dividend tax was only introduced in South Africa in 2012, and was effective from the 1 April 2012. Thus high dividend yield shares would not have traded at depressed prices relative to intrinsic value due to taxation policy alone, although going forward this could be a reason that is of more relevance in South Africa.

2.7.3 Outperformance as a Consequence of The Value Effect

Arnott *et al*. (2009) studied the value effect, and defined the value effect as simply the tendency for value shares to outperform the market. Value shares were defined by Arnott *et al*. (2009) as those shares that were out of favour and traded below intrinsic value as measured by below average valuation multiples. The authors proposed that investors bid up the price of so called “growth stocks”, those which were presumed to have extreme growth potential, to unrealistic levels. Conversely, value stocks were ignored, and the value of these shares are depressed to levels below intrinsic value.

Arnott *et al*. (2009) found that although the market correctly indentified “growth stocks”, investors had substantially overpaid for this growth and the subsequent returns on these shares was below average. Growth shares typically had low

dividend yields, as companies in the growth phase of the maturity curve, needed all the cash available to them to fund their growth.

In contrast, high dividend yield shares were typically more mature companies, and generated little investor excitement which caused depressed prices relative to intrinsic value. This was one reason why high dividend yield portfolios outperformed low dividend yield portfolios as found by Dimson *et al*. (2011).

Piotroski (2000) also found that value shares tended to outperform the market and proposed that a value portfolio could increase the expected return of a portfolio by 7.5% annually. The author however did not purport to identify the optimal method for identifying value shares, and conceded that the results in the study could have been achieved because of a data snooping bias.

2.7.4 Outperformance as a Consequence of Market Inefficiency

Siegel (2006) argued that contrary to the efficient market hypothesis, numerous studies had shown anomalies existed, which enabled investors to outperform the market. The efficient market hypothesis stated that stock market prices incorporated all available data and priced securities fairly, and that investors could not systematically outperform the market (Siegel, 2006)

Siegel (2006) amusingly stated that the efficient market hypothesis, which was the dominant view held by financial practitioners for decades and still is today, was akin to the Ptolemaic view of the universe which held the earth to be the centre of the universe. He proposed that a new paradigm was needed to explain why small and value stocks outperformed the market, when the efficient market hypothesis stated that this was not possible.

Siegel's (2006) new paradigm argued that current prices were not the best estimate of intrinsic value, and that the prices of securities were subjected to temporary shocks. These shocks were caused by speculators and institutions, which often bought or sold stocks for reasons other than intrinsic value. These temporary shocks obscured the true value of securities, and were called noise. Siegel (2006) called this paradigm, the "noisy market hypothesis".

The "noisy market hypothesis" explained anomalies in that if a share was underpriced for reasons other than fundamental value, choosing a portfolio of these

shares would likely outperform the market (Siegel, 2006). The author went further and advised using dividend or dividend yield as tool in evaluating whether a share was undervalued. Dividend yield thus serves as a proxy for undervalued shares, and the reason for the outperformance was that the market corrects for the under pricing in the medium to long term, which leads to outperformance versus the market.

2.8 Conclusion

The literature review has built up the theory of why dividends should be irrelevant in firm valuation and by extension share returns. The valuation of a firm is dependent on its earning potential, and not the manner in which it chooses to finance itself, or distribute profits.

It has been shown that in the presence of taxes, investors are actually less well off after having received a dividend. The fact that firms still paid dividends is referred to as the dividend puzzle.

Despite the theory, evidence seemed to suggest that at least in some markets, a dividend yield strategy had outperformed the market even after accounting for risk and tax implications. Over longer time periods, the effect was particularly pronounced, and the implications this could have for pension funds and the ability of people to retire comfortably is critical.

The need for institutions to produce returns that are at least equal to those of the market is even more important in a country like South Africa, where government finances are stretched and any extra burden on the state due to a failure of private pensions can hardly be afforded. It is hoped that this study could provide evidence to investment professionals that by using a relatively simple strategy, they could achieve superior returns and create value for their clients and themselves alike.

3 Hypotheses

3.1 Hypothesis 1

Dimson *et al.* (2011) split the top 100 UK stocks 50:50 into a high dividend portfolio and a low dividend portfolio. The authors' showed that the long term returns of the high dividend yield portfolio were 20 times greater than the low dividend yield portfolio over 111 years. The first hypothesis is based on this finding although the study will be over a shorter period:

Does a high dividend yield portfolio demonstrate superior returns versus a low dividend yield portfolio when the dividend yield strategy is applied to stocks on the ALSI of the JSE?

The null hypothesis states that the average annual return of the High Yield portfolio is less than or equal to the average annual return of the Low Yield portfolio. The alternate hypothesis states that the average annual return of the High Yield portfolio is greater than the average annual return of the Low Yield portfolio.

Equation 3-1

Ho: ALSI High Yield (average annual return) ≤ ALSI Low Yield (average annual return)

Ha: ALSI High Yield (average annual return) > ALSI Low Yield (average annual return)

3.2 Hypothesis 2

Slatter's (1988) " Dogs of the Dow" strategy of selecting the top 10 dividend yielding stocks has been shown to outperform the market index in studies by Visscher and Filbeck, (2003), Brzeszczyński and Gajdka, (2008) and Rinne & Vähämaa (2011). The second hypothesis is based on these studies:

Does the strategy of creating a portfolio by selecting the top 10 dividend yielding shares on the JSE Top 40 Index, outperform the Index itself?

The null hypothesis states that the average annual return of the Top 10 portfolio is less than or equal to the average annual return of the Top 40 portfolio. The alternate

hypothesis states that the average annual return of the Top 10 portfolio is greater than the average annual return of the Top 40 portfolio.

Equation 3-2

Ho: Top 10 (average annual return) ≤ JSE Top 40 (average annual return)

Ha: Top 10 (average annual return) > JSE Top 40 (average annual return)

3.3 Hypothesis 3

Da Silva (2001) and McQueen *et al.* (1997) showed that although the top 10 strategy outperformed the market index, when adjusted for risk and taxes, the superior performance all but disappeared. The third and fourth hypotheses are based on these findings:

Does the strategy of creating a portfolio by selecting the top 10 dividend yielding shares on the JSE Top 40 Index, outperform the Index itself when adjusted for risk?

The null hypothesis states that the average annual return of the Top 10 risk adjusted portfolio is less than or equal to the average annual return of the Top 40 portfolio. The alternate hypothesis states that the average annual return of the Top 10 risk adjusted portfolio is greater than the average annual return of the Top 40 portfolio.

Equation 3-3

Ho: Top 10 (risk adjusted average annual return) ≤ JSE Top 40 (average annual return)

Ha: Top 10 (risk adjusted average annual return) > JSE Top 40 (average annual return)

3.4 Hypothesis 4

Does the strategy of creating a portfolio by selecting the top 10 dividend yielding shares on the JSE Top 40 Index, outperform the Index itself when adjusted for risk and taxes?

The null hypothesis states that the average annual return of the Top 10 risk and tax adjusted portfolio is less than or equal to the average annual return of the Top 40 tax adjusted portfolio. The alternate hypothesis states that the average annual return of

the Top 10 risk and tax adjusted portfolio is greater than the average annual return of the Top 40 tax adjusted portfolio.

Equation 3-4

Ho: Top 10 (risk and tax adjusted average annual return) ≤ JSE Top 40 (tax adjusted average annual return)

Ha: Top 10 (risk and tax adjusted average annual return) > JSE Top 40 (tax adjusted average annual return)

4 Research Methodology

4.1 Introduction

Miller and Modigliani (1961) stated that under the conditions of a.) perfect capital markets, b.) rational behaviour and c.) perfect certainty, a firm's dividend policy was irrelevant to its current market valuation. The value of a firm was determined by its earning power and Miller and Modigliani (1961) argued that dividend policy had no impact on the wealth of the investor.

Since dividends had no affect either on the value of a company or to the returns of investors, using a dividend yield strategy should not enable the investor to outperform the market in producing abnormal returns.

However studies by Dimson *et al.* (2011) and French (2010) showed that high dividend yield portfolios' outperformed low dividend yield portfolios. Furthermore, McQueen *et al.* (1997), Visscher and Filbeck, (2003) and others showed that high dividend yield portfolios outperformed their respective market indices over the period of study.

The contradiction between dividend theory and actual observed returns in the studies quoted above is the motivation for this study which aims to establish whether such a relationship exists in the South African context.

This section will detail the research design, and provide definitions of the unit of analysis and the population of relevance. The sampling technique used to perform the analysis and the data collection process will then be explained. Lastly the procedure used to produce the results of the analysis will be described and the limitations of this study will be detailed.

4.2 Research Design

This research aims to use dividend yield as an explanatory variable as a means to select portfolios that produce superior performance. The research aims to show causal links between dividend yield and portfolio returns and as such the appropriate means to study this would be through experimental research (Saunders and Lewis, 2012).

Experimental research is defined as a strategy that involves the definition of a hypothesis, the random selection of individuals from known populations and the allocation of these samples to different experimental conditions (Saunders and Lewis, 2012). However the units of analysis in this research have predefined characteristics which are specified and such a random selection cannot be made.

A quasi-experimental research approach is appropriate when a random allocation of the units of analyses cannot be made (Welman and Kruger, 2005). Quasi experimental research is often used for time series data, and is most commonly and appropriately used for financial studies (Welman and Kruger, 2005). This study will use a quasi-experimental research approach due to these characteristics being present.

4.3 Unit of Analyses

Welman and Kruger (2005) define the unit of analysis as the members or elements of a population. The unit of analysis in this study will be the dividend yield of stocks on the JSE for the period of the study which will be the period of 2004 to 2012.

4.4 Population of Relevance

The population was defined by Saunders and Lewis (2012) as the complete set of group members. The complete population will be all the stocks listed on the JSE for the period 2004 to 2012.

4.5 Sampling

A non-probabilistic purposive sampling technique will be used in this study. The sample to be used in testing the first hypothesis is all the shares that make up the JSE All Share Index (ALSI). The sample to be used in testing the second, third and fourth hypotheses are all the shares that make up the JSE Top 40 Index. Both samples are predefined by the theoretical underpinnings upon which the research questions are based.

Purposive sampling is defined as a type of non-probability sampling where a researcher's judgement is used to select the sample based on a range of possible reasons and premises (Saunders and Lewis, 2012, p. 138).

4.6 Data Collection

The data used for this study will be secondary data. Secondary data was defined as data originally collected for some other purpose (Saunders and Lewis, 2012). The reason for selecting secondary data is due to the nature of this study, which is based on historical information of daily share dividend and price observations. This data has been recorded in databases and is readily available from secondary sources. All data will be sourced from the McGregor BFA database.

4.7 Procedure and Data Analysis

This section will outline the process used to test each hypothesis. The steps are sequentially presented, and all the equations used in constructing the portfolios are documented. The process for each hypothesis is outlined individually.

4.7.1 Hypothesis 1

Step 1

The first step will be to get the data of all shares of the ALSI from the beginning of 2004 to the end of 2012.

Step 2

Next all the shares will be ranked according to their dividend yields in descending order.

Dividend yield is calculated as follows:

Equation 4-1

$$\frac{Dividend\ per\ Share}{Share\ Price} \times 100$$

Step 3

The shares will then be divided into two equal portfolios, starting at the beginning of the year and spilt 50:50 into a high yield and a low yield portfolio and the returns calculated for the entire year based on an equally weighted portfolio.

Share return is calculated as follows (Benninga, 2008):

Equation 4-2

$$Share\ Return\ (r) = \frac{(Value\ (t+1) - Value\ (t)) + Dividends\ Received}{Value\ t} \times 100$$

Step 4

The procedure will then be repeated for each year of the study, and the portfolios will be rebalanced annually as in the study by French (2010). All dividends will be reinvested every year.

