UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

AN INVESTIGATION INTO CHANGES IN PRICE MOMENTUM AFTER SHARE EX-DIVIDEND DATES

BY

Wynand Marais (MRSALB002)

DISSERTATION

Submitted to

UNIVERSITY OF CAPE TOWN

Department of Finance and Tax

Research dissertation presented for the approval of the University of Cape Town Senate in partial fulfilment of the requirements for the degree of Master of Commerce specialising in finance (in the field of financial and risk management) in approved courses and a minor dissertation. The other part of the requirement for this qualification was the completion of a programme of courses.

Supervisor: Darron West (University of Cape Town)

Declaration

I declare that this is my own original work and that all sources have been accurately reported and acknowledged. It is submitted to the University of Cape Town for the degree of Master of Commerce. This dissertation has not been submitted for any degree or examination at this or any other university.

Wynand Marais

Abstract

This paper examines changes in share price momentum by comparing the share price momentum before and after the ex-dividend date. The study was conducted using price data from shares comprising the Johannesburg Stock Exchange (JSE) Shareholder Weighted Top 40 Index on 30 June 2015. Share price momentum changes were considered over 10 business days, 21 business days and 90 business days before and after the ex-dividend date. The results of the study are as follows: The share price momentum tends to be positive before and after the ex-dividend date. On average, the share price momentum is positive more frequently before the ex-dividend date than afterwards. Comparing before and after ex-dividend date share price momentum, there was no statistically significant difference over 10 and 21 business days. When comparing before and after ex-dividend date share price momentum over 90 business days, a statistically significant difference exists. The reasons for the respective statistically significant and non-significant differences are speculative and are not addressed in this paper. These occurrences could be investigated as further areas of research.

Contents

Chapter 1: Introduction

Momentum trading can be explained colloquially as a strategy in which an investor buys shares that show an upward trend (thriving shares or winners) and simultaneously sells shares that show a downward trend (struggling shares or losers), in order to achieve excess return (Page, Britten & Auret, 2013).

The research question addressed in this study is whether the share price momentum changes after the ex-dividend date. For the purposes of this study, the phrases "share price momentum" and "stock price momentum" are used interchangeably.

Research about the effect of dividends on price momentum and on the human psyche has been well-documented and is set out in more detail below. The review of relevant literature set out below will address the following thematic reasons for price momentum and the effects thereof:

1. Short-term versus long-term trends
2. Trade volume effect
3. Behavioural finance effect
4. Economic variables effect
5. Dividend effects

Each theme is summarised briefly in these introductory comments before being addressed in more detail in chapter 2.

Jegadeesh and Titman (1993) researched the short-term and long-term stock price momentum of shares. They suggest that the short-term stock price momentum differs significantly from the long-term stock price momentum. Reversal of short-term negative stock price momentum is evident over the long term. On average, positive price momentum over the previous six months tends to persist over the following six months and achieves outperformance. However, on average, stocks with a positive stock price momentum over the previous six months will have a negative price momentum over the longer term. Jegadeesh and Titman's (1993) observations about the reversal of stock price momentum offer support for contrarian investment strategies.

The effect of trade volume on stock price momentum has been debated. Lee and Swaminatha (2000) continued the research of Jegadeesh and Titman (1993) and discovered that trading

volumes do provide information regarding the reversal of gains and losses over the short term and long term. Lee and Swaminatha (2000) believe past winners that traded at high volumes reverse gains over the long term much faster than past winners that traded at low volumes.

Stock price momentum has been explained by various behavioural finance theories. Behavioural finance theorists argue that stock price momentum is caused by factors such as naive trading by investors and other cognitive and heuristic biases. The main behavioural finance theories responsible for stock price momentum are believed to be regret aversion bias, the herding effect and overconfidence (Nørregård, 2008).

Changes in stock price momentum and the correlation with economic variables have also been studied. Verardo (2009) investigated how divergent views of analysts can influence stock price momentum, while Chordia and Shivakumar (2002) studied the effect of various macro-economic factors on stock price momentum. Verardo (2009) discovered that momentum profits increase as investment beliefs disperse, while Chordia and Shivakumar (2002) found that macro-economic factors such as dividend yield, the default spread, the yield on three-month T-bills and the term structure spread can explain momentum profits.

Chan et al. (1996) and Chordia and Shivakumar (2006) researched the asymmetry between thriving and struggling stocks that pay dividends. They believe that when struggling or less successful companies maintain or increase their dividends, investors interpret it as positive, while it is seen as negative when thriving or more successful companies maintain their dividends. Asem (2009) researched momentum profits for dividend paying stocks versus those for non-dividend paying stocks. He suggests that dividend paying stocks experience larger momentum profits than non-dividend paying stocks. On the other hand, Zhang (2006) did similar research as Asem (2009), Chan et al. (1996) and Chordia and Shivakumar (2006) and suggests that momentum profits do not increase due to dividend maintenance but rather as a result of information uncertainty being neutralised when companies maintain their dividends.

The balance of this paper is set out as follows: Chapter 2 contains a detailed thematic review of the relevant literature; chapter 3 sets out the research method and the data set that was used; chapter 4 provides the analysis and interpretation of the results of applying the research method to the data; and chapter 5 contains conclusions arising from the study.

Chapter 2: Literature review

Seminal work

Jegadeesh and Titman (1993) conducted a seminal study about stock returns and momentum, tracking and documenting how stock momentum varied over the short and long term. If share prices react abnormally to new information in the market (i.e. overreact), investors will create a trading strategy to profit from this. Jegadeesh and Titman (1993) noted that some finance and behaviour finance professions felt that human nature will cause individuals to overreact to new information in the market. According to Jegadeesh and Titman (1993), theirs is a direct addition to a study by De Bondt and Thaler (1985). Investors' emotions often prompt them to overreact, which can cause stock prices to overreact (Jegadeesh & Titman, 1993). Overreaction stimulates contrarian trading and investment strategies. Overreaction to negative information leads to stock being sold at much lower prices than might rationally be expected. Overreaction to positive information has the opposite effect. De Bondt and Thaler (1985) found support for a contrarian strategy by showing that shares that performed poorly in the previous three to five years outperformed in the subsequent three to five year.

Contrarian strategies have been well-documented, with Neill (1954) originally formulating a theory of "going against the herd", which was named "the contrarian option". Neill (1954) supported the theory by researching the prevailing market opinion at the time. He would then calculate the probability of that opinion being proved incorrect. Investors do not necessarily make wrong decisions; they are capable of making rational and reasonable decisions (Neill, 1954). However, when an event occurs that has a high degree of emotional appeal to a large number of investors, herding behaviour can take over. This may cause a rational investor to make a decision that probably would not have been made if the investor acted alone. Davis (2004) noted that the market can act irrationally and illogically with regards to the economic fundamentals of a market or a specific share. Irrationality in stock markets can often persist over the short or even the medium term. Over the long term, the collective knowledge of the market becomes more rational, which smooths out irrational behaviour. Short-term market movements are largely a result of herd behaviour and market psychology. Davis (2004) delved into why the market reaches contrarian turning points and when those turning points normally occur. He argues that they are linked to market liquidity, which cannot last forever, but can drive the market in the short to medium term. Davis (2004) gives an extreme example of how market liquidity or cash can drive the direction of the market:

If investors on the JSE All Share Index believe the market will rise by 30%, investors will start buying, making stocks more expensive. Investors will continue to buy into the market as they see rising prices and returns. However, they will reach a stage where they are fully invested and do not have any liquidity left. When no investors are able to invest anymore, the market will be classified as overbought and will not able to rise anymore. Optimism in the market is noted as extreme when liquidity in the market is at a low point. If investors want to regain liquidity, they will need to start selling, decreasing the market's value and return.

Conversely, when investors believe the JSE All Share Index will drop by 30%, they become nervous and will start selling, which will force the share price down. Shareholders will reach a stage where they do not have any shares left to sell, the market will reach oversold territory and will not be able to sell lower any more. Pessimism in the market is noted as extreme when liquidity is at a high point. Liquidity or cash does not yield adequate returns (at most stages) for equity investors. At some point, investors will start chasing equity yields and reinvest in the equity market, driving up share prices and removing liquidity.

Using the same logic, Jegadeesh and Titman (1993) devised a momentum strategy to test if stock with short-term positive momentum will continue having this momentum throughout the short term, while stock with short-term negative momentum will continue having it throughout the short term. They used the Relative Strength Index to measure the momentum of stocks over several time periods, varying holding periods and different market capitalisations. Jegadeesh and Titman (1993) suggested that a trading strategy where you buy and sell stock based on its performance over the past six months and then hold your position for six months realized a compounded outperformance of 12.01% per year on average. This is accurate for a short-term trading strategy, but the outperformance reverses partially over a longer timeframe. Jegadeesh and Titman (1993) also advised that, according to their model, eight to twenty months after a portfolio formation date, the stocks in the negative momentum portfolio outperformed those in the positive momentum portfolio significantly, supporting contrarian investment strategies.

Momentum trading and trade volume

Lee and Swaminatha (2000) believe that valuable stock information can be gathered from analysing past trading volumes. The information the trading volume provides and how it should be interpreted are debated among academics. Lee and Swaminatha (2000) feel that this uncertainty flows over to the predictability that past trading volume may have on future returns. Trading volume and share returns are mutually determined by similar market dynamics and

both are linked in textbook theory. Although the dependence is certain, prior research treated the two share characteristics separately. Lee and Swaminatha (2000) attempt to investigate the predictability of future returns by analysing past trading volume.

While investigating the link between future returns and past trading volume, Lee and Swaminatha (2000) agreed with Jegadeesh and Titman's (1993) argument that significant price reversals happen over longer time periods. They agreed that over a stock return time horizon of three to five years, stocks that thrived significantly underperform against those that struggled. Lee and Swaminatha (2000) argue that current price momentum is not merely a result of historical underreaction, but also happens due to overreacting.