Step 5

At the end of the study period, the average annual return will be calculated and descriptive statistics will be used to analyse the differences between the portfolios.

The average annual return is calculated as follows (Benninga, 2008):

Equation 4-3

$$Average\ Annual\ Return = \frac{\sum_{t=1}^{T} Portfolio\ return(t)}{T}$$

Step 6

Testing of Hypothesis 1 will be performed to detect if any statistically significant difference in the mean return between the portfolios can be detected. The shares are independent of each other and each portfolio has no bearing on the other. An independent sample t-test will be used to test for a difference in means for each year of the study (Berenson *et al.* 2012).

The t-test will be performed using the average annual return as per Dimson *et al*. (2011). This traditional approach has however been criticised by Ward and Muller (2012), and the authors suggest a cumulative return comparison would be more useful. The next step compares the returns of each portfolio using the approach of Ward and Muller (2012).

Step 7

The cumulative index return of each portfolio will be plotted over the timeframe of the study and a visual comparison between the two portfolios will be made as per Ward and Muller (2012).

The cumulative return is calculated as follows:

Equation 4-4

$$Cumulative\ Return\ (t2) = \prod_{i=T1}^{T2}(1 + Portfolio\ return\ (t1)) \times\ 1$$

4.7.2 Hypothesis 2

Step 1

The first step will be to get the data of the Top 40 Shares on the JSE by market cap at the beginning of each year from 2004 to 2012.

Step 2

Next all the shares will be ranked according to their dividend yields in descending order.

Dividend yield is calculated as follows:

Equation 4-5

$$\frac{Dividend\ per\ Share}{Share\ Price} \times 100$$

Step 3

The top 10 dividend yielding shares will be selected to create a Top 10 portfolio in the beginning of each year. The portfolio will be held for the entire year and the annual return will be calculated based on an equally weighted portfolio in the same manner as per the previous studies of Visscher and Filbeck, (2003), Brzeszczyński and Gajdka, (2008) and Rinne & Vähämaa (2011). The returns of both the Top 10 portfolio and the Top 40 portfolio will be calculated using the capital gain plus the dividend received during the year. An equally weighted portfolio assumes that an equal amount of money is invested in each share of the portfolio.

Share Return is calculated as follows (Benninga, 2008):

Equation 4-6

$$Share\ Return\ (r) = \frac{(\ Value\ (t+1) - \ Value\ (t)) + \ Dividends\ Received}{Value\ t} \times 100$$

Step 4

The procedure will be repeated at the start of the following year, and the portfolio will be rebalanced annually in the manner used by Visscher and Filbeck, (2003), Brzeszczyński and Gajdka, (2008) and Rinne & Vähämaa (2011). All dividends will be reinvested.

Step 5

At the end of the study period, the average annual return of the Top 10 portfolio and the Top 40 portfolio will be calculated.

The average annual return is calculated as follows (Benninga, 2008):

Equation 4-7

$$Average\ Annual\ Return\ (r) = \frac{\sum_{t=1}^{T} Portfolio\ return(t)}{T}$$

Step 6

Testing of Hypothesis 2 will be performed to detect if any statistically significant difference in the mean return between the Top 10 portfolio and the JSE Top 40 portfolio exists. Both portfolios are drawn from the same population and are thus dependant with the Top 10 portfolio being a subset of the Top 40 portfolio. A paired sample t-test will be used to test for a difference in means (Berenson *et al.* 2012). This traditional approach has however been criticised by Ward and Muller (2012), and the authors suggest a cumulative return comparison would be more useful. The next step compares the returns of each portfolio using the approach of Ward and Muller (2012).

Step 7

The cumulative index return of each portfolio will be plotted over the timeframe of the study and a visual comparison between the two portfolios will be made as per Ward and Muller (2012).

The cumulative return is calculated as follows:

Equation 4-8

$$Cumulative\ Return\ (t2) = \prod_{i=T1}^{T2}(1 + Portfolio\ return\ (t1)) \times\ 1$$

4.7.3 Hypothesis 3 and 4

Step 1

The average annual returns of the Top 10 portfolio as calculated above will be adjusted first for risk, using the Sharpe ratio (McQueen *et al*. 1997), which corrects for the fact that the Top 10 portfolio still carries some unsystematic risk which results in a higher standard deviation than the JSE Top 40 portfolio.

The Sharpe ratio sets the standard deviation of the Top 10 portfolio equal to the standard deviation of the JSE Top 40 portfolio which facilitates a more realistic comparison between the two and was the method employed by McQueen *et al.* (1997).

The risk adjusted return based on the Sharpe ratio is calculated as follows (McQueen *et al*. 1997):

Equation 4-9

$$Risk\ Adjusted\ Return$$
$$= (Top\ 10\ (r) - Risk\ Free\ rate)\frac{\sigma JSE\ Top\ 40(r)}{\sigma Top\ 10(r)} +\ Risk\ Free\ rate$$

Thereafter the both portfolios will be adjusted for tax by utilising the effective tax rates on dividends in South Africa for each year of the study to arrive at a risk and tax adjusted return. A dividend tax was only introduced in South Africa in 2012, and was effective from the 1 April 2012.

Previous to this, secondary tax on companies existed and shareholders were not directly taxed on dividends. Dividend tax is levied at 15% of the dividend received. However for the purposes for this study, all dividends will be adjusted for tax from the beginning of 2004, as this would be a more realistic representation given that dividend tax is a reality for any fund manager presently. Dividends will be adjusted for tax using the following formula:

Equation 4-10

$$After\ tax\ dividend = Pretax\ Dividend\ \times 0.85$$

Step 2

Testing of Hypotheses 3 and 4 will be performed to detect if any statistically significant difference in the mean return between the adjusted Top 10 portfolios and the JSE Top 40 portfolio exists. The portfolios being tested are drawn from the same population and are thus dependant with the Top 10 portfolio being a subset of the Top 40 portfolio. A matched paired t-test will be used to test for a difference in means (Berenson *et al.* 2012).

4.8 Limitations

Several limitations to this study have been identified and are listed below:

- The time frame selected is nine years and the results might not be representative of other periods.
- The results of this study could be impacted by causal factors other than dividend yield which are not captured by this study.
- The period under investigation includes the Global Financial Crises (GFC) of 2008, and an economic event of such magnitude might have an impact on the results that would not apply during other periods.
- Confounding events could introduce either positive bias in support of dividend yield when no relationship exists, or negative bias which would underestimate the effect of dividend yield when a strong relationship exists. Confounding events are variables that are statistically correlated to the dependant or independent variable of a study, which can have a material impact on the relationship being studied (Konchitchki and O'Leary 2011). Examples of confounding events that are relevant to this study include:

- Special dividends paid by companies
- Stock splits and structural changes
- Once off changes in dividend policy
- Changes in taxation treatment of dividends

Confounding events are more salient and influential in event studies, where specific occurrences are assessed as to their impact on a company's performance. This study being a quasi-experimental time series investigation is less affected by confounding events (Konchitchki and O'Leary 2011). Therefore confounding events will not be considered in this study.

4.9 Conclusion

The combination of testing high dividend versus low dividend yield portfolios as well high dividend yield portfolios versus an index should uncover any positive relationship that dividend yield has as a portfolio selection strategy if it exists. The JSE and the South African economy have characteristics of both developed and developing economies, and the results discovered in other countries do not necessarily translate in the South African context. This research aims to determine whether any justification can be claimed by practitioners who use dividend yield in constructing portfolios.

5 Results

5.1 Introduction

This section presents the results of the study, which are based upon the data collection and procedure as detailed in the previous section. The most important measurement of this study is dividend yield, and the first part of this section will provide selective descriptive statistics on this variable for the top 160 shares on the JSE for each year from 2004 until 2012, representing nine years of data with the aim of determining whether dividends are disappearing in South Africa.

Thereafter, the data will be presented according to the four stated hypotheses, the objective of which is to determine firstly whether a high dividend yield portfolio will outperform a low dividend yield portfolio derived from the ALSI. The second objective is to determine whether a high dividend yield portfolio based on "The Dogs of the Dow" strategy can outperform the Index from which it was derived, in this instance the Top 40 Shares on the JSE.

The stated hypotheses and the methods used to test the hypotheses are based on previous studies of dividend yield, and the table below provides a very brief overview of these studies in relation to the hypotheses tested.

Table 5-1

Hypothesis	Description	Previous Studies
1	High Dividend Yield vs. Low Dividend Yield	Dimson *et al.* (2011)
2	Top 10 High Dividend Yield vs. Index	Visscher and Filbeck, (2003), Brzeszczyński and Gajdka, (2008) and Rinne and Vähämaa (2011).
3	Top 10 High Dividend Yield vs. Index Adjusted for Risk	Da Silva (2001) and Visscher and Filbeck (2003),
4	Top 10 High Dividend Yield vs. Index Adjusted for Risk and Taxes	McQueen *et.al.* (1997) and Rinne and Vähämaa (2011)

5.2 Generation of the Sample

The data for all shares available on the McGregor BFA database was obtained at the beginning of each year, for the years between 2004 and 2012. The data at the beginning of the year provided by McGregor was on the first working day of the specific year, and this was used consistently for each year of the study period. The shares were ranked for each year according to market cap as per Ward and Muller (2012), to determine the top 160 shares used to test Hypothesis 1, and to determine the top 40 shares used to test for Hypotheses 2 to 4.

Outliers were then identified for each year, and this was done by using box plots. All extreme data points shown on the box plot and denoted by an "x" in SPSS were removed, as suggested by Berenson *et al.* (2012), who argued that the validity of the t-test is jeopardised if extreme outliers were present in the data. The method of excluding extreme outliers was not used in the comparative studies listed in Table 5-1.

The McGregor BFA database only had data for shares that were listed on the JSE at present, and data on shares that were delisted during the period was not available. This introduces survivorship bias into the study, and is noted as a limitation of the results presented. Due to the time and cost limitations of this study, it was not feasible to build a database free from survivorship bias considering these constraints. The effect of survivorship bias is discussed in more detail in Chapter 6.