Taking their overreaction theory into account, Lee and Swaminatha (2000) continued their study about the correlation between the volume of shares, momentum in share prices over the shorter term and the reversal of share prices over the longer term. After comparing shares that used to thrive with a high trading volume with those with a low volume, they learned that high volume past winners reverse gains over the long term much faster than those with low trading volumes. This supported Jegadeesh and Titman's (1993) idea that information gathered from past trading volumes can provide valuable data in reconciling underreacting and overreaction in the short term compared to possible return reversals over the long term. Lee and Swaminatha (2000) therefore suggested that trading volume can be more than just a proxy for stock liquidity. It can also be a beneficial criterion to research, specifically with regards to contrarian investing.

Behavioural finance and momentum trading

In the past, behavioural theories suggested that momentum trading can be the result of naive trading by investors with biased prospects (Hvidkjaer, 2006). The academic literature on behavioural finance advocates that investors suffer from cognitive bias, or heuristic bias, leading investors to hold on to a specific theory or model that will result in an expected return. Hvidkjaer (2006) noted that behavioural finance can have a dramatic effect on the price momentum of stock, and this can also easily be measured and extrapolated.

According to the Central Intelligence Agency ("CIA") (2008), cognitive bias is one of the fundamental limitations the human brain experiences when information is processed mentally. The CIA (2008) believes that cognitive limitations cause humans to implement various mental strategies that simplify the mental processing burden. According to them, these rule of thumb

strategies simplify the mental capacity that is required to solve ambiguous and complex problems. As convenient as it may seem, this cognitive bias can often lead to faulty and predictable judgements and decisions. The CIA (2008) argues that cognitive biases can be characterised as mental mistakes made by human beings in an effort to simplify information. They advocate that this form of bias does not originate from any form of intellectual of emotional predisposition towards judging certain information, but rather results from subconscious cerebral techniques for processing data.

When the models that cognitive bias investors are committed to are uncorrelated, there will be no effect on share prices, due to investors trading with one another (Hvidkjaer, 2006). Conversely, he argues that if different models equate comparable predictions, investors will attempt to sell or buy the same securities, driving stock prices down or up, often in the absence of any new fundamental news and information. Hvidkjaer (2006) therefore suggests that the relationship between the prices and cognitive bias of investors is the trading behaviour of investors. A relatively simple trading method that can be studied to develop more insight into trading behaviour is momentum trading. Hvidkjaer (2006) provides insight into his model by advocating that stock trading can be studied by investigating whether the trading behaviour is constant with a suggested behavioural explanation of a return abnormality, or whether it is constant with a higher degree of rational motivation. Hvidkjaer (2006) believes that momentum trading provides an opportunity to study how current demand affects future returns and that momentum trading simplifies the study of cognitive bias due to the well-defined time period during which momentum trading portfolio performance is measured.

Nørregård (2008) examined a number of behavioural finance biases that influence the price momentum of stocks in the Danish market. He documented that the disposition effect, or regret aversion bias, is the prejudice of investors to sell securities that have increased in value to realise the capital gain and hold on to those that have decreased in value due to their unwillingness to realise a loss. The fear of losing or the regret of losing has a stronger impact on investors than the fear of selling too early. Nørregård (2008) believes that this bias affects the stock momentum by decreasing price momentum. He says that if investors sell a share that is increasing in value and has a positive stock price momentum, they erode the positive momentum. If investors hold on to a stock that is decreasing in value, they do not increase the negative price momentum but rather keep it neutral or stable. In essence, this erodes the potential negative momentum that an investor without regret aversion bias would add to the stock price momentum.

Nørregård (2008) believes that risk aversion bias can be difficult to identify in the market. He argues that the reason for this is the possible subjectivity of investor behaviour. Nørregård (2008) mentions that investors can sell shares with positive momentum due to a number of aspects, including regulatory factors, internal guidelines and restrictions, as well as holding periods. Selling positive momentum shares may be due to loss aversion bias, but as with many investment strategies, the subjectivity of value can also result in selling due to fundamental calculations (Nørregård, 2008). When investors refrain from selling shares with negative momentum, they may be influenced by similar factors as when investors refrain from selling positive momentum shares, including the fundamental calculation belief that the market is incorrect and that the specific investor is correct (Nørregård, 2008).

Nørregård (2008) explains the herding bias effect as investors who refrain from making decisions that differ considerably from those of other investors, as well as investors who have the propensity to bundle together. Nørregård (2008) argues that the herding effect is similar to the disposition effect, due to investors experiencing losses or negative stock price movements much more severely than stock price gains. He continues to suggest that investors experience losses much less intensely when they also involve other investors. The more an investor's portfolio diverges from that of other investors, the more severely the investor will feel losses.

Nørregård (2008) contemplates that the effect of herding forces investors to invest in companies with historically good returns and economic performance, rather than in companies with promising future prospects but which have not yet been verified by their profitability. According to Nørregård (2008), investors invest in companies with good historical returns, believing that they are high quality companies and therefore partially protected against risk aversion. If the high quality company underperforms, investors can argue that it was extremely difficult to foresee, while the underperformance of a low quality company or companies without a proven profitability track record could be argued as easily predictable.

Nørregård (2008) therefore suggests that a positive stock price momentum will increase in stocks with good historical returns that often had positive price momentum. He suggests that negative stock price momentum will increase in stocks with historically low returns that often had negative stock price momentum historically. The continuation of positive or negative stock price momentum may be due to investors accumulating or selling stocks in an effort not to diverge from other investors (Nørregård, 2008). The herding effect of investors' behavioural bias can cause an increase in stock price momentum, both positively and negatively. Nørregård

(2008) remarks that herding is often easily identified in markets where investors benchmark themselves against the index or other similar investors and in extreme bull and bear markets where the fundamental underlying shares do not correlate with stock prices.

Nørregård (2008) believes that overconfidence is the bias when investors overestimate their knowledge, skills and abilities compared to the average investor. These heuristics can influence investors' decision-making ability, leading them to believe their decisions are more correct than those of others. Nørregård (2008) suggests that overconfident investors are often optimistic in situations with low probability or when forecasting outcomes that are determined at random. He also believes that professional investors are overconfident compared to non-professionals without expertise or a qualification in a certain discipline.

Nørregård (2008) understands that professionals are confident compared to non-professionals, but considers professionals to be overconfident when making decisions with very low probability and making decisions at random. Non-professionals and professionals have the same expertise when making random decisions, according to Nørregård (2008). He argues that professionals should have the expertise not to make low probability decisions, while non-professionals often adhere to the possible outcome of a low probability decision and therefore choose not to make the decision. Nørregård (2008) believes that overconfidence is still not legitimate when experienced as a bias by professional investors, or investors who are more knowledgeable and have a stronger mental capability. Investors should therefore be aware of and refrain from having an overconfidence bias.

Kent and Titman (1999) believe that overconfidence bias affects the way individuals' process information. They suggest that overconfidence affects stock price momentum in a positive and a negative direction. They give an example that investors might be unwilling to sell struggling stocks due to not believing evidence suggesting that they might be wrong. The same unwillingness can be identified with thriving stocks, due to investors being unwilling to buy winners (Kent & Titman, 1999).

According to Nørregård (2008), the representativeness bias refers to a situation where a disproportionate amount of attention is paid to a specific piece of prominent evidence, even if it carries a fairly low weight in its predictive capacity. He continues to sketch representative bias as the propensity of investors to base their decisions on simplified factors that link occurrences and events. Some investors often estimate the probability that an event will occur as normal, while the statistical probability of such an occurrence is ignored. Nørregård (2008)

argues that investors also base the probability of an event occurring by comparing it to recent similar events. They believe that the more similar the event, the higher the probability that it will occur and the less similar the event, the less the probability of it occurring. Nørregård (2008) provides examples of his theory in the financial markets, such as the overreaction by investors to new information. He believes investors often value new information too highly when they predict the future returns of stocks. By overweighting a recent event, investors can often underweight long-term averages which could skew the predicted results extensively.

Nørregård (2008) suggests that representativeness bias can be split in two forms – base rate neglect and sample size neglect. Base rate neglect refers to the bias where investors make decisions by disregarding the available information on the tangible statistical distribution of a population by relying on the self-perceived distribution, which they base on recent events. Sample size neglect refers to the bias where investors base their decision on a small number of events, disregarding the distribution of a complete population and ignoring the high variance of a tiny sample.

According to Barberis, Shleifer and Vishny (1998), representative bias can cause investors to overreact. This can increase the negative or positive price momentum. Agreeing with Nørregård (2008), Barberis, Shleifer and Vishny (1998:316) suggest that investors will digest information selectively. They might disregard the reality of a company's low earnings by continuing to base their analyses on the company's historical high earnings. Investors with representative bias may continue to believe that the company will indefinitely deliver good earnings, although it is highly unlikely (Barberis, Shleifer & Vishny, 1998).

Nørregård (2008) believes conservatism or underreaction bias refers to the heuristics trait where investors are unwilling to make shifts and changes, although current events and information indicate that such actions are necessary. This could imply that investors, instead of overreacting to new information, underreact to it. Nørregård (2008) believes this is an error in the processing of new information that forms part of the investor's decision-making process. The slow or inefficient processing of new information that is available in the market can cause a price lag for stocks. When market information is immediately and efficiently processed, the market can be judged to be more efficient (Nørregård, 2008). Barberis, Shleifer and Vishny (1998) suggest that conservatism leads to under reaction in the market. This could result in a decrease in positive or negative price momentum.

The effect of dividends on stock price momentum

Jegadeesh and Titman's (1993) research suggests that in the short term struggling stocks, or stocks with negative momentum, continue to lose, while thriving stocks or stocks with positive momentum continue to win. They believe that this phenomenon is reversed over the longer term, causing struggling stocks to thrive and thriving stocks to become less successful.

Carnevale (2012) advocates that stock returns are generally made up of two components – capital appreciation or depreciation and income. Capital appreciation or depreciation can be identified as the difference between the cost of the stock and the current selling price, while income can be identified as the dividend paid by the stock. Hvidkjaer (2006) believes that a relatively simple trading method that can be studied is momentum trading. Evidence of momentum trading and price momentum is easier to extrapolate in the short term.

Asem (2009) investigated this return contribution to discover the effects of dividends on the momentum of a stock. Chan et al. (1996) and Chordia and Shivakumar (2006) studied the relationship between the dividend payments of stocks and their price momentum. They concluded that there is an asymmetric relationship between dividend payments in thriving stocks and those in struggling stocks. Asem's (2009) studies suggest that if a company with declining earnings maintains its dividend and dividend policy, its message to the market is that the company's management does not believe that the deterioration in earnings will be prolonged. Asem (2009) believes it indicates that management is willing to pay a dividend in conjunction with the weak earnings due to the anticipation that the decreased earnings are irregular and that improved earnings are due.

Asem (2009) therefore argues that dividend payments by struggling stocks can be interpreted as a positive signal. Conversely, he believes that thriving stocks maintaining their dividends are not necessarily a positive signal. Asem (2009) argues that stocks that maintain their dividends when earnings increase signal that such increases are not to be expected or experienced in future. He believes that thriving stocks with increasing earnings will raise their dividends because the company believes that future earnings will increase. This indicated to Asem (2009) that the maintenance of dividends conveys divergent information for thriving and struggling stocks. He continued to suggest that new market evidence indicates that when dividend paying stocks are compared to non-dividend paying stocks, the latter produce higher momentum profits. Asem (2009) therefore believes that when taking into account dividend paying stocks that increase or decrease their dividend payments and when comparing dividend

paying stocks with non-dividend paying stocks it is evident that a company's dividend policy and management decisions have an impact on momentum profits.

This evidence supports Miller and Modigliani's (1961) theory about the importance of dividends. They suggest that if an investor takes into account a firm's investment policy, the dividend policy should have no effect on the firm's current market valuation. They do concede that they believe firms with a higher dividend pay-out ratio often command a premium in the market, while firms with a lower pay-out ratio often trade at a discount. Although Asem (2009) suggests that an increase in the dividend pay-out ratio is believed to be a signal by management that improved economic and financial times are to be expected while a decrease in a firm's dividend ratio forecasts the opposite, Miller and Modigliani (1961) still conclude that the change in a firm's value due to a change in the dividend policy (ignoring the effect of tax) is a result of systematic irrationality identified in the behaviour bias of investors.

The effect of dividends on the momentum of stocks was further investigated by researching the effect of a firm's dividend policy in a bear market and a bull market (Fuller and Goldstein, 2005). They studied the dividend effect on thriving and struggling stocks and believe that firms with a high dividend pay-out ratio outperform those with a low dividend pay-out ratio in bear markets, when all firms tend to struggle. In bull markets, when all firms tend to thrive, Fuller and Goldstein (2005) suggest that high dividend paying stocks do not outperform low dividend paying stocks by a significant margin. They propose that dividend payments are more valuable when firms have a negative momentum than when they the momentum is positive. Fuller and Goldstein's (2005) theory links to that of Asem (2009) in that a firm's dividend policy and therefore a stock's dividend payments can influence a stock's momentum profits.

Asem (2009) created a trading strategy in which investors will buy thriving stocks that are in the process of increasing their dividend pay-out ratio and sell struggling stocks that are in the process of decreasing their dividend pay-out ratio. His strategy returned on average 3.08% per month. Asem (2009) compared his results to a long only momentum strategy and concluded that his strategy created an outperformance of almost 1%.

Asem (2009) suggests that when investors value dividend paying and non-dividend paying stocks by incorporating behavioural finance models for momentum profits, specific attention needs to be paid to the dividend maintenance of companies. He says that if different valuation techniques are used for dividend maintenance announcements by thriving and struggling stocks, different momentum profits will transpire. Asem (2009) believes that certain valuation

methods focus more on dividends than other, resulting in stock prices being driven by dividends. He also believes that in the shorter term stock prices move in the same direction as governed by the dividend announcement. Asem's (2009) interpretation is that if a company's dividend announcement indicates an increase in the dividend pay-out ratio, the positive price momentum of the stock will increase after the dividend announcement date. He also believes that stocks on which investors place dividend emphasis will decrease in value and in positive momentum if the dividend pay-out ratio decreases.

When forecasting the stock price momentum, the sensitivities are often linked to event dates and the dependence of the model to these dates, according to Asem (2009). He suggests that post-event momentum is dependent on how positively or negatively the event data is interpreted. He adds that post-event momentum is dependent on the pre-event stock price lead-up compared to how the result of the event equates to an acceptable price lead-up. Asem (2009) argues that there is a large divergence if the price momentum lead-up to the event date is -1% per month and the event indicates that it should have been 1%. He explains that this will cause a higher post-event price momentum increase than a price momentum lead-up to the event date of 1% versus an event indication of 1.5%.

Asem (2009) regards this theory applicable to negative price momentum and negative event results. He argues that slow updates of forecasts and models when there is new information after event dates and the resulting overreaction can be attributed to behaviour finance bias that investors experience. Asem (2009) summarised this by saying that if an event is a dividend announcement and the lead-up momentum was lower than necessary, the post-event stock price momentum will increase due to underreaction. He argues that behavioural finance and momentum trading go hand in hand, and advocates that many of the momentum trading strategies filter through investor behavioural finance models. Asem (2009) therefore believes that many cases of momentum trading can be explained by general behavioural finance investor behaviour.

Zhang (2006) researched price momentum at the same time as Asem (2009) and reported that it is not necessarily the dividend maintenance announcement that investors favour that causes an overreaction or increased momentum. He believes it is information uncertainty that emphasizes the behavioural bias that causes higher momentum returns. Zhang (2006) argues that uncertainty causes investors to doubt the future direction of a share price, which could lead to increased volatility and positive and negative price momentum. He also argues that

information certainty might cause short momentum shocks in the market, but that a stock's overreaction and underreaction will decrease. Zhang (2006) believes that struggling stocks that maintain their dividends on an announcement date reduce uncertainty. This reduces return momentum compared to non-dividend paying stocks. The price momentum of thriving stocks that maintain their dividends is not significantly different from when dividends are not maintained. If information about dividend maintenance, dividend payment increases and decreases can be conveyed, changes in dividend maintenance can be conveyed as information changes, according to Zhang (2006). He suggests that changes in dividend maintenance can change momentum profits, therefore information changes can change momentum profits.

Hong and Stein (1999) believed that momentum traders differ from investors who forecast returns by looking at past prices only. Other types of investors may take past prices into account when forecasting returns, but prefer to be more dependent on private information that forecasts future improved fundamentals. Hong and Stein (1999) believed that investors will use public information, for example dividend announcements, and combine it with private information attained form analysing and researching a stock. Once all information, public and private, is available, an investor needs to make a judgement call and decide to buy, sell, hold on to or do nothing about a stock.

Hong and Stein (1999) further investigated news events, private information, public information and the effect on share price momentum. They created a model which assumes that private information disperses gradually among news watchers over the course of an event or time. Hong and Stein (1999) believed that this resulted in investors underreacting to private news and suggested that this causes positive serial correlation that attracts attention from momentum traders. They suggest that once momentum traders start trading the stocks that underreacted, these stocks eventually start to overreact to the private news.

Hong and Stein (1999) believed that their model mimicked investor behaviour by separating a population into two groups of rational agents. One group was perceived as the news watchers while the other was seen at the momentum traders. The news watchers observe their own private information, but unsuccessfully extract and gather other news watchers' private information from researching the price movements of the share. Hong and Stein (1999) believed that this causes information to gradually diffuse among members of the population, causing a short-term price underreaction. They suggested that momentum traders can profit from this underreaction if the momentum trading population picks it up in time. Hong and Stein

(1999) argued that momentum traders can incorporate private information with price information and establish that a share is underreacting. Momentum traders can then start buying or selling the share, increasing its positive or negative momentum. Momentum traders can however only implement univariate strategies. Hong and Stein (1999) suggested that if momentum traders start attempting to arbitrage stocks, it will lead to long-term overreaction. They believed that momentum traders make the market more efficient by extorting underreacting to set the market-agreed price.

In the same vein, Asem (2009) believed that momentum strategies can exploit underreaction and overreaction to information. He suggested that if investors underreact to dividend news, momentum traders can exploit this to increase momentum profits. Asem (2009) argued that underreaction to dividend announcements, specifically by struggling stocks, can be exploited to increase momentum returns. Such underreaction by thriving stocks can also be exploited, but to a lesser extent. In line with other researchers, Asem (2009) believes that dividend paying thriving stocks that tend to maintain their dividends do not significantly differ in return from non-dividend paying thriving stocks. Returns for dividend paying thriving stocks that tend to increase their dividends do differ significantly from non-dividend paying thriving stocks.

Asem (2009) continues to agree with other researchers when he suggests that dividend paying struggling stocks that tend to maintain their dividends have higher positive returns than non-dividend paying struggling stocks. However, if dividend paying struggling stocks decrease their dividends, there will on average be lower returns than with non-dividend paying struggling stocks. Asem (2009) attempted to use this information in a trading strategy, and the strategy in which an investor buys thriving stocks that increase their dividends while investors sell struggling stocks that decrease their dividends had positive outperforming returns.