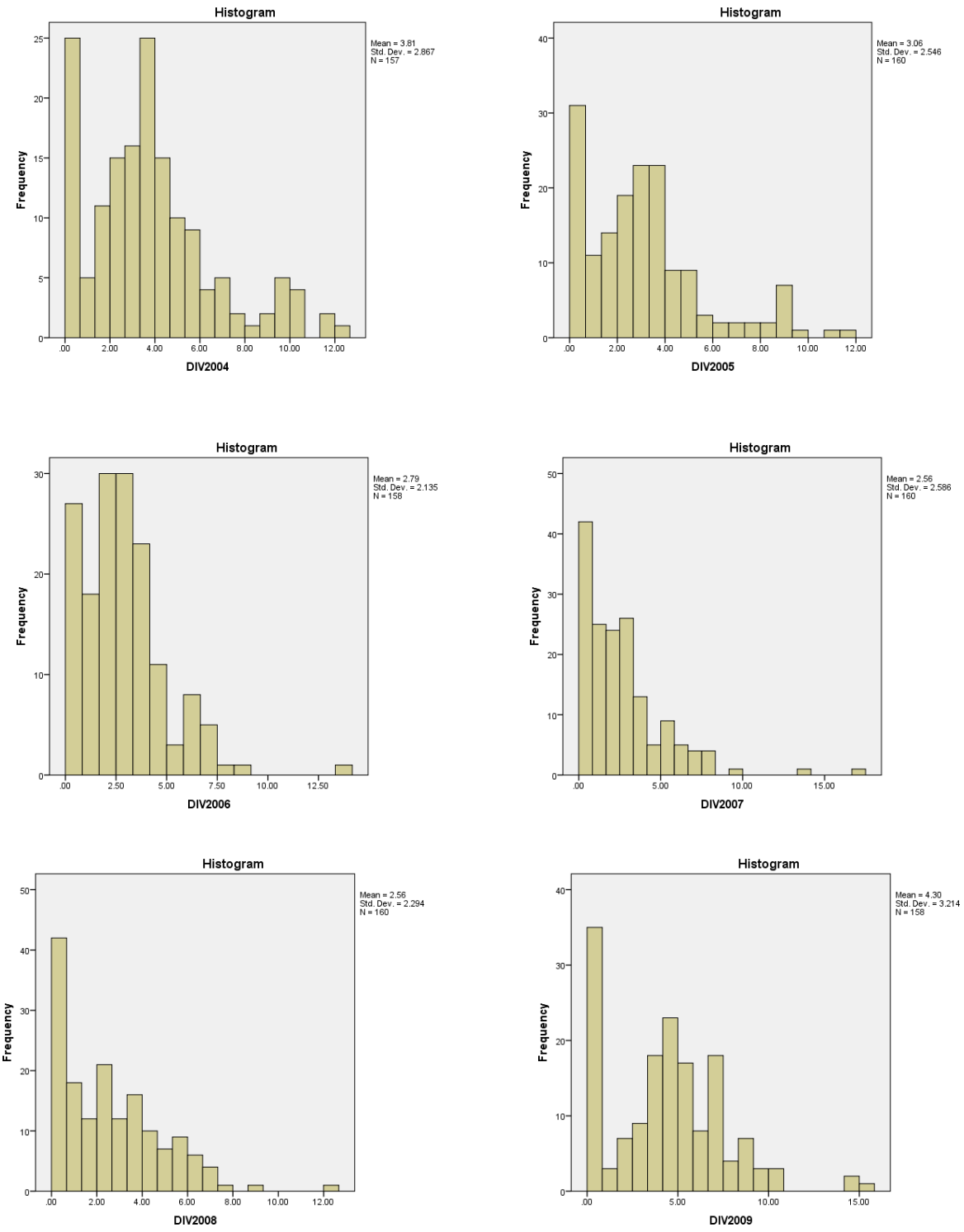
5.3 Descriptive Statistics

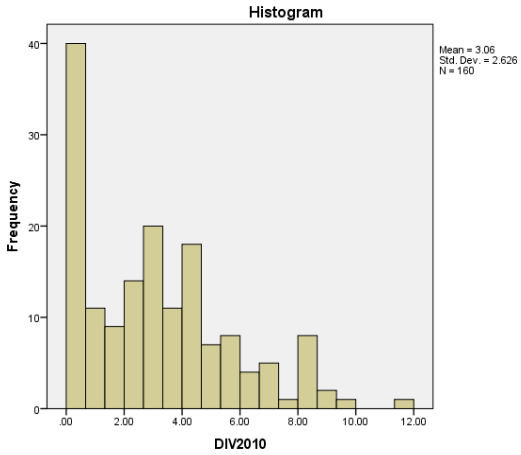
The histograms of all shares for every year is presented below for the main variable of interest namely, dividend yield. This demonstrates the distribution of the data using histograms obtained from SPSS, which serves two purposes. The first is to give a visual indication of the spread of dividend yields for all shares each year, which serves as an indication of whether firms that pay dividends are increasing their dividend payouts as documented by DeAngelo *et al*. (2004).

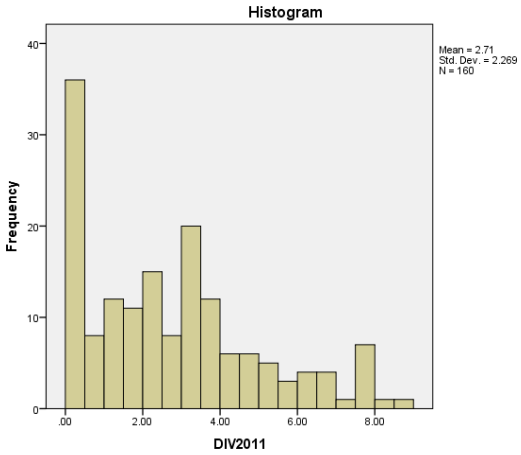
The second purpose is to provide a visual indication of the number of companies that pay dividends versus those that do not pay dividends. Analysing the progression through the nine years of data gives a visual indication of whether dividends are disappearing in South Africa during the period of study, as was found by Fama and

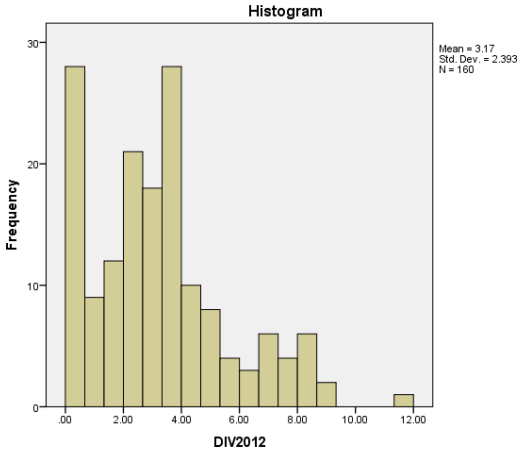
French (2001) in their study of the US market. The horizontal axis represents the dividing yield percentage, with the suffix denoting the year, and the vertical axis represents the frequency.

Figure 5-1









The histograms do not show any large shifts toward higher dividend yields, and the spread is relatively stable throughout the study period. The histograms also show that in most years, the largest frequency occurs amongst firms that pay no dividends. However dividend paying firms in total far outnumber non-dividend paying firms in all the years of the period under review. The visual histograms do not provide concrete evidence of a trend toward disappearing dividends. The range is approximately between 25 and 40 companies per year that pay no dividends, with random fluctuations between the years.

The descriptive statistics do not provide support for the theory that dividends are disappearing. The proportion of firms paying dividends, as well as the magnitude of the dividends paid is relatively stable over the time period under review. The confirmation that dividend paying firms outnumber non-dividend paying firms on the

JSE provides a solid foundation from which to test the efficacy of dividend yield as an investment strategy.

5.4 Hypothesis 1

The first hypothesis tests whether a high dividend yield portfolio derived from the top 160 shares on the JSE will outperform a low dividend yield portfolio. The portfolios' are created by taking the sample generated previously, and ranking that sample by dividend yield from the highest to the lowest. The process of eliminating outliers means that during some years, less than 160 shares will be in the sample. The sample is split with the top 50% making the high dividend yield portfolio and the bottom 50% making the low dividend yield portfolio.

The annual return for each share is then calculated using Equation 4-2, for each year of the sample. The average annual return is then calculated for the entire portfolio using Equation 4-3, and this is repeated for every year of the study period. Lastly, the cumulative return of the two portfolios is calculated using Equation 4-4.

Hypothesis 1 is then tested for each year of the study period, to determine if the high dividend yield portfolio has a statistically higher rate of return than the low dividend yield portfolio using an independent sample t-test. This results in nine separate t-tests, one for each year of the study. Thereafter, a t-test is run for the entire study period encompassing the average return of all nine years to determine if the high yield portfolio is superior over the entire period. Finally, the cumulative return index of each portfolio is plotted over time to give a visual comparison between the two portfolios as per Ward and Muller (2012).

Descriptive statistics are presented below which shows the mean return of the two portfolios. The high yield portfolio has an average return of 26.85% while the low yield portfolio has an average return of 20.67%. The difference in return looks significant, and the hypothesis tests will determine if it is statistically significant.

Figure 5-2

Descriptives

			Statistic	Std. Error
HighYield	Mean		.2685	.07638
	95% Confidence Interval for Mean	Lower Bound	.0923	
		Upper Bound	.4446	
	5% Trimmed Mean		.2739	
	Median		.2737	
	Variance		.053	
	Std. Deviation		.22915	
	Minimum		-.18	
	Maximum		.62	
	Range		.80	
	Interquartile Range		.26	
	Skewness		-.567	.717
	Kurtosis		1.203	1.400

Descriptives

			Statistic	Std. Error
LowYield	Mean		.2067	.09217
	95% Confidence Interval for Mean	Lower Bound	-.0059	
		Upper Bound	.4192	
	5% Trimmed Mean		.2240	
	Median		.2455	
	Variance		.076	
	Std. Deviation		.27651	
	Minimum		-.39	
	Maximum		.49	
	Range		.88	
	Interquartile Range		.35	
	Skewness		-1.360	.717
	Kurtosis		1.954	1.400

The independent sample hypothesis test output from SPSS provides the p-value for a two tailed test which needs to be adjusted for a one tailed test. The output also tests for the equality of variances, and provides the p-value with equal and unequal variances assumed. Hypothesis 1 is a one tailed test, with the alternate hypothesis stating that the high yield portfolio has a greater return than the low yield portfolio. In interpreting the output to determine whether to reject the null hypothesis or not, the SPSS p-value needs to be divided by two to adjust for a one tailed test, and this number should be below 0.05 for the null hypothesis to be rejected at a 5% significance level (Landau and Everitt, 2004). The test for equal variances will determine which p-value to use, and is determined by looking at the significance of the test, and if it is greater than 0.05, equal variances can be assumed (Landau and Everitt, 2004).

The t-test for 2004 shows a mean difference between the portfolios of 19.53%, with a p-value of 0.047. When divided by two, the p-value is 0.0235. This is below 0.05, and the null hypothesis can be rejected for 2004.

Figure 5-3

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PORT_RETURN_2004	Equal variances assumed	.006	.940	2.000	155	.047	.19532	.09765	.00241	.38822
	Equal variances not assumed			2.000	154.991	.047	.19532	.09764	.00244	.38820

The t-test for 2005 shows a mean difference between the portfolios of 0.398%, with a p-value of 0.955. When divided by two, the p-value is 0.4755. This is above 0.05, and the null hypothesis cannot be rejected for 2005.

Figure 5-4

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PORT_RETURN_2005	Equal variances assumed	1.131	.289	.056	158	.955	.00398	.07078	-.13583	.14378
	Equal variances not assumed			.056	154.963	.955	.00398	.07078	-.13585	.14380

The t-test for 2006 shows a mean difference between the portfolios of -9.92%, with a p-value of 0.877. When divided by two, the p-value is 0.4385. This is above 0.05, and the null hypothesis cannot be rejected for 2006.

Figure 5-5

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PORT_RETURN_2006	Equal variances assumed	9.038	.003	-1.553	156	.122	-.09920	.06388	-.22539	.02699
	Equal variances not assumed			-1.553	135.740	.123	-.09920	.06388	-.22554	.02713

The t-test for 2007 shows a mean difference between the portfolios of -10.95%, with a p-value of 0.847. When divided by two, the p-value is 0.4235. This is above 0.05, and the null hypothesis cannot be rejected for 2007.

Figure 5-6

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PORT_RETURN_2007	Equal variances assumed	25.585	.000	-1.438	158	.152	-.10945	.07612	-.25979	.04089
	Equal variances not assumed			-1.438	115.818	.153	-.10945	.07612	-.26022	.04132

The t-test for 2008 shows a mean difference between the portfolios of 21.23%, with a p-value of 0.000. When divided by two, the p-value is 0.000. This is below 0.05, and the null hypothesis can be rejected for 2008.

Figure 5-7

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PORT_RETURN_2008	Equal variances assumed	1.696	.195	5.457	158	.000	.21231	.03891	.13546	.28916
	Equal variances not assumed			5.457	156.325	.000	.21231	.03891	.13546	.28917

The t-test for 2009 shows a mean difference between the portfolios of 2.82%, with a p-value of 0.631. When divided by two, the p-value is 0.316. This is above 0.05, and the null hypothesis cannot be rejected for 2009.

Figure 5-8

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PORT_RETURN_2009	Equal variances assumed	10.918	.001	.482	156	.631	.02827	.05868	-.08765	.14419
	Equal variances not assumed			.482	128.901	.631	.02827	.05868	-.08784	.14438

The t-test for 2010 shows a mean difference between the portfolios of 9.7%, with a p-value of 0.029. When divided by two, the p-value is 0.0145. This is below 0.05, and the null hypothesis can be rejected for 2010.