Other factors that affect stock price momentum

According to Verardo (2009), investors are often characterised and labelled based on heterogeneity in their investment views, beliefs and trading strategies. She researched how heterogeneity in investor beliefs can influence the price momentum of shares, measuring the dispersion of analyst forecasts on certain stocks as a proxy for heterogeneity and regressing it against the price momentum prices of the applicable stocks. Verardo (2009) believes that momentum profits increase substantially as investment beliefs disperse. She suggests that previous studies about stock price momentum and stock visibility results show a correlation between the two factors. She also says that stocks followed by a larger number of analysts often

return larger momentum profits than those followed by fewer analysts. Verardo (2009) believes that although stocks with a larger market capitalisation are usually covered by more analysts, momentum profits are also often larger for stocks with a smaller market capitalisation with high analyst coverage than stocks with a larger market capitalisation and high analyst coverage. According to her, the reason might be that stocks with smaller market capitalisations often incorporate and digest new information slower than stocks with larger market capitalisations. Verardo (2009) continues by saying that stocks with smaller market capitalisations are less visible and are therefore neglected by market participants. When more market participants pay attention to a stock, trade it and research it, a larger cluster of collective knowledge about the stock is created, causing it to trade more efficiently and respond faster to new market information.

Verardo (2009) continued to research the effect of trading volume on the price momentum of stocks. She believes that stocks with a higher average trading volume have higher stock price momentum, confirming what Lee and Swaminatha (2000) suggested in their study on price momentum.

Li et al. (2008) researched momentum trading by investigating the effect of the time-varying unsystematic risk of struggling stocks and thriving stocks on the abnormal returns of a momentum portfolio. Similar to the dividend announcement investigation by Asem (2009) and Zhang (2006), Li et al. (2008) investigated the volatility effect of any type of news on stocks. They discovered strong volatility patterns in the price momentum of thriving and struggling stocks, and suggested that volatility in thriving stocks has a higher sensitivity to resenting new information and market news than struggling stocks. Li et al. (2008) subsequently suggested that struggling stocks have a higher sensitivity to older information and market news than thriving stocks. They reason that due to the asymmetric reaction of struggling stocks to positive and negative news and the risk premium embedded in the shares, momentum portfolios outperform in the short term.

Chordia and Shivakumar (2002) regard research on the profitability of momentum trading as particularly captivating, as it remains the only capital asset pricing model (CAPM) related to the irregularity that remained unexplained by the Fama and French (1996) three-factor model. Chordia and Shivakumar (2002) researched different factors that might influence momentum profits and strategies, including macro-economic factors. They used macro-economic variables such as the dividend yield, the default spread, the yield on three-month T-bills and the term

structure spread, associated with different business cycles. Chordia and Shivakumar (2002) believe that if macro-economic variables can explain momentum profits, business cycle stages could do the same. Macro-economic variables are believed to be able to predict market returns and formed the base for their study to attempt predicting momentum returns. When they used a one-month lagged macro-economic variable, they reported to have found that components of momentum returns could be forecast, creating the possibility to forecast momentum returns. Their study also suggested that a momentum strategy's payoffs have intriguing time variations. They argue that momentum strategy returns are only positive during growing or expansionary economic periods and that during contracting or recessionary periods, momentum strategies do not deliver positive returns, although they are statistically insignificant.

Chordia and Shivakumar (2002) supported the work of Moskowitz and Grinblatt (1999), who believed that a momentum strategy's profitability can predominantly be attributed to the momentum of industry factors. Moskowitz and Grinblatt (1999) suggested that if industrial momentum is excluded, individual stocks do not exhibit any residual momentum.

Chordia and Shivakumar (2002) therefore suggested that both industry momentum and individual stock momentum can be explained by common macro-economic variables instead of firm-specific and industry-specific returns. Interestingly enough, they believed to have discovered that the correlation between the momentum of individual stocks and that of common macro-economic variables is independent from the momentum between industry factors and common macro-economic variables. Chordia and Shivakumar (2002) regard industrial momentum as insufficient when explaining and forecasting individual stock momentum and therefore believe that industry factors and individual stock momentum are isolated from each other and occur separately.

Chordia and Shivakumar (2002) interpreted the above results as the difference in cross-sectional expected returns predicted by the common macro-economic variables. They regard it as important to take into account cross-sectional variation in expected returns when determining expected returns with regards to macro-economic variables. This complements research by Bernanke and Gertler (1989), Gertler and Gilchrist (1994) and Kiyotaki and Moore (1997), who investigated the effect of changes in the credit market on the risk and return expectation for large and small firms.

Summary

Markets often act illogically and irrationally when considering the economic fundamentals of a market or a specific share (Davis (2004)). This illogical and irrational behaviour is largely driven by human behaviour. Humans have many biases that influence share price momentum. These biases include risk aversion, herding, the disposition effect, overconfidence, the representativeness heuristic, and conservatism or underreaction. These cognitive or heuristic biases can be characterised as mental mistakes made by human beings in an effort to simplify information. These mental mistakes affect share price momentum over shorter periods. Lee and Swaminatha (2000) and Jegadeesh and Titman (1993) suggest that significant price reversals happen over longer time periods, and agreed that over a stock return time horizon of three to five years, stocks that thrived significantly underperformed against those that struggled.

Dividends also play a significant role in share price momentum. Chan et al. (1996) and Chordia and Shivakumar (2006) studied the relationship between the dividend payments of stocks and their price momentum, concluding that there is an asymmetric relationship between dividend payments of thriving stocks and struggling stocks. Asem (2009) suggested that if a company increases its dividend payment makes it dividend policy more generous, a positive signal results. A company that maintains its dividend payment and policy in a negative environment also results in a positive signal. Therefore, dividend payments can influence stock price momentum by virtue of the signal provided.

Chapter 3: Methodology

Research design

The aim of the study is to explore the changes, if any, in share price momentum once a share goes ex-dividend.

The following questions will guide the research approach when gathering, processing and analysing the data:

Descriptive testing:

1. Is momentum on average positive or negative after the ex-dividend date (percentage time positive)?
2. Is momentum on average positive or negative before the ex-dividend date (percentage time positive)?

Statistical testing:

3. Is there a statistically significant difference between share price momentum before and after the ex-dividend date?

Qualitative versus quantitative research

Over the past two decades of investigative research, the number of research methods increased substantially, leaving researchers with a variety of methods to choose from (Creswell, 2013).

The two most well-known research approaches are the qualitative and quantitative routes. The arguments for the use of the quantitative or qualitative research method usually revolve around the subjective qualitative research method being labelled as inferior to the largely mathematical quantitative research method (Broadbent & Unerman, 2011).

Qualitative research is often conducted through surveys and produces non-numerical data. The information is analysed, diagnosed and interpreted to produce an outcome. Quantitative research is often conducted with case studies that produce numerical data and information that can be transformed into numbers. These numbers can be interpreted to produce statistically significant conclusions. Researchers are often more satisfied to substantiate results with quantitative data, as many researchers feel comfortable with numbers and statistics (Holden & Lynch, 2004).

Results from quantitative research have a substance that makes it easier to convince non-believers. This is because the results are numeric – the validity, reliability and generalisation give the output some tangibility.

A quantitative research approach will be used when conducting the study.

Methodology employed

The literature reviewed in chapter 2 highlighted several techniques to measure and analyse the causes of stock price momentum with relation to dividends. The most frequently used momentum techniques include simple price momentum, the Relative Strength Index measurement and the moving average convergence/divergence.

A Relative Strength Index measurement is a technical momentum indicator that compares the degree and size of recent losses and gains to construct a momentum oscillator that indicates overbought and oversold assets. It was developed by J. Welles Wilder in 1978 and identifies the general trend (upwards or downwards) of assets (Nathan & Bureau, 2013).

The moving average convergence/divergence oscillator was devolved by Gerald Appel between 1975 and 1980. It calculates the trend following and momentum of a stock, and is very useful in recognising overbought and oversold stocks (Meissner, 2012).

Simple price change momentum is measured by dividing the current share price by a previous share price minus one. This calculates the simple price changes and returns of a specific stock.

There is a wealth of research on simple price momentum, which is a technique many investors use as it is simple to understand and execute. Lee and Swaminatha (2000) used simple price momentum when they investigated the relationship between trading volume and price momentum. Chordia and Shivakumar (2006) used it when they investigated the connection between price momentum and earnings momentum. Brush (2007) used it when he investigated the link between price momentum and different cultures and countries. Burch and Swaminathan (2001) used it when they investigated whether institutions can be classified as momentum traders. Chan, Jegadeesh and Lakonishok (1999) used it when they researched profitable momentum strategies. These are just a few instances where simple price momentum was used in research projects. Simple price momentum is less susceptible to price swings by smoothing out market fluctuations so that a price trend can easily be identified. When increasing the term used to measure price change momentum, the results become smoother. Simple price change momentum is more beneficial to investors who operate over longer time frames, such as 90 days.

Simple price momentum will be used in this study to investigate whether price momentum changes before and after a stock's ex-dividend date.

Chapter 4: Data

Data collection method

The sample consists of the stocks included in the Johannesburg Stock Exchange (JSE) Shareholder Weighted Top 40 Index on 30 June 2015. Data from 1 January 2000 to 30 June 2015 is used. Because momentum changes are analysed over 10, 21 and 90 business days respectively, the data range must be extended to a maximum of 90 business days before and after the date range that is analysed. Share price changes over 10 days were used to calculate the 2-week short-term price change. Share price changes over 21 days were used to calculate the average price change over one month. On average, a month has 21 working days. Share price changes over 90 days were used to see a longer price change picture. Traders often use a simple moving average line over 10, 21 and 90 business days to investigate when the price momentum changes in the short term. When, for example, the 10-day simple moving average line crosses the 21-day line and the 90-day line, it could be interpreted as a sign to buy the share.