Figure 5-9

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PORT_RETURN_2010	Equal variances assumed	1.662	.199	2.208	158	.029	.09700	.04393	.01024	.18376
	Equal variances not assumed			2.208	153.733	.029	.09700	.04393	.01022	.18378

The t-test for 2011 shows a mean difference between the portfolios of 9.33%, with a p-value of 0.024. When divided by two, the p-value is 0.012. This is below 0.05, and the null hypothesis can be rejected for 2011.

Figure 5-10

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PORT_RETURN_2011	Equal variances assumed	9.966	.002	2.290	158	.023	.09329	.04074	.01282	.17375
	Equal variances not assumed			2.290	139.857	.024	.09329	.04074	.01274	.17383

The t-test for 2012 shows a mean difference between the portfolios of 13.47%, with a p-value of 0.012. When divided by two, the p-value is 0.006. This is below 0.05, and the null hypothesis can be rejected for 2012.

Figure 5-11

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PORT_RETURN_2012	Equal variances assumed	6.337	.013	2.543	158	.012	.13472	.05298	.03009	.23936
	Equal variances not assumed			2.543	144.705	.012	.13472	.05298	.03002	.23943

The t-test for the period 2004-2012, shows a mean difference between the portfolios of 6.18%, with a p-value of 0.613. When divided by two, the p-value is 0.3065. This is above 0.05, and the null hypothesis cannot be rejected for the period 2004-2012.

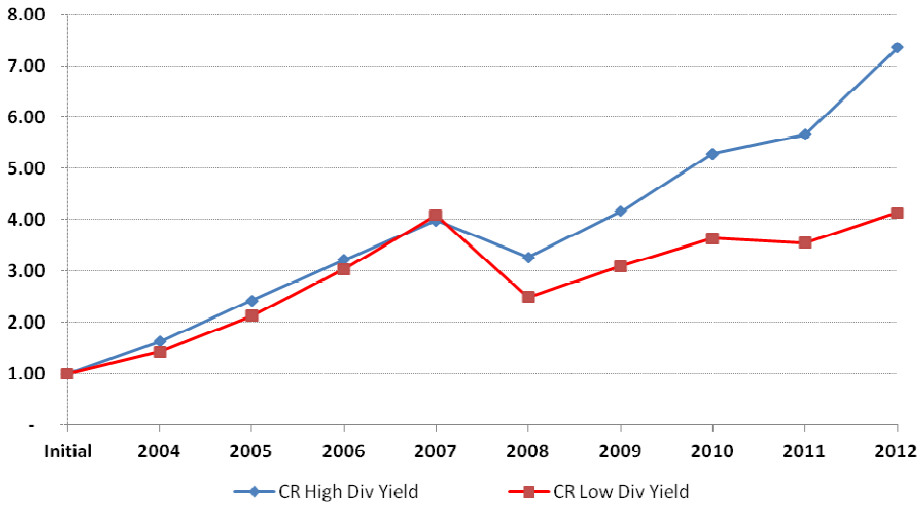
Figure 5-12

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
AVE_ANNUAL_50_50	Equal variances assumed	.380	.546	.516	16	.613	.06177	.11971	-.19200	.31553
	Equal variances not assumed			.516	15.467	.613	.06177	.11971	-.19271	.31625

The cumulative return index compares the two portfolios by indexing them and assumes they both start at a nominal value of 1. This indexing allows for an easy comparison as can be seen from the graph. Over the nine year period, the high yield portfolio would have grown to 7.36 times its original value, while the low yield portfolio would have grown to 4.14 times its original value.

Figure 5-13



The yearly hypothesis tests were inconclusive as to whether the high yield portfolio was able to outperform the low yield portfolio, with evidence being found in only five of the nine years. The hypothesis test over the entire period was unable to find evidence of any superior performance either, and the null hypothesis could not be rejected. The cumulative return index was the most convincing with regard to the ability of the high yield portfolio to outperform the low yield portfolio, with there being a large visual performance gap in the difference between the two portfolios. These results will be discussed in more detail in the next chapter.

5.5 Hypothesis 2

The second hypothesis tests whether the strategy of selecting the Top 10 dividend yield stocks of the JSE Top 40 Index, outperforms the index itself. The JSE Top 40 Index is used in this case as a proxy for the market return, and if the Top 10 dividend yield portfolio outperforms the index, it will show that the strategy has the ability to outperform the market. Visscher and Filbeck, (2003), Brzeszczyński and Gajdka, (2008) and Rinne and Vähämaa (2011) all tested this in their respective markets, with varying degrees of success.

The portfolios are created by first ranking the top 160 shares by market capitalisation, and selecting the top 40 largest shares on the JSE for each year. The top 40 shares are then ranked by dividend yield, and two portfolios are created. The Top 10 portfolio is created by using the 10 shares with the largest dividend yield, and the Top 40 portfolio is created by using all 40 shares. The annual return for each share is then calculated using Equation 4-6, and this process is repeated for each year of the study period. The average annual return is then calculated for the entire portfolio using Equation 4-7, and this is repeated for every year of the study period. Lastly, the cumulative return of the two portfolios is calculated using Equation 4-8.

Hypothesis 2 is tested on the average annual return of the two portfolios at the end of the study period to determine if the Top 10 portfolio outperforms the Top 40 portfolio statistically. The independent sample hypothesis test cannot be run for each year of the study as was the case for Hypothesis 1, as the Top 10 portfolio and the Top 40 portfolio are not independent from each other, with the Top 10 portfolio being a subset of the Top 40 portfolio. Thus a paired sample t-test will need to be run to

analyse the two portfolios as the two portfolios are related to each other (Berenson *et al.* 2012).

However, a paired sample t-test cannot be run for each individual year, as the sample sizes are different, with 10 and 40 data points for the Top 10 and Top 40 portfolios respectively. Therefore a single paired sample t-test is run on the average annual return at the end of the study period. Finally, the cumulative return index of each portfolio is plotted over time to give a visual comparison between the two portfolios as per Ward and Muller (2012).

Descriptive statistics are presented below for both the Top 10 portfolio, as well as the Top 40 portfolio. The mean return on each portfolio for the nine years is 26.95% for the Top 10 portfolio, and 21.29% for the Top 40 portfolio. This difference will be tested for significance using the paired sample t-test.

Figure 5-14

Descriptives

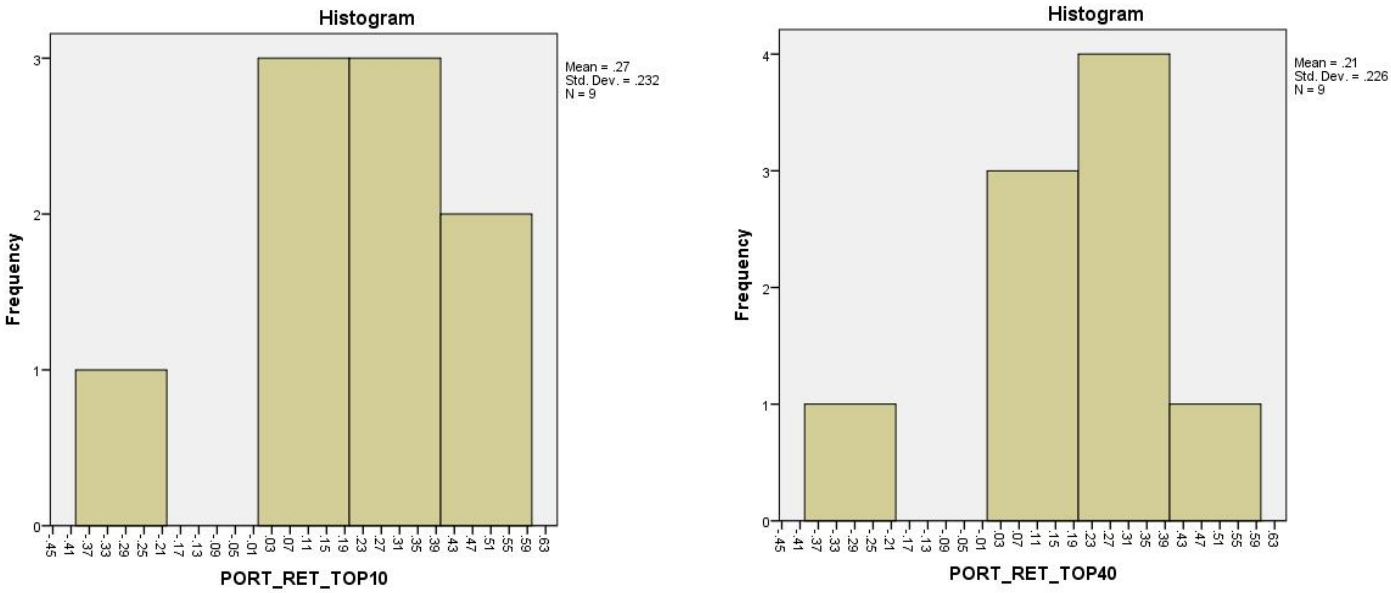
			Statistic	Std. Error
PORT_RET_TOP10	Mean		.2695	.07735
	95% Confidence Interval for Mean	Lower Bound	.0912	
		Upper Bound	.4479	
	5% Trimmed Mean		.2803	
	Median		.3381	
	Variance		.054	
	Std. Deviation		.23206	
	Minimum		-.21	
	Maximum		.55	
	Range		.76	
	Interquartile Range		.30	
	Skewness		-.926	.717
	Kurtosis		1.225	1.400

Descriptives

			Statistic	Std. Error
PORT_RET_TOP40	Mean		.2129	.07535
	95% Confidence Interval for Mean	Lower Bound	.0391	
		Upper Bound	.3866	
	5% Trimmed Mean		.2242	
	Median		.2844	
	Variance		.051	
	Std. Deviation		.22604	
	Minimum		-.28	
	Maximum		.50	
	Range		.79	
	Interquartile Range		.25	
	Skewness		-1.276	.717
	Kurtosis		2.461	1.400

The histograms of both portfolios over the nine years are presented in order to assess if the return profile of the two portfolios show any significant differences. The main difference that can be seen is that the Top 10 portfolio has two years in which returns exceeded 40% versus one year for the Top 40 portfolio.

Figure 5-15



The SPSS output for the paired sample t-test is presented below. The t-test is run on the average annual returns for each portfolio calculated for each year. The t-test produces a p-value of 0.012 which is the value for a two tailed test. The p-value for a one tailed test is 0.006. This is smaller than 0.05, and we can reject the null hypothesis and conclude that the Top 10 portfolio outperforms the Top 40 portfolio statistically.

Figure 5-16

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PORT_RET_TOP10	.2695	9	.23206	.07735
	PORT_RET_TOP40	.2129	9	.22604	.07535

Paired Samples Correlations

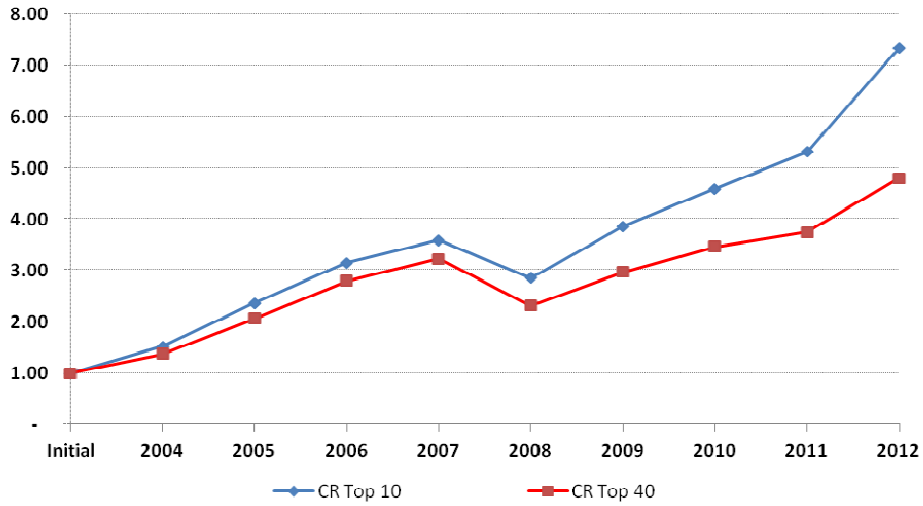
		N	Correlation	Sig.
Pair 1	PORT_RET_TOP10 & PORT_RET_TOP40	9	.974	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	PORT_RET_TOP10 - PORT_RET_TOP40	.05669	.05270	.01757	.01618	.09720	3.227	8	.012

The cumulative return index is presented below, which gives a visual representation as to the difference between the two portfolios, assuming they both start off a common base of 1. The Top 10 portfolio would have would have grown by 7.35 times the original value while the Top 40 portfolio would have grown by 4.8 times the original value.