The Shareholder Weighted Top 40 Index represents the forty largest companies on the JSE All Share Index. Companies in the Shareholder Weighted Top 40 Index are ranked based on market capitalisation and the number of shares in this index can exceed forty, as some companies have multiple-issue equity instruments. The Shareholder Weighted Top 40 Index is believed to be a fair reflection of what occurs across the South African stock market, even though it contains only a portion of all the JSE-listed shares. The Shareholder Weighted Top 40 Index contains more than 80% of the market capitalisation on the JSE. Some of the shares with smaller market capitalisation experience liquidity constraints, while those with larger capitalisations tend to be highly liquid. Chordia,Roll and Subrahmanyam (2008) commented that according to them liquidity and efficient markets are linked, with liquidity playing an important part in creating an efficient market. Taking this into account, the author decided to use the JSE Shareholder Weighted Top 40 Index, being one of the largest, most liquid and efficient JSE indexes.

All the stocks included in the JSE Shareholder Weighted Top 40 Index on 30 June 2015 have not been listed and included in the index since 1 January 2000. These stocks are British American Tobacco PLC (BTI), Capital & Counties PLC (CCO), Capitec Bank Holdings Ltd (CPI), Investec PLC (INP), Kumba Iron Ore Ltd (KIO), MMI Holdings Ltd (MMI), Mondi Ltd (MND), Mondi PLC (MNP), Reinet Investments SCA (REI), Remgro Ltd (REM), Rand

Merchant Insurance Holdings Ltd (RMI) and Vodacom Group Ltd (VOD). These stocks are analysed based on the available data. This includes 186 months of data and 143 285 price data points collected from Bloomberg. Data regarding the JSE Shareholder Weighted Top 40 Index dividends and ex-dividend dates were also collected from Bloomberg. Ex-dividend dates between 1 January 2000 and 30 June 2015 are included for the JSE Shareholder Weighted Top 40 Index.

The data had to be adjusted to account for anomalies in the information and to prevent overstated or understated results. Abnormalities, effects and resolutions include the following:

1. Abnormality:

   Certain stocks included in the JSE Shareholder Weighted Top 40 Index have a secondary listing, often on the London Stock Exchange (LSE). The effect is for example that Investec Ltd and Investec PLC are both included in the JSE Top 40. Both shares trade at similar prices and pay similar dividends. The two listed companies function as a single business with the same risks and rewards, and equal treatment of shareholders in cash flow and voting rights. Dual-listed companies usually share a board of directors. Shareholders that have similar voting and cash flow rights also have the same rights with regards to liquidation claims, corporate governance, corporate actions and dividends. These dual-listed corporations are one company.

   Effect:

   Due to the two stocks trading similarly, with similar dividends and in effect being the same company, including both stocks in the sample will duplicate the data.

   Resolution:

   The author therefore decided to remove the dual-listed stocks which listed last in an attempt to keep the maximum amount of data in the sample. These are in all circumstances the stocks listed on the LSE, and include Investec PLC (INP) and Investec Ltd (INL) as well as Mondi PLC (MNP) and Mondi Ltd (MND). The domestic JSE-listed stocks are therefore included in the sample, while the LSE-listed stocks were removed. This decreased the price data points from 143 285 to 138 049, and the stocks in the sample from 42 to 40.

2. Abnormality:

Certain stocks paid a dividend shortly after listing. If a stock paid a dividend within 10 business days, 21 business days or 90 business days after listing, the model will not be able to calculate a momentum return for the applicable days. These stocks include British American Tobacco PLC (BTI), Capitec Bank Holdings Ltd (CPI), Kumba Iron Ore Ltd (KIO), Mondi Ltd (MND), Reinet Investments SCA (REI), Remgro Ltd (REM) and Rand Merchant Insurance Holdings Ltd (RMI).

Effect:
Without the data point, no results for the applicable shares could be calculated for the relevant dates.

Resolution:
The applicable data point was removed from the sample so that it has no influence on the result. The following stocks had an ex-dividend date within 90 days after listing, and were therefore removed from the applicable test with reference to question 2 – Is momentum on average positive or negative before the ex-dividend date (percentage time positive)? British American Tobacco PLC (BTI), Capitec Bank Holdings Ltd (CPI), Kumba Iron Ore Ltd (KIO), Mondi Ltd (MND), Reinet Investments SCA (REI), Remgro Ltd (REM) and Rand Merchant Insurance Holdings Ltd (RMI). The following stocks had an ex-dividend date within 21 days after listing and were also removed from the applicable test: Reinet Investments SCA (REI), Remgro Ltd (REM) and Rand Merchant Insurance Holdings Ltd (RMI). The following stock had an ex-dividend date within 10 days after listing and was therefore removed from the applicable test: Reinet Investments SCA (REI).

Data analysis

The ex-dividend date is excluded from the return. If the ex-dividend date is T and the 10 business days before and after the date are analysed, the model calculates the price change between T -11 and T -1 versus T +11 and T +1. This creates a 10-day comparable return from before the ex-dividend date to after the date. The same rationale applies to calculating the price returns over 21 and 90 business days.

The ex-dividend date is excluded from the calculations due to the price drop on that date. When a firm pays out a dividend, the firm's value drops by approximately the dividend amount

(ignoring taxes). This drop occurs because the pay-out decreases the cash in the firm's retained earnings. Cash is an asset for a firm and paying it out decreases the firm's assets and therefore its value. Shareholders who purchase a company's shares after the ex-dividend date can no longer lay claim to the dividend and therefore would pay a lower price for the shares. In the case of a stock dividend, the dividend amount decreases the retained earnings and increases the equity account common stock at par value, and shareholders are issued with new shares. The number of outstanding shares increases, which spreads the market value of the company over more shares. This stabilises the market value of the company, but the value per share decreases. This explanation of the drop in share price after a dividend pay-out ignores taxes. In South Africa, dividends are taxed at 15% for individuals.

The data was analysed on Microsoft Excel, using simple return calculations over different time periods.

Analysis question 1: Is momentum on average positive or negative after the ex-dividend date (percentage time positive)?

The number of positive time periods[1] after the ex-dividend dates was divided by the number of dividend dates.

Example: AngloGold Ashanti Ltd (ANG) had a positive share price momentum 68.57% of the time for 10 days after the ex-dividend date. The 10-day positive return periods after the ex-dividend date were added together and divided by the number of ex-dividend dates.

Analysis question 2: Is momentum on average positive or negative before the ex-dividend date (percentage time positive)?

The number of positive time periods before the ex-dividend date was divided by the number of dividend dates.

Example: AngloGold Ashanti Ltd (ANG) had a positive share price momentum 50.00% of the time for 10 days before the ex-dividend date. The 10-day positive return periods before the ex-dividend date were added together and divided by the number of ex-dividend dates.

[1] Note that in the data analysis section of the paper time periods refer to cycles of 10 business days, 21 business days and 90 business days.

Analysis question 3: Is there a statistically significant difference between share price momentum before and after the ex-dividend date?

To simplify the model, question 3 is split into two parts. The average momentum over the time periods before the ex-dividend date is compared to the average momentum for the coinciding time period after the ex-dividend date. This was done on a share-by-share basis.

The hypothesis is the following:

H_0: Stock price momentum does not change when comparing it before and after an ex-dividend date.

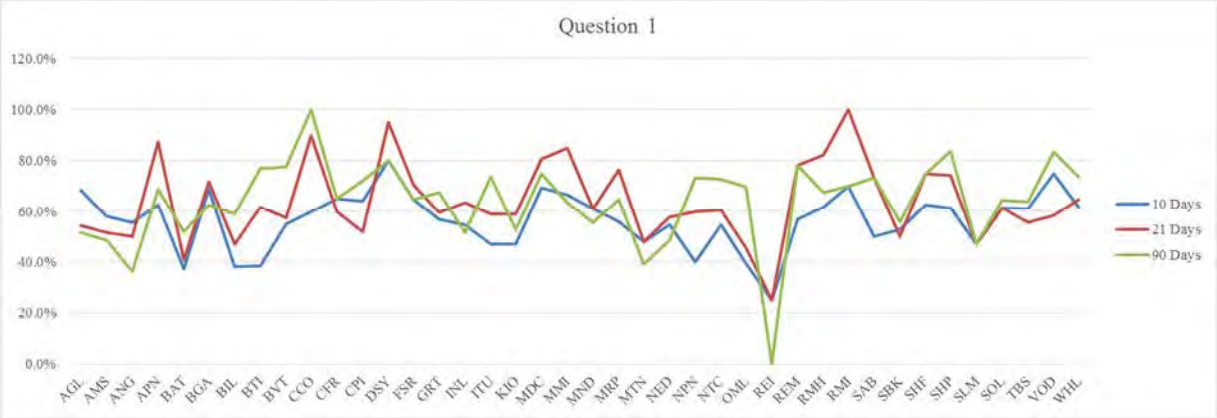
H_1: Stock price momentum changes when comparing it before and after an ex-dividend date.

The data was tested for statistical significance, using the t-test. The t-test is applicable where testing is conducted to determine if there is a statistically significant difference between the means of two populations. A t-test is mostly used when data is normally distributed.

The t-test was deemed to be a paired two-tailed test. A paired t-test often used when two population or sample means are correlated, particularly when comparing before-and-after studies. The sample means for the same stocks were determined before and after the ex-dividend dates. A two-tailed t-test is used when deviation from a benchmark or mean can be in a positive or a negative direction. The stock's momentum before an ex-dividend date was compared to the momentum after the ex-dividend date. The momentum can change positively or negatively.

Interpretation of data

Question 1: Is momentum on average positive or negative <u>after</u> the ex-dividend date (percentage time positive)?



Average			
Results	**10 DAYS**	**21 DAYS**	**90 DAYS**
Q1	56.43%	63.75%	63.96%

Over cycles of 10, 21 and 90 business days, the price momentum is on average positive after the ex-dividend date. The longer the period after the ex-dividend date, the larger amount of time stock momentum will be positive. It seems as if investors appreciate the dividends and are willing to pay a premium for the stocks due to the dividends indicating that there will be improved economic times. The results support evidence that investors do not blindly sell stocks after the dividend dates. A possible reason for the positive stock price momentum and particularly the increased number of times stocks have positive momentum could possibly relate to the reinvestment of dividends.