Figure 5-17



The hypothesis test found evidence of superior performance for the Top 10 portfolio, and the null hypothesis was able to be rejected. The cumulative return index was also convincing with regard to the ability of the Top 10 portfolio to outperform the Top 40 portfolio, with there being a large visual performance gap in the difference between the two portfolios. These results will be discussed in more detail in the next chapter.

5.6 Hypothesis 3

The third hypothesis tests whether the results of Hypothesis 2 will still hold after the Top 10 portfolio is adjusted for risk. The Top 10 portfolio could have achieved a higher return if it was more risky than the Top 40 portfolio, and the increased return would not be due to a superior strategy, but rather as a reward for taking on extra risk. To control for risk, the Top 10 portfolio is adjusted using the Sharpe ratio, which is an application of Equation 4-9.

Hypothesis 3 is tested on the average annual return of the two portfolios at the end of the study period to determine if the Top 10 risk adjusted portfolio outperforms the

Top 40 portfolio statistically. The same paired sample t-test as was used for Hypothesis 2 is repeated for the risk adjusted portfolio.

Descriptive statistics are presented below for both the Top 10 risk adjusted portfolio, as well as the Top 40 portfolio. The mean return on each portfolio for the nine years is 26.47% for the Top 10 risk adjusted portfolio, and 21.29% for the Top 40 portfolio. This difference will be tested for significance using the paired sample t-test.

Figure 5-18

Descriptives

			Statistic	Std. Error
PORT_RET_TOP10_RISK	Mean		.2647	.07524
	95% Confidence Interval for Mean	Lower Bound	.0912	
		Upper Bound	.4382	
	5% Trimmed Mean		.2751	
	Median		.3312	
	Variance		.051	
	Std. Deviation		.22572	
	Minimum		-.20	
	Maximum		.54	
	Range		.74	
	Interquartile Range		.29	
	Skewness		-.922	.717
	Kurtosis		1.215	1.400

Descriptives

			Statistic	Std. Error
PORT_RET_TOP40	Mean		.2129	.07535
	95% Confidence Interval for Mean	Lower Bound	.0391	
		Upper Bound	.3866	
	5% Trimmed Mean		.2242	
	Median		.2844	
	Variance		.051	
	Std. Deviation		.22604	
	Minimum		-.28	
	Maximum		.50	
	Range		.79	
	Interquartile Range		.25	
	Skewness		-1.276	.717
	Kurtosis		2.461	1.400

The SPSS output for the paired sample t-test is presented below. The t-test is run on the average annual returns for each portfolio calculated for each year. The t-test produces a p-value of 0.017 which is the value for a two tailed test. The p-value for a one tailed test is 0.0085. This is smaller than 0.05, and we can reject the null hypothesis and conclude that the Top 10 risk adjusted portfolio outperforms the Top 40 portfolio statistically.

Figure 5-19

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PORT_RET_TOP10_RISK	.2647	9	.22572	.07524
	PORT_RET_TOP40	.2129	9	.22604	.07535

Paired Samples Correlations

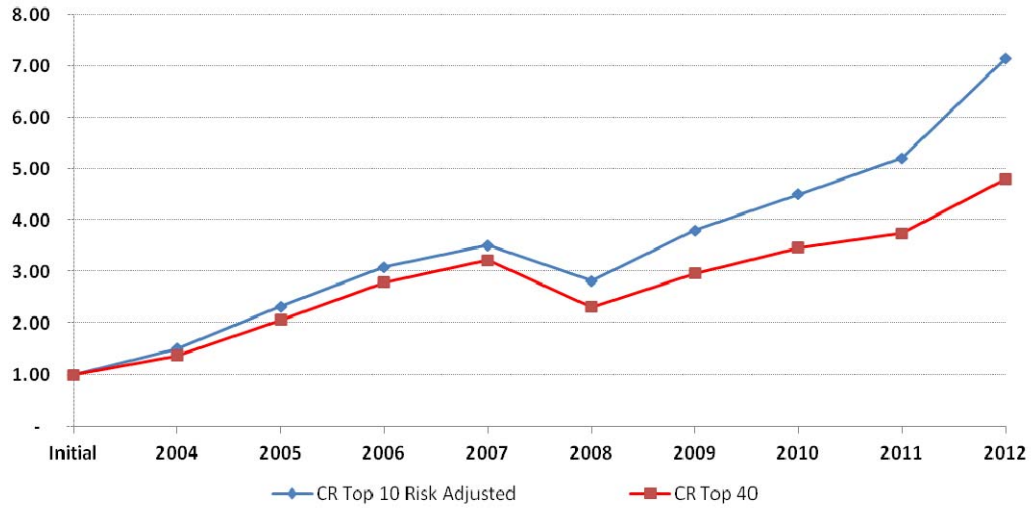
		N	Correlation	Sig.
Pair 1	PORT_RET_TOP10_RISK & PORT_RET_TOP40	9	.974	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	PORT_RET_TOP10_RISK - PORT_RET_TOP40	.05182	.05164	.01721	.01213	.09152	3.010	8	.017

The cumulative return index is presented below, which gives a visual representation as to the difference between the two portfolios, assuming they both start off a common base of 1. The Top 10 risk adjusted portfolio would have would have grown by 7.16 times the original value while the Top 40 portfolio would have grown by 4.8 times the original value.

Figure 5-20



The hypothesis test found evidence of superior performance for the Top 10 risk adjusted portfolio, and the null hypothesis was able to be rejected. The cumulative return index was also convincing with regard to the ability of the Top 10 risk adjusted portfolio to outperform the Top 40 portfolio, with there being a large visual performance gap in the difference between the two portfolios. These results will be discussed in more detail in the next chapter.

5.7 Hypothesis 4

The fourth hypothesis adjusts the Top 10 portfolio not only for risk, but for the effect of dividend taxes as well. A dividend tax was only introduced in South Africa in 2012, and was effective from the 1 April 2012. For the purposes of this study, all dividends received will be adjusted using Equation 4-10 and the average annual return for each portfolio will be recalculated. Thereafter the Top 10 tax adjusted portfolio will be adjusted for risk as well, and the same paired sample t-test as used for Hypothesis 2 and Hypothesis 3 will be run for Hypothesis 4. Hypothesis 4 is tested on the average annual return of the two portfolios at the end of the study period to determine if the Top 10 risk and tax adjusted portfolio outperforms the Top 40 tax adjusted portfolio statistically.

Descriptive statistics are presented below for both the Top 10 risk and tax adjusted portfolio, as well as the Top 40 tax adjusted portfolio. The mean return on each portfolio for the nine years is 25.36% for the Top 10 risk and tax adjusted portfolio, and 20.55% for the Top 40 tax adjusted portfolio. This difference will be tested for significance using the paired sample t-test.

Figure 5-21

Descriptives

			Statistic	Std. Error
PORT_RET_TOP10_RISK_TAX	Mean		.2536	.07463
	95% Confidence Interval for Mean	Lower Bound	.0815	
		Upper Bound	.4257	
	5% Trimmed Mean		.2640	
	Median		.3182	
	Variance		.050	
	Std. Deviation		.22388	
	Minimum		-.21	
	Maximum		.53	
	Range		.74	
	Interquartile Range		.29	
	Skewness		-.965	.717
	Kurtosis		1.282	1.400

Descriptives

			Statistic	Std. Error
PORT_RET_TOP40_TAX	Mean		.2055	.07470
	95% Confidence Interval for Mean	Lower Bound	.0332	
		Upper Bound	.3777	
	5% Trimmed Mean		.2169	
	Median		.2783	
	Variance		.050	
	Std. Deviation		.22411	
	Minimum		-.29	
	Maximum		.49	
	Range		.78	
	Interquartile Range		.24	
	Skewness		-1.301	.717
	Kurtosis		2.533	1.400

The SPSS output for the paired sample t-test is presented below. The t-test is run on the average annual returns for each portfolio calculated for each year. The t-test produces a p-value of 0.020 which is the value for a two tailed test. The p-value for a one tailed test is 0.010. This is smaller than 0.05, and we can reject the null hypothesis and conclude that the Top 10 risk and tax adjusted portfolio outperforms the Top 40 tax adjusted portfolio statistically.

Figure 5-22

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PORT_RET_TOP10_RISK_TAX	.2536	9	.22388	.07463
	PORT_RET_TOP40_TAX	.2055	9	.22411	.07470

Paired Samples Correlations

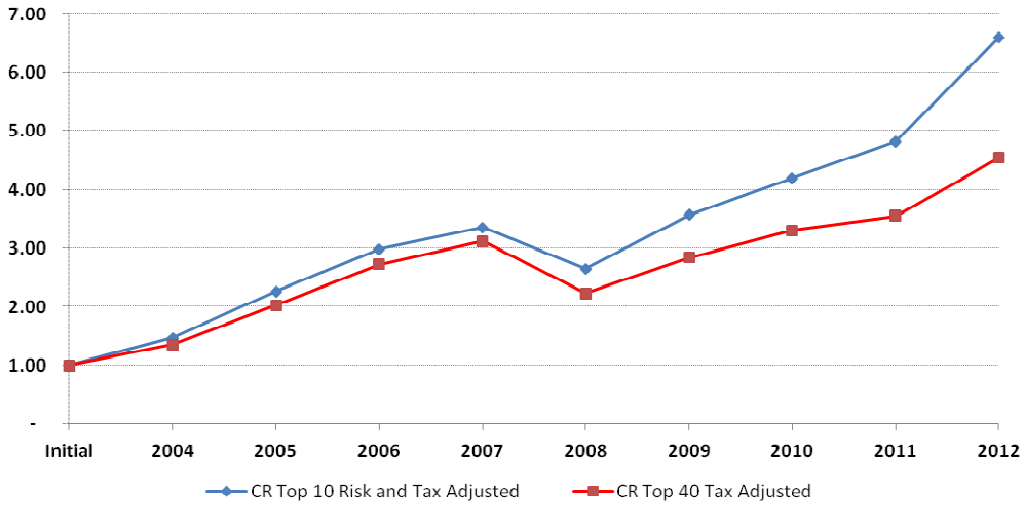
		N	Correlation	Sig.
Pair 1	PORT_RET_TOP10_RISK_TAX & PORT_RET_TOP40_TAX	9	.975	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	PORT_RET_TOP10_RISK_TAX - PORT_RET_TOP40_TAX	.04810	.05009	.01670	.00960	.08660	2.881	8	.020

The cumulative return index is presented below, which gives a visual representation as to the difference between the two portfolios, assuming they both start off a common base of 1. The Top 10 risk and tax adjusted portfolio would have would have grown by 6.60 times the original value while the Top 40 tax adjusted portfolio would have grown by 4.55 times the original value.