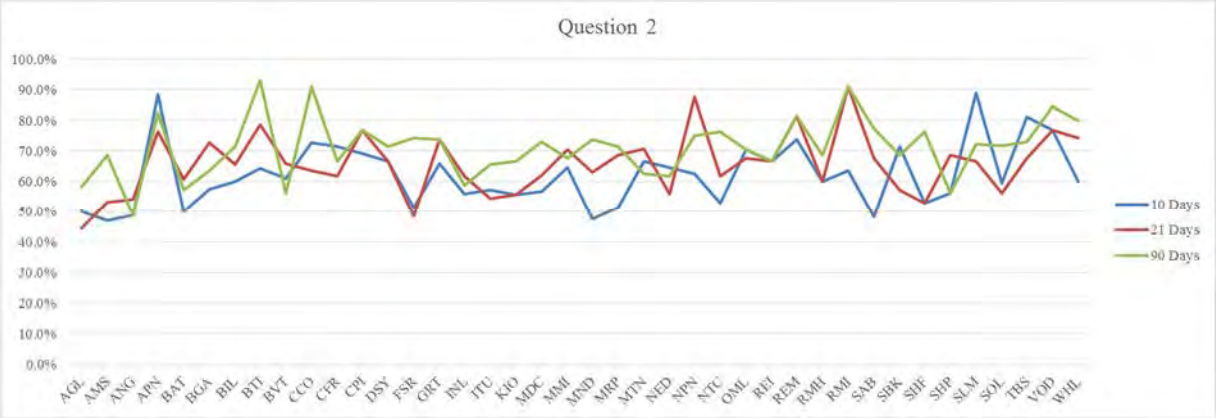
Median			
Results	**10 DAYS**	**21 DAYS**	**90 DAYS**
Q1	57.41%	60.30%	66.28%

The median[2] indicated the same results as when the averages were calculated, and corroborates the model's finding based on averages. Over cycles of 10 and 90 business days respectively, the median indicated a larger percentage of time that the momentum is positive. The difference

[2] The median is often used instead of the mean to remove the effect of outliers in the model. The mean is representative of the data in the model if the data is systematically distributed.

between the average model and the median model is that a larger amount of negatively distributed data is included in the mean model.

Question 2: Is momentum on average positive or negative before the ex-dividend date (percentage time positive)?



Average			
Results	**10 DAYS**	**21 DAYS**	**90 DAYS**
Q2	62.23%	65.75%	71.11%

Over cycles of 10, 21 and 90 business days, the price momentum is on average positive before the ex-dividend date. The longer the period before the ex-dividend date, the larger amount of time stock momentum will be positive.

It seems as if investors favour the dividend payment and could possibly invest in stocks for the purpose of receiving the dividend. The closer the time comes to the ex-dividend date the less amount of time stocks have a positive price momentum. This could possibly be due to the stocks becoming more expensive and the premium being paid for the dividend becoming larger versus the dividend advantage.

Median			
Results	**10 DAYS**	**21 DAYS**	**90 DAYS**
Q2	60.49%	66.26%	71.43%

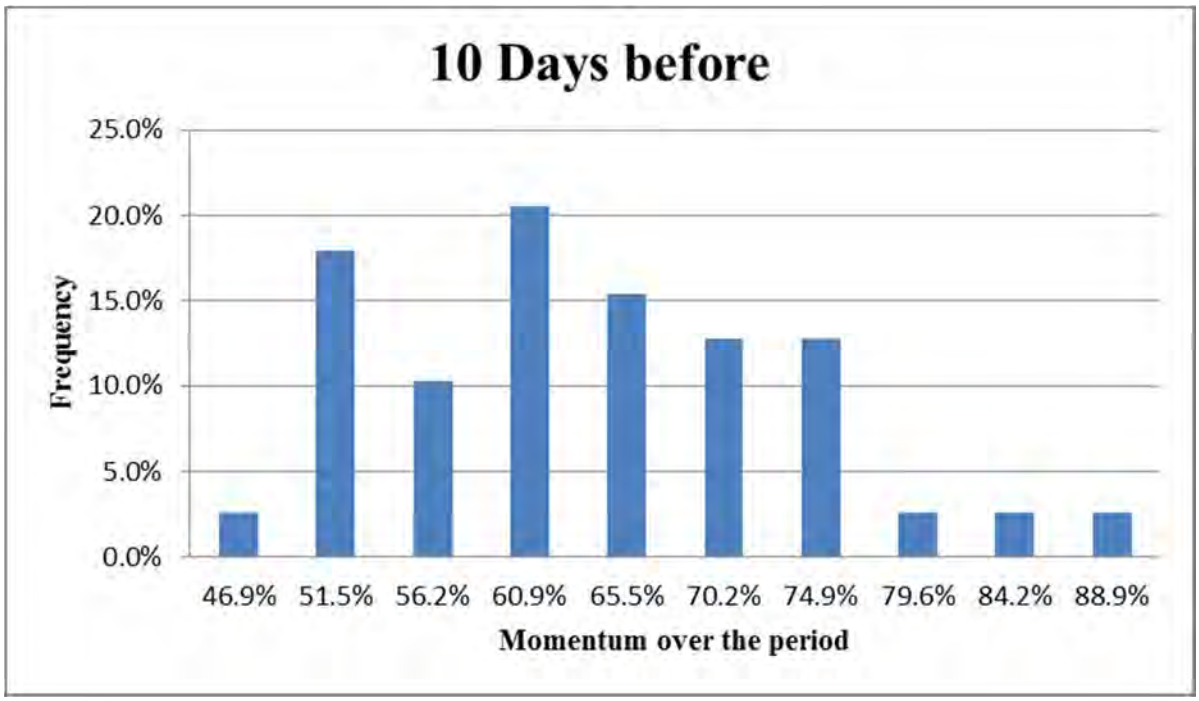
The median model renders a similar result to the average model. Over 10 business days, the average model indicates a larger percentage of time that the momentum is positive, while over 21 and 90 business days the average model indicates a smaller percentage. The difference

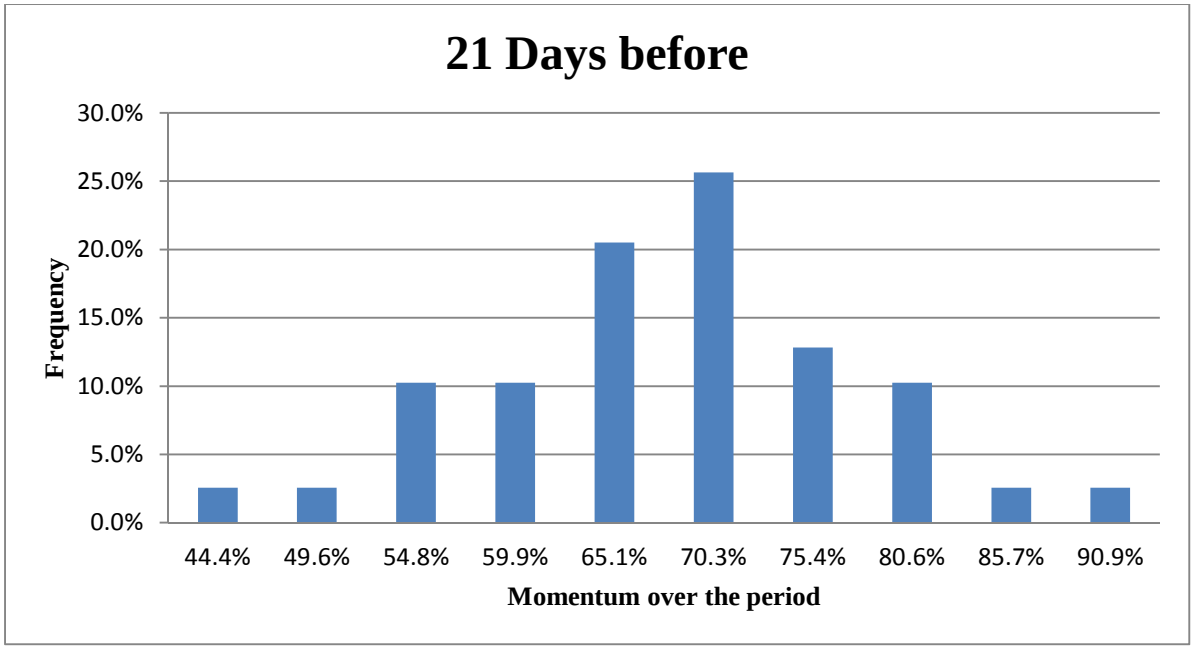
between the average model and the median model is that a larger amount of positively distributed data is included in the average model over 10 business days, while a larger amount of negatively distributed data is included in the average model over 21 and 90 business days