Figure 5-23



The hypothesis test found evidence of superior performance for the Top 10 risk and tax adjusted portfolio, and the null hypothesis was able to be rejected. The cumulative return index was also convincing with regard to the ability of the Top 10 risk and tax adjusted portfolio to outperform the Top 40 tax adjusted portfolio, with there being a large visual performance gap in the difference between the two portfolios. These results will be discussed in more detail in the next chapter.

5.8 Conclusion

Table 5-2 below summarises the results from the four hypotheses tested, with supporting evidence for the superiority of a high dividend yield portfolio being found in three of the four hypotheses tests. The first hypothesis is the only one which was unable to statistically prove the superiority of the high yield portfolio over the low yield portfolio.

Table 5-2

	Portfolios	T-Test Type	p-value	Result
Hypothesis 1	High Yield vs. Low Yield	Independent	0.3065	Do Not Reject Null
Hypothesis 2	Top 10 vs. Top 40	Paired	0.006	Reject Null
Hypothesis 3	Top 10 Risk vs. Top 40	Paired	0.0085	Reject Null
Hypothesis 4	Top 10 Risk & Tax vs. Top 40 Tax	Paired	0.010	Reject Null

Hypothesis 1 was also the only one to use an independent sample t-test, and in contrast to Hypotheses 2 to 4, used all the shares of the JSE ALSI Index. This has to be considered when evaluating the reason for the lack of statistical evidence found by Hypothesis 1. The next chapter will analyse the evidence presented from all the hypotheses, and attempt to provide insight into the findings.

6 Discussion of Results

6.1 Introduction

This chapter is based on the results of the previous chapter, and the structure will follow that of Chapter 5. The chapter provides a discussion of the results, and attempts to provide insight and reasons for the results observed. The context and framing for the discussion will be centred on using dividend yield as a means of constructing a portfolio that can outperform the market. The discussion is not meant to determine the merits of whether or not firms should pay dividends, and does not attempt to classify the quality of the underlying company based on its dividend policy.

The aim of this research was to determine if investors could use a relatively simple strategy in order to achieve returns that are superior to market returns as indicated by a relevant proxy such as the JSE Top 40 Index. Investors and professional fund managers are often overwhelmed by the sheer volume of analysis and statistics that are available for equity markets. The assimilation of all this data into a coherent strategy that is able to outperform the market is almost an impossibility given the volume of data available. The separation of "noise" versus useful data is also not easily done and casual proof of this failure can be seen in the long term returns of fund managers and other investors (Siegel, 2006). The majority of fund managers are unable to beat the market index used as their respective benchmarks over the long term. This research aims to provide one such strategy, one that is easily implemented and can be constructed with the minimum of cost or specialist skills.

The discussion will begin with a short commentary on the sample used and the limitations of the sample. The descriptive statistics will then be looked at, with the purpose of identifying major shifts in the dividend structure of all firms in the ALSI. This will be followed by a discussion and interpretation of the findings of each hypothesis, including comparative analysis to the other studies of dividend yield in markets internationally. The discussion will also speak to observations found that were not directly studied or tested for in this research but which have a bearing on the debate over dividend yield. Lastly, a position on the viability of the strategy as supported by the data will be taken.

6.2 Generation of the Sample

The sample of the top 160 shares and the top 40 shares by market was based on the data of all shares on the McGregor BFA database for each year of the study. The limitation of the database is that data is only available for shares that are currently listed on the JSE, and consequently shares that have delisted or companies that have been liquidated are not included in the database. This introduces survivorship bias into the sample, in that only shares that have been successful and have survived are included. Survivorship bias has been well documented in US data by Kothari *et al.* (1995) and Davis (1996) amongst many others. Gilbert and Strugnell (2010) stated that while survivorship bias was well documented in the US, the authors could find no studies that had confirmed this in South Africa.

Gilbert and Strugnell (2010) conducted a study on the JSE in an attempt to determine if survivorship bias had an impact on the results of studies that used data which included only surviving firms. The authors' motivation for this research was the difficulty and cost involved in obtaining historical datasets in emerging markets, particularly South Africa for delisted shares which was time consuming and impractical.

Gilbert and Strugnell (2010) concluded that any research which excluded delisted shares was likely to be subject to survivorship bias. The authors found that survivorship bias had the potential to affect the outcome of studies on the JSE, but they also found that the conclusions reached from the specific studies they tested would not have changed even if the delisted shares were included. The specific studies as assessed by Gilbert and Strugnell (2010) would not have been materially affected by survivorship bias.

Survivorship bias has the potential to skew returns, and make them look more favourable than they would have been had the shares of companies that have failed been included. This should be considered when the results of this study are interpreted.

The ALSI Index and the JSE Top 40 Index are approximated in this study by ranking the shares by market cap at the beginning of the year, and choosing the top 160 or the top 40 shares respectively. The actual indices have different dates at which the shares to be included in each index are calculated, and any variation between the

two is a result of this methodology. The published JSE Top 40 Index does not include dividends in the calculation of annual return, which also necessitated the methodology as described above to be used in calculating dividend adjusted returns. For the purposes of this study, dividend adjusted returns were essential, and the use of dividend adjusted returns provided a more realistic approximation of the return an investor or fund manager could expect by holding the market.

6.3 Descriptive Statistics

The histograms of the returns for each year of the top 160 shares were presented in order to determine if dividends were disappearing in South Africa, and whether or not companies were increasing or decreasing their dividend yield. The purpose of this exercise was not to interrogate each company on an individual basis, but rather to get a feeling for the distribution of dividends across the JSE, and to determine if any change was happening over time that could be visually ascertained from the histograms.

The data showed that the number of companies that paid no dividends on the JSE fluctuated from year to year, and that no discernible pattern could be established. The histograms did not provide any evidence that dividends were disappearing, or that more companies were choosing not to pay any dividends, as was found by Fama and French (2001). What can be concluded is that during this period on the JSE, there is no conclusive evidence that the number of firms that pay no dividends are increasing. Dividends are not irrelevant on the JSE, as the majority of the top 160 shares pay dividends. Institutional investors in South Africa are major owners of equities on the JSE, and dividends are an important income stream. The persistence of such a large proportion of dividend paying firms is perhaps a reflection of the institutional shareholders demand for an income stream in addition to capital appreciation (Baker and Wurgler 2004b).

The second reason for the histograms was to find out if the spread of dividend yields were changing, either becoming larger as found by DeAngelo *et al*. (2004), or whether they were shrinking. Visually, there was no concrete evidence that dividend yields were getting smaller, with the spread of yields across all firms appearing relatively stable. The observation that the spread of dividend yields across the JSE has remained relatively stable over the period of the study shows that firms have

expended effort in maintaining dividends at a consistent level. This is again evidence that dividends are not irrelevant.

The descriptive statistics allows the inference that dividends in South Africa are not disappearing or irrelevant, and that a strategy of using dividend yield in constructing portfolios can be applied given the large number of firms that maintain dividend payments.

6.4 Hypothesis 1

The null hypothesis stated that the average annual return of the High Yield portfolio was less than or equal to the average annual return of the Low Yield portfolio. The alternate hypothesis stated that the average annual return of the High Yield portfolio was greater than the average annual return of the Low Yield portfolio.

The descriptive statistics presented a brief overview of the two portfolios, and showed that the high yield portfolio had an average return of 26.85% while the low yield portfolio had an average return of 20.67%.The difference was in excess of 6% which in the context of equity returns, is very large. The standard deviation also showed that the high yield portfolio was less volatile than the low yield portfolio, which implies that the high yield portfolio was less risky during this period. The figures from the descriptive statistics are a surprise in that the high yield portfolio was less risky even though the returns were much larger. This finding negates one explanation for the higher returns of the high yield portfolio, which is that the increased yield is due to increased risk.

Dimson *et al*. (2011), in their study for the years 11 years between 2000 and 2010, found that the excess return of the high yield portfolio over the low yield portfolio on average across the 21 countries studied, was even higher than that found in this research at 9.1%. The results of this study based on the descriptive statistics agree with the findings of Dimson *et al*. (2011), even though the premium in South Africa was smaller than the average of all 21 countries in the other study. Dimson *et al*. (2011), also found that the high yield portfolio was less volatile and risky, as was found in this study, which is intuitive since dividends provided a level of certainty and security as found by Brav *et al*. (2005).

The results from the descriptive statistics are quite compelling, and it may be tempting to conclude that the one portfolio is definitively superior to the other portfolio. Before this conclusion can be made, the results of the nine hypotheses tests corresponding to each year of the study need to be analysed. A summary of the results of the hypotheses tests are presented in the table below.

Table 6-1

Year	p-value	Mean Difference	Result
2004	0.0235	19.53%	Reject Null
2005	0.4755	0.398%	Do Not Reject Null
2006	0.4385	-9.92%	Do Not Reject Null
2007	0.4235	-10.95%	Do Not Reject Null
2008	0.000	21.23%	Reject Null
2009	0.316	2.82%	Do Not Reject Null
2010	0.0145	9.7%	Reject Null
2011	0.012	9.33%	Reject Null
2012	0.006	13.47%	Reject Null

The results showed that in five years, the null hypothesis could be rejected and statistical evidence could be found that the high yield portfolio outperformed the low yield portfolio. However, in four years, the null hypothesis could not be rejected, which means that we could not conclude that the high yield portfolio outperformed the low yield portfolio in those years. However, in only two years did the low yield portfolio outperform the high yield portfolio explicitly, that being in 2006 and 2007.

From the data, we see that in some years the high yield portfolio outperformed the low yield portfolio by a large margin and in other years the difference between the two portfolios was much smaller. What can be said is that over the nine years, the mean difference of approximately 6% is due to a few years, in which the high yield

portfolio outperformed significantly, and that the high yield portfolio was not superior in every year. However in seven of the nine years, the high yield portfolio nominally outperformed the low yield portfolio, although it was statistically significant in only five of the nine years. The hypotheses tests are not conclusive, which makes the last part of the analysis all the more important.

The cumulative return index plotted the cumulative returns of both portfolios on a graph as a graphical test of the difference between the two portfolios as suggested by Ward and Muller (2012). Ward and Muller (2012) had reservations about using hypotheses tests for detecting differences between portfolios, and they suggested the cumulative return index was a better method in visualising the difference.

The graph showed a large difference between the two portfolios, with the high yield portfolio growing by 7.36 times its original value during the nine years, versus 4.14 times for the low yield portfolio. This difference is unequivocal, and the superiority of the high yield portfolio is clearly demonstrated by this finding. Dimson *et al*. (2011), had similar findings using a cumulative return graph, where over a period of 111 years, the high yield portfolio achieved a cumulative return of over 20 times that of the low yield portfolio. While in this study of the ALSI on the JSE, the cumulative return difference is just under two times, the fact that a high yield portfolio can achieve almost double the cumulative return of a low yield portfolio on the JSE in just nine years, is strong evidence that a high dividend yield strategy can significantly outperform a low dividend yield strategy.

The evidence is strong that a high yield portfolio is able to outperform a low yield portfolio over the study period. The reason for this outperformance was not due to increased risk and hence increased reward. In looking for answers, Dimson *et al*. (2011), contemplated four theories namely risk, tax, chance and value.

The risk theory stated that any increased reward associated with the high yield portfolio was merely a reward for taking on extra risk, and was not due to any inherent superiority of the high dividend yield portfolio. The tax theory stated that high dividend yield stocks were artificially depressed due to the unfavourable tax treatment of dividends and hence they traded at discounts to intrinsic value. When the market corrects for this, the high dividend yield strategy benefits and outperforms

the market. The chance theory stated that any superior performance was merely down to chance, and that this would not persist into the future (Dimson *et al*. 2011).

The theories above are not supported by the evidence, as the high yield portfolio was less risky than the low yield portfolio as was seen by the standard deviation from the descriptive statistics. Thus risk is ruled out as an explanation. Dividend tax was only introduced in South Africa in 2012, and shares would not have been depressed artificially due to the unfavourable tax treatment of dividends. This negates the tax theory as an explanation. Finally, the hypothesis test showed that the difference was not due to chance, and this rules out the chance theory.

The explanation that most resonates is the value theory, that high dividend yield stocks are those shares that are undervalued by investors and are seen as stocks with low future growth potential. As a consequence, the share prices of those companies are depressed based not on fundamentals but on sentiment (Dimson *et al*. 2011).

Conversely, growth companies are typically those in the early stages of development and are more likely not to pay dividends as they require cash flow to fund growth. Investors overestimate the growth potential of low dividend paying stocks, and bid up the share prices of these companies to unrealistic levels (Arnott *et al*. 2009). Again, this is based on sentiment and not fundamentals. Markets can misprice equities in the short run based on sentiment, but in the long run fundamentals are what drive share price and hence returns. The inevitable correction in prices causes high growth, low dividend yield companies to underperform, and low growth, high dividend yield companies to outperform (Arnott *et al*. 2009).

6.5 Hypothesis 2

The null hypothesis stated that the average annual return of the Top 10 portfolio was less than or equal to the average annual return of the Top 40 portfolio. The alternate hypothesis stated that the average annual return of the Top 10 portfolio was greater than the average annual return of the Top 40 portfolio.

The descriptive statistics presented showed that the Top 10 portfolio had an average annual return of 26.95%, and the Top 40 portfolio had an average annual return of 21.29%. The difference between the portfolios was in excess of 5.5% and without

looking at the results of the hypothesis test, would seem to be significant. In contrast to the portfolios in Hypothesis 1, the standard deviation showed that the Top 10 portfolio (high dividend yield) was more volatile and hence riskier than the Top 40 portfolio. The Top 10 portfolio had shares with a higher dividend yield which should have reduced the volatility as was the case between the two portfolios in Hypothesis 1. However the Top 10 portfolio had only 10 shares and the Top 40 portfolio had 40 shares, meaning that the Top 10 portfolio could not fully diversify all unsystematic risk away, and the higher dividend yield was not enough to compensate for the risk associated with insufficient diversification (Dimson *et al*. 2011).

Histograms of the average returns for the two portfolios were also provided and the major difference that can be seen was that the Top 10 portfolio had one more observation in the largest return bin versus the Top 40 portfolio. That is the only discernible difference between the two portfolios which visually does not seem very significant.

A paired sample hypothesis test was performed on the sample as the portfolios were related to each other, with the Top 10 being a subset of the Top 40. The hypothesis test had a p-value of 0.006 which allowed for the rejection of the null hypothesis and was evidence that the Top 10 Portfolio statistically outperformed the Top 40 Portfolio over the period of study. This finding is consistent with that of Visscher and Filbeck, (2003), McQueen *et al*. (1997) and Brzeszczyński and Gajdka, (2008), who similarly found that the Top 10 portfolio in their respective markets outperformed the index from which it was derived before risk and taxes were accounted for. The evidence thus far is supportive of the ability of the high yield Top 10 portfolio to outperform the Top 40 portfolio and hence the market.

The cumulative return index was also presented for this hypothesis and the results were again strongly in favour of the Top 10 portfolio being able to outperform the Top 40 portfolio. The cumulative return index showed that with both portfolios starting off a common nominal base of 1, the Top 10 portfolio would have cumulatively grown to 7.35 times its original value versus the Top 40 portfolio which would have grown to 4.8 times its original value. This is not a trivial difference and the average investor or fund manager would be lauded as an investment genius with returns that were able to outperform the market by such a large margin. The visual evidence from the

cumulative return index is in agreement with the hypothesis test, as well as the casual observations of the descriptive statistics. The outperformance of the Top 10 portfolio is real and is verified by the data.

The construction of a Top 10 portfolio is neither difficult nor time consuming, and with such a large apparent performance advantage, it is a viable strategy for both the individual investor and professional manager. While the strategy might not be cutting edge or mathematically complex, the only outcome that matters is investor return, and based on the findings so far, it is hard to argue against such a strategy.

The reasons for the outperformance have to also be considered and the obvious starting point is the difference in risk between the portfolios. As was seen from the descriptive statistics, the Top 10 portfolio's return was more volatile than the Top 40, and the difference in returns could be attributed to the difference in risk. This will be further tested in the next hypothesis, where the Top 10 portfolio is formally adjusted for risk to reflect the disparity. At this stage, it can be seen as a possible explanation.

The explanation from the previous hypothesis, that high dividend and low dividend shares were proxies for value and growth companies is more difficult to make in this case, as the top 40 companies would all be mature companies that were in the stable phase of the company maturity cycle and hence would be unlikely to be growth companies. Some other factor has to be at play which is allowing for the high dividend yield portfolio to outperform the market.

The researcher proposes an alternative explanation that investors underestimate the proportion of returns that dividends contribute to total returns, and that while high dividend and low dividend yield shares might display the same capital growth return prospects; the differentiating factor is the extra boost that high dividend yields give to these companies. While this was not tested for in this study, a study on the contribution of dividends as a proportion of total returns for the top 40 shares on the JSE would be able to provide more insight and support for this theory.

6.6 Hypothesis 3

The null hypothesis stated that the average annual return of the Top 10 risk adjusted portfolio was less than or equal to the average annual return of the Top 40 portfolio.

The alternate hypothesis stated that the average annual return of the Top 10 risk adjusted portfolio was greater than the average annual return of the Top 40 portfolio.

The descriptive statistics showed that the Top 10 portfolio adjusted for risk had a mean return of 26.47% versus the Top 40 portfolio which remained the same, and still had a mean return of 21.29%. The difference between the Top 10 risk adjusted portfolio and the Top 40 portfolio would still seem to be significant at 5.18%, although this was slightly smaller than the portfolios before the adjustment for risk. The difference between the Top 10 portfolio and the Top 10 portfolio adjusted for risk is not a major one, with the risk adjusted portfolio only losing 0.48% after being adjusted for risk. The adjustment for risk has not eroded the outperformance of the Top 10 portfolio, and without looking at the results of the hypothesis test, it would seem that the outperformance was not solely due to the difference in risk between the portfolios. This finding again negates the explanation that increased risk is responsible for the outperformance of the high dividend yield strategy, and is in agreement with the same finding of Hypothesis 1.

A paired sample hypothesis test was again performed on the Top 10 risk adjusted portfolio against the Top 40 portfolio, in the same manner as Hypothesis 2. The hypothesis test had a p-value of 0.0085 which again allowed for the rejection of the null hypothesis and provided stronger evidence that even after adjusting for risk, the Top 10 portfolio outperformed the Top 40 portfolio. This finding is more significant than that in Hypothesis 2, as the two portfolios are equalised for risk, and the evidence is still in favour of the high dividend yield strategy being able to outperform the market.

This finding is consistent with that found by Visscher and Filbeck (2003), who found that the Top 10 portfolio outperformed the index from which it was derived after adjusting for risk in the Canadian market. The period of study used by Visscher and Filbeck (2003) was 10 years, which is of similar length to the nine years of data used in this study. The finding that the Top 10 portfolio outperformed the Top 40 portfolio after adjusting for risk between 2004 and 2012, demonstrates that even though Visscher and Filbeck (2003) studied the Canadian market which is in a developed economy, the same outcome can be observed in South Africa, which is a developing

economy. This demonstrates that in principle, the strategy of using dividend yield is not restricted to developed or developing economies and can be applied universally.

Caution however was advocated by Da Silva (2001) who in a study of seven emerging Latin American markets, found some evidence that the Top 10 portfolio in all the markets except Brazil was able to beat the market return after adjusting for risk. However the author cautioned that although the differential between returns was evident, the result was only statistically significant in a minority of the countries studied, and concluded that although the strategy did seem to add value, the statistical evidence was not absolutely conclusive. While the findings in Hypothesis 3 are stronger than that found by Da Silva (2001), the limitations of the time period should be noted, in that the results could be due to having selected a favourable period and further study over a longer time period would be required to make any universal claims.

The cumulative return index was again strongly in support of the proposition that the Top 10 portfolio was able to outperform the Top 40 portfolio after being adjusted for risk. With both portfolios starting off a common base of 1, the Top 10 risk adjusted portfolio would have grown to 7.16 times its original value while the Top 40 portfolio would have grown to 4.8 times its original value. This finding was slightly less than that found from the cumulative return index in Hypothesis 2, but the difference is marginal. This again lends support to the theory that the difference in performance between the two portfolios is not merely down to a difference in risk, and that the visual evidence is strongly in favour of the superiority of the Top 10 risk adjusted portfolio over the Top 40 portfolio. The evidence is strongly in favour of the outperformance being real, with the cumulative return index supporting the results of the hypothesis test.

The reason postulated in Hypothesis 2, that the difference in performance is due to the impact of dividends on total returns, and that investors underestimate the effect that dividends have on total returns is looking more plausible. Adjusting the Top 10 portfolio for risk equalises the expected returns of capital growth between the two portfolios, and the mean difference of 5.18% could be the boost that is given by having high dividend stocks in the portfolio. As previously stated, the proportion of dividends to total returns was not tested for in this study, and research in this area

would be able to add insight into whether a mean difference as the one observed could be attributable to the effect of dividends on total return. High dividend yield could also be an indicator of an inefficient market, and that the firms with high dividend yield are systemically undervalued by the market which subsequently corrects and leads to outperformance relative to the market.

6.7 Hypothesis 4

The null hypothesis stated that the average annual return of the Top 10 risk and tax adjusted portfolio was less than or equal to the average annual return of the Top 40 tax adjusted portfolio. The alternate hypothesis stated that the average annual return of the Top 10 risk and tax adjusted portfolio was greater than the average annual return of the Top 40 tax adjusted portfolio.

The descriptive statistics presented showed that the Top 10 portfolio adjusted for both risk and taxes had a mean return of 25.36% while the Top 40 portfolio adjusted for tax had a mean return of 20.55%. The difference between the Top 10 risk and tax adjusted portfolio and the Top 40 tax adjusted portfolio was again smaller at 4.81%, versus 5.18% in Hypothesis 3. The adjustment for the effect of both risk and tax had still not eroded the outperformance of the Top 10 portfolio, and this finding negates the view that either taxes or risk are the reason for the difference between the returns of the two portfolios.

This finding is even more significant as the Top 10 portfolio as well as the Top 40 portfolio were adjusted for tax for the entire study period between 2004 and 2012. This was done despite the fact that dividend taxes were only introduced in South Africa in 2012. However, the portfolios were adjusted for tax during the entire period as the reason for this study was to assess the efficacy of dividend yield as a portfolio selection tool, and any practitioner today would face the reality of taxation from the onset of portfolio selection. The descriptive statistics provided compelling prima facie evidence in favour of dividend yield as a selection strategy, but to fully assess whether the difference is significant, the results of the hypothesis test need to be considered.

A paired sample hypothesis test was performed on the Top 10 risk and tax adjusted portfolio against the Top 40 tax adjusted portfolio, in the same manner as Hypothesis 2 and 3. The hypothesis test had a p-value of 0.010 which again allowed for the

rejection of the null hypothesis and provided the strongest evidence to date from all the previous tests that even after adjusting for risk and taxes, the Top 10 portfolio outperformed the Top 40 portfolio. This finding is significant in that two major reasons for the differences in portfolios can be rejected, that of compensation for increased risk, and the effect of taxation policy.

This finding is much stronger than that found by Rinne & Vähämaa (2011), who found that although the strategy was able to outperform the market, the authors doubted whether the outperformance would have survived adjustments for taxation, particularly in the Finnish market where taxes were relatively high. Rinne & Vähämaa (2011), as well as most of the others researchers into this strategy, including McQueen *et al*. (1997), advised caution even after adjusting for risk and taxes and qualified their findings by the possibility of transaction costs eroding any superior performance.