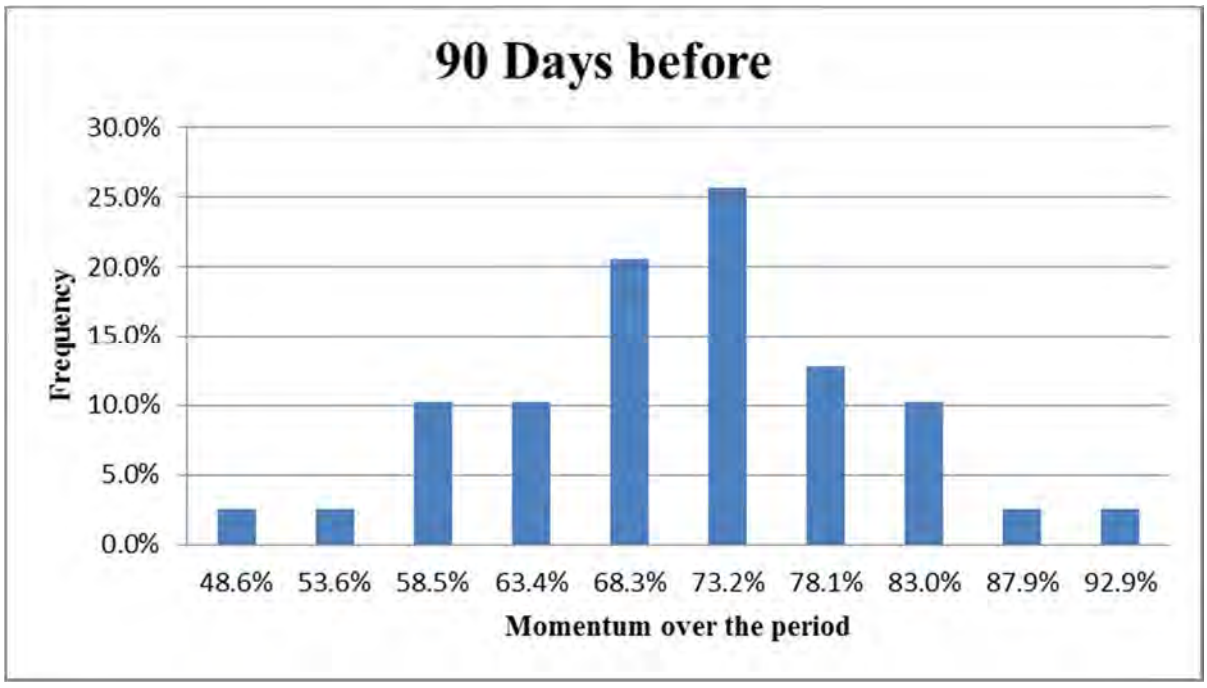
Question 3: Is there a statistically significant difference between share price momentum before and after the ex-dividend date?

The sample data before and after the ex-dividend date are examined for normality. Share price momentum over 10, 21 and 90 business days before and after the ex-dividend date are graphed. The graphs indicate that the share price momentum is normally distributed.

The data was examined for normality before the ex-dividend date as follows:

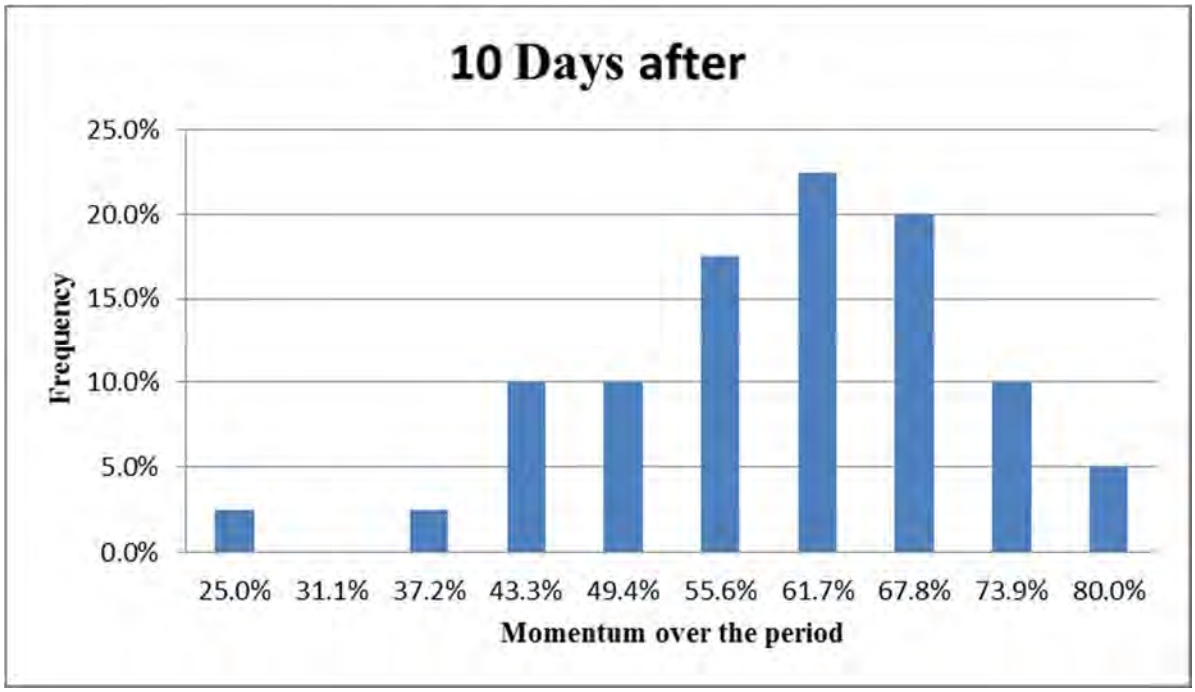


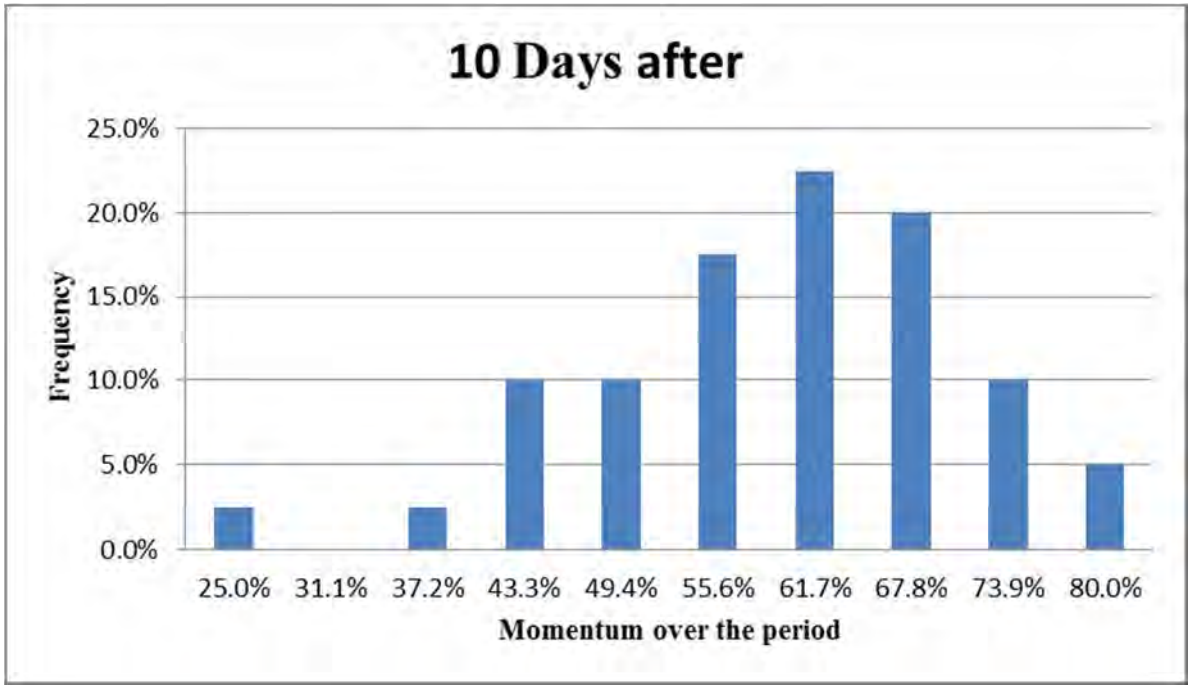


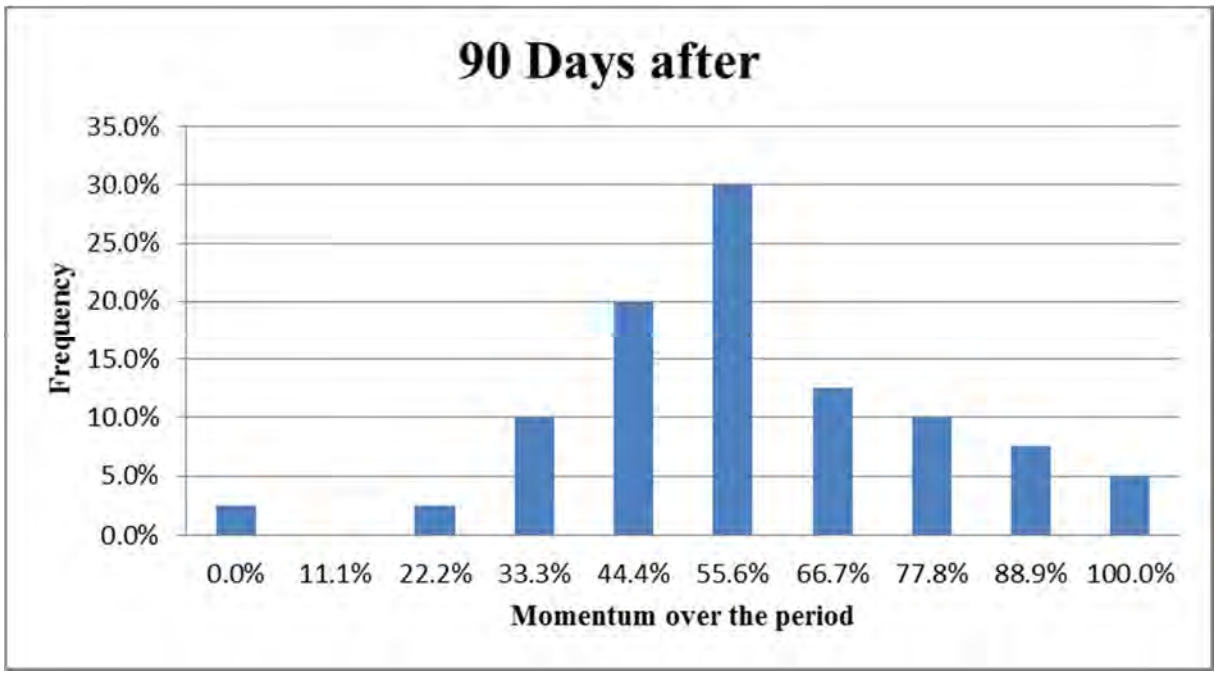


The graphs indicate that the data is normally distributed before the ex-dividend date. The graphs give an indication that the data becomes more obviously normally distributed as the momentum is measured over a longer term.