This finding is also stronger evidence than that found by McQueen *et al*. (1997), who found that the Top 10 portfolio only outperformed the index from which it was derived after adjusting for risk and taxes during certain sub periods. The period of study used by McQueen *et al*. (1997) was from 1946 to 1995, and thus a direct comparison between the time periods of the two studies is not possible as there is no overlap. The finding that the Top 10 portfolio outperformed the Top 40 portfolio after adjusting for risk and taxes between 2004 and 2012, cannot be interpreted to mean that this would be the case under other time periods. Caution also has to be taken in extrapolating, as this outperformance in the real world could be eroded by transaction costs and further research into the effect of transaction costs on return is needed to be able to provide more insight.

Finally, the cumulative return index was still strongly in support of the proposition that the Top 10 portfolio was able to outperform the Top 40 portfolio after being adjusted for both risk and taxes. With both portfolios starting off a common base of 1, the Top 10 risk and tax adjusted portfolio would have grown to 6.60 times its original value while the Top 40 tax adjusted portfolio would have grown to 4.55 times its original value. The visual evidence was perhaps more striking than the hypotheses test result, as even after making adjustments for risk and taxes, the gap between the two portfolios was large, which can be seen more intuitively on a graph.

Hypothesis 3 and 4 have shown that the reason for the outperformance of the Top 10 portfolio is not due to the effect of risk or taxes, and this lends support to the theory that the outperformance is linked to the ability of high dividend yield being able to identify shares that are undervalued by an inefficient market. The efficient market hypothesis has long being criticised, and studies have shown that markets consistently misprice securities. That dividend yield can be used as one method of identifying undervalued securities is a finding that is easily applied by almost any investor. This has value in that the costs associated with implementing the strategy are negligible and the potential payoff is the ability to consistently outperform the market, something which most professional fund managers are unable to do.

The second possibility for the results achieved, is that investors consistently underestimate the amount that dividends contribute towards total returns. Miller and Modigliani's (1961) argument that whether a firm pays out dividends, or retains them, is irrelevant to investor returns has been the dominant theory on dividends since the theory first appeared. This has permeated the collective thinking of the investment community and dividends as a contributor toward total returns is thus underestimated systemically. Research into the percentage contribution of dividends toward total returns would enable a more enlightened discussion as to whether this is the reason for the outperformance of the high yield strategy.

These two reasons are not mutually exclusive and the outperformance could very likely be some combination of these, with each reinforcing the effect of the other.

6.8 Conclusion

The evidence as shown is largely in support of the high dividend yield strategy's ability to produce outperformance even when adjusted for the effects of risk and taxation. The reasons for this outperformance are strongly suspected to be due to a combination of the value effect and the underestimation of the contributions dividends have toward total returns. The cumulative return graphs are even more compelling, and the visual superiority of the high dividend yield portfolios is immediately evident, even to the unsophisticated investor. These findings provide a persuasive argument for both individual and professional investors to consider a high dividend yield strategy when constructing their investment portfolios.

7 Conclusion

7.1 Background

The motivation for this research started with the premise of finding a simple and low cost strategy that would be easily applicable in order to beat the returns of the market as a whole. Both individual and professional investors are searching for yield in the current low interest rate environment, which coupled with very volatile equity markets, makes for a very challenging investment climate. A high dividend yield strategy was proposed as a solution to both problems, as dividends could provide income in a low interest rate environment, and the high dividend yield portfolio was a possible candidate to outperform the market. This chapter will provide a motivation for the use of a high dividend yield strategy, as well as discuss the limitations to the adoption of this strategy.

7.2 Findings and Implications

The findings of this study have already been discussed in the previous chapter, and this section will provide a summary of these findings, and present them in a manner which highlights the evidence that supports the applicability of the high dividend yield strategy. The main focus areas are the results of the hypotheses tests, and the cumulative return indices, both of which provide a level of evidence that adds credibility to the application of a high dividend yield strategy. Table 7-1 and Table 7-2 below summarise these results and provide the platform for the discussion which follows.

Table 7-1

	Portfolios	T-Test Type	p-value	Result
Hypothesis 1	1)High Yield vs. 2)Low Yield	Independent	0.3065	Do Not Reject Null
Hypothesis 2	1)Top 10 vs. 2)Top 40	Paired	0.006	Reject Null
Hypothesis 3	1)Top 10 Risk vs. 2)Top 40	Paired	0.0085	Reject Null
Hypothesis 4	1)Top 10 Risk &	Paired	0.010	Reject Null

	2)Tax vs. Top 40 Tax			

Table 7-2

	Portfolios	Portfolio 1	Portfolio 2	Multiple
Cumulative Return 1	1)High Yield vs. 2)Low Yield	7.36	4.14	1.78
Cumulative Return 2	1)Top 10 vs. 2)Top 40	7.35	4.8	1.53
Cumulative Return 3	1)Top 10 Risk vs. 2)Top 40	7.16	4.8	1.49
Cumulative Return 4	1)Top 10 Risk & 2)Tax vs. Top 40 Tax	6.6	4.55	1.45

Table 7-1 shows that three out of the four hypotheses tested provided evidence that the high dividend yield strategy was able to produce superior performance. Hypothesis 1 was different to Hypotheses 2 to 4, not only in the results achieved, but also in the portfolios tested. Hypothesis 1 tested a high dividend yield portfolio against a low dividend yield portfolio, and divided the top 160 shares of the JSE by market cap into the two portfolios.

While Hypothesis 1 was unable to provide statistical evidence of a difference in returns between the portfolios, the cumulative returns showed that the portfolios differed significantly in the overall return to investors. The cumulative return showed that the high yield portfolio would have cumulatively grown by 7.36 times its original value, and that its performance would have been 1.78 times the relative performance as compared to the low yield portfolio. While the hypothesis test might not have been sensitive enough to provide convincing evidence of a difference in returns, the cumulative returns provided a comparison that any investor would regard as convincing evidence of the superiority of the high yield portfolio.

Hypotheses 2 to 4 tested a Top 10 high dividend yield portfolio against the Top 40 portfolio, constructed from the largest 40 shares by market cap on the JSE. The Top 40 shares were a proxy for the market return, and the tests were designed to determine if the high dividend yield strategy could outperform the market. The tests were further refined by adjusting the portfolios first for risk and then for both risk and taxes, to give a closer approximation of the returns that could be expected in the real world. Hypotheses 2 to 4 all provided evidence that the Top 10 portfolio was statistically superior to the Top 40 portfolio and hence the market. This result held even after adjusting for both risk and taxes, and negated theories that stated any superior performance was due to these two factors. The cumulative returns added further weight to the findings, with the risk and tax adjusted portfolio achieving a 1.45 times relative performance advantage over the market.

The reasons as discussed in the preceding chapter were that the superior returns were a combination of the value effect and the underestimation of the percentage returns dividends contributed toward total returns. This observation provides a credible base from which to implement a high dividend yield strategy, as the reasons are based on fundamental value, and not on short term sentiment or emotion.

As this study was not meant solely as an academic exercise, the application of a low cost strategy that would enable even an unsophisticated investor to outperform the market in the real world, was always a central pillar that motivated this research. The researcher believes that the evidence presented provides a compelling argument for the adoption of such a strategy by investors, both professional and individuals in constructing their portfolios.

The idea that sophistication and complexity is essential in creating portfolios that are able to outperform the market is commonplace, yet the majority of professional fund managers are unable to achieve sustained superior performance over the long term. The cynic would argue that the smokescreen of complexity created by finance professionals is a self serving attempt at protecting generous fee structures at the expense of their clients.

This research provides evidence that a simple and easy to implement strategy, can potentially be used as one tool in achieving superior performance, and that the relative simplicity of the strategy should not be dismissed out of hand before looking

at the evidence. In a financial world where complexity is increasing every day, a contrarian approach using dividend yield is one possible area where value is hidden in plain sight.

7.3 Limitations of Research

The previous section provided convincing evidence for the application of a high dividend yield strategy. However caution should be applied when interpreting these findings as factors which have not been accounted for in this study have the potential to reduce the magnitude of the evidence presented. Several limitations to this research were alluded to previously in this research, and these are documented below with a short discussion with regard to each limitation. Each limitation also brings with it a corresponding opportunity to expand and improve upon this research and these opportunities are discussed in the next section.

The first limitation is the time frame of this study, which was from 2004 to 2012. This represented nine years of data, and although this time period was consistent with the length of study of some of the international studies on high dividend yield portfolios, the findings might not be able to be extrapolated to other periods. The relevance of the applicability of these findings is an important consideration, as the implementation of any investment strategy should ideally be supported by evidence over an extended period of time.

The time period between 2004 and 2012 is one that has been characterised by enormous societal change, both technologically, and by the shifting of economic power from the West to the East. The GFC also occurred during this time period, and an event of such magnitude is unlikely to happen again in the near future. To the extent that this could have influenced the findings of this report, due consideration should be given to these factors when interpreting the results of this study.

The second limitation of survivorship bias is one that is often encountered in financial studies, and the availability of databases that are free from survivorship bias is limited in the South African context. The limitations of time and cost for this research precluded the manual construction of a database free from survivorship bias, and the researcher is unaware of any public database that makes this data available. Survivorship bias has been shown to have an impact on other studies, and this is a

consideration that also needs to be appreciated when interpreting the results of this study.

The third limitation is that of the effect of transaction costs on any observed outperformance, as transaction costs have the potential to erode the magnitude of this outperformance. The magnitude of transaction costs would vary based on the investor, with professional fund managers being able to negotiate significantly lower rates than private investors. The effect that transaction costs would have on each class of investor should be considered based on the level of transactions costs applicable to each class of investor.

Finally, confounding events could introduce either positive of negative bias, and this study did not attempt to identify all the events that had the potential to affect the returns of the JSE. While confounding events are more influential when conducting event studies, the effect of confounding events on the results achieved cannot be dismissed out of hand without a thorough evaluation.

7.4 Recommendations for Future Research

This research was primarily concerned with the real world application of a high dividend yield strategy, and the limitations as noted above provide several channels to explore in order to expand on the current research, and improve on the real world application of these findings. The limited scope of this research would be enriched by the recommendations below, allowing for the wider appreciation and application of a high dividend yield strategy in the South African investment community.

The first recommendation is to increase the time span of the study, and to use as long a period as possible, dependent on the availability of data. As an extreme example, McQueen *et al*. (1997) used 50 years of data, and were able to identify sub-periods where dividend yield was useful as a portfolio selection tool, and other periods where it was not. While it might be extremely difficult in the South African context to acquire data over such a long time period, a study that used a larger time frame might uncover period specific effects not uncovered by this study.

The second recommendation is to account for survivorship bias, and use a database that has the data records of all firms that have been delisted off the JSE. While the researcher might not have access to such a database, other researchers might and

by accounting for survivorship bias, the real world application of a high dividend yield study can be assessed under more realistic assumptions.

Accounting for transaction costs is the third recommendation for future research, as the returns to any investor can be affected by the level of transaction costs incurred as a consequence of portfolio creation and thereafter, portfolio churn. The annual rebalancing of the portfolios has the potential to attract a significant amount of transaction costs, dependent on the number of changes to the portfolio. The impact of transaction costs should be assessed at different levels, based on the transaction rates that are available to a wide range of investors, from the individual through to the large mutual funds. This again would add another element of realism into the analysis as all investors would be affected to some degree by these costs.

The final recommendation is to understand the role that dividends play as a percentage of total returns. The idea that investors underestimate the impact of dividends on total returns is one that has been proposed in this study, and further research into this would be able to provide evidence either for or against this premise.

The real value in this study is the ability to apply the findings of this research to portfolio selection by finance practitioners. The recommendations above are not merely of academic interest, but are meant to add value by accounting for the limitations of this study all of which are grounded in reality. Demonstrating the robustness of the results of this research after accounting for these limitations can provide conclusive evidence that dividend yield is truly a superior investment strategy.

8 References

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