The data was examined for normality after the ex-dividend date as follows:







A similar data trend as before the ex-dividend date can be seen when examining the data after the ex-dividend date. In both cases the graphs indicate that the data is more normally distributed when measured over a longer period. This is expected as short-term volatility spikes are smoothed out over the longer term. Short-term data distributions can have a more skewed positive or negative distribution, while the longer-term distributions may have larger excess kurtosis.

Given the indicative normal distribution, a t-test was performed to compare the stock price return momentum from before the dividend date to after that date.

Each time period over 10, 21 and 90 business days was tested individually.

10 days	*Before*	*After*
Mean	1.38%	1.00%
Variance	0.02%	0.03%
Observations	40	40
Pearson Correlation	0.372596	
Hypothesized Mean Difference	0	
df	39	
t Stat	1.403837	
P(T<=t) one-tail	8.41%	
t Critical one-tail	1.684875	
P(T<=t) two-tail	**16.83%**	
t Critical two-tail	2.022691	

Over 10 business days, H_0 is not rejected. Stock price momentum changes are not significantly different over 10 business days before and after the ex-dividend date. The two-tailed t-test returns a result of 16.83%, which is not rejected at the 5% and 10% significance level. The ex-dividend date therefore has no influence on share price momentum over 10 business days.

21 days	*Before*	*After*
Mean	2.85%	2.06%
Variance	0.04%	0.09%
Observations	40	40
Pearson Correlation	-0.352786628	
Hypothesized Mean Difference	0	
df	39	
t Stat	1.198930984	
P(T<=t) one-tail	11.89%	
t Critical one-tail	1.684875122	
P(T<=t) two-tail	**23.78%**	
t Critical two-tail	2.02269092	

Over 21 business days, H_0 is also not rejected. Stock price momentum changes are not significantly different over 21 business before and after the ex-dividend date. The two-tailed t-test returns a result of 23.78%, which is not rejected at the 5% and 10% significance level. The ex-dividend date therefore has no influence on share price momentum over 21 business days.

Possible reasons for H_0 not to be rejected over 10 and 21 business days can be due to the short-term nature of the test. Investors may need time to digest new market information, leaving the stock price momentum unchanged. The market often lags in absorbing behavioural finance factors such as herding behaviour, and this can affect the price momentum of shares. Investors need to start seeing a pattern that they can base their decisions on and follow through the herding behaviour heuristic. Structural changes to the company and the economy take time to filter through to a share's price momentum and therefore do not have a shorter-term influence.

90 days	*Before*	*After*
Mean	8.67%	5.98%
Variance	0.16%	0.26%
Observations	40	40
Pearson Correlation	0.436787	
Hypothesized Mean Difference	0	
df	39	
t Stat	3.436893	
P(T<=t) one-tail	0.07%	
t Critical one-tail	1.684875	
P(T<=t) two-tail	**0.14%**	
t Critical two-tail	2.022691	

Over 90 business days, H_0 is rejected. Stock return momentum changes are significantly different over 90 business days before and after the ex-dividend date. The two-tailed t-test returns a result of 0.14%, which is rejected, even at the 1% significance level. The ex-dividend date therefore has an influence on the share price return momentum over 90 business days. Very strong evidence is found that investors change the stock price momentum by buying or selling stocks over the cycle of 90 business days.

Chapter 5: Conclusions

The research considered whether the stock price momentum changes after the ex-dividend date and investigated reasons for such changes. Contrary to Miller and Modigliani's (1961) theory about dividends not being important, but in line with studies by Fuller and Goldstein (2005) and Asem (2009), dividends are indeed important and investors appreciate them.

When investigating if the stock price return momentum is on average positive or negative before and after the ex-dividend date, the following was found: Before the ex-dividend date, the share price return momentum is on average positive. This indicates that investors appreciate the dividend and are willing to pay a premium to receive it. After the ex-dividend date, the stock price momentum is also mostly positive. This could indicate that shareholders reinvest their dividends or believe that better economic times are ahead. However, the stock price momentum tends to be positive more frequently before the ex-dividend date than afterwards. This indicates that investors do not blindly purchase stocks after the ex-dividend date. This could mean that investors reinvest their dividends by buying the same stock from which the dividends were received. Investors could also possibly buy other stocks closer to their ex-dividend dates with the dividends received. This could explain why more stocks have a positive share price return momentum before the ex-dividend date than afterwards. It is clear that investors appreciate dividends and are willing to pay a premium for dividend stocks, which often increases the stock price momentum positively before the ex-dividend date.

When comparing stock price momentum changes over 10, 21 and 90 business days before and after ex-dividend dates, the following was found: Over 10 and 21 business days, this study found no statistically significant changes in the stock price return momentum. Therefore dividend dates do not materially influence stock prices. However, previous research creates the impression that dividend amounts affect stock prices. Companies that increase or decrease their dividend payments could possibly influence the underlying stock price momentum, as researched by Chan et al. (1996), Chordia and Shivakumar (2006) and Asem (2009). On average, the studied stocks retain their price return momentum from before the ex-dividend date to after the ex-dividend date over 10 and 21 business days.

This study found that over 90 business days the stock price return momentum changes significantly from before the ex-dividend date to after this date. The reasons could stem from the longer timeframe. The longest timeframe over 90 business days before and after an ex-

dividend date is 180 business days. A longer timeframe can include external factors that influence the momentum of a share price. These can possibly include macro-economic factors in a country, structural changes in a market or segment and black swan effects that influence the market. The reason for the share price momentum changes can also be share-specific or company-specific. Over a longer cycle of business days, companies can report improved or deteriorating results or internal restructuring. Structural changes could materialise, new areas of business could be pursued and internal fraudulent behaviour may even emerge. These are all factors that could change the share price momentum.

The above reasons behind statistical differences, no statistical difference and a positive share price momentum are speculative and may encourage further research. Areas of future studies regarding changes in the share price momentum around ex-dividend dates are vast and often unexplored. More research could be conducted on what investors do with the dividends received. Does reinvesting the dividends change the share price momentum? Do investors use the dividends received to purchase alternative shares, changing the alternative share price momentum? Do investors use the dividends for non-investment activities such as salaries, down payments on properties or living expenses? Further research should also focus on directional and quantum changes in the share price momentum around ex-dividend dates. This could include an investigation into the direction and quantum of the share price momentum after an ex-dividend date if the share price momentum was negative before that date. The same study could be applied if the share price momentum was positive before the ex-dividend date. Other momentum measurement tools, including the Relative Strength Index (RSI) and the Moving Average Convergence Divergence (MACD) indicators could be used to compare the before and after ex-dividend date share price momentum. The research could be extended to test other foreign stock exchanges and markets, such as the New York Stock Exchange (NYSE) or the Shanghai Stock Exchange (SSE), as well as stocks with different characteristics, including less liquid stocks.

References

Asem, E. 2009. Dividends and price momentum. *Journal of finance.* 33(3):486–494.

Barberis, N., Shleifer, A. & Vishny, R. 1998. A model of investor sentiment. *Journal of financial economics*. 49(3):307-343.

Bernanke, B. & Gertler, M. 1989. Agency costs, net worth, and business fluctuations. *American economic review.* 79(1):14-31.

Broadbent, J. & Unerman, J. 2011. Developing the relevance of the accounting academy: The importance of drawing from the diversity of research approaches. *Meditari accountancy research*. 19(1/2):7-21.

Brush, J.S. 2007. A flexible theory of price momentum. *The journal of investing.* 16(1):36-42.

Burch, T.R. & Swaminathan, B. 2001. Are Institutions Momentum Traders? *Working paper*. University of Miami and Cornell University.

Carnevale, C. 2012. *The two components of total return: Part II dividends*. Available at http://www.valuewalk.com/2012/11/the-two-components-of-total-return-part-ii-dividends/ [27 January 2016].

Central Intelligence Agency. 2008. *Psychology of intelligence analysis*. Available at https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/psychology-of-intelligence-analysis/art12.html [28 August 2015].

Chan, L.K.C., Jegadeesh, N., Lakonishok, J. 1996. Momentum strategies. *Journal of finance.* 51(1):1681–1713.

Chan, L.K.C., Jegadeesh, N., Lakonishok, J. 1999. The profitability of momentum strategies. *Financial analyst journal.* 55(6):80-90.Chordia, T., R. Roll, and A. Subrahmanyam, 2008, Liquidity and market efficiency, *Journal of Financial Economics* 87(2), 249-268.

Chordia, T. & Shivakumar, L. 2002. Momentum, business cycle, and time-varying expected returns. *Journal of finance*. 57(2):985–1019.

Chordia, T. & Shivakumar, L. 2006. Earnings and price momentum. *Journal of financial economics*. 80(3):627–656.

Creswell, J.W. 2013. *Research design: Qualitative, quantitative and mixed methods approaches*. 2nd ed. California, United States of America: Sage Publications, Inc.

Davis, N. 2004. *The triumph of contrarian investing: Crowds, manias, and beating the market by going against the grain.* United States of America: The McGraw-Hill Companies, Inc.

De Bondt, W.F.M. & Thaler, R. 1985. Does the stock market overreact? *Journal of finance.* 40(3): 793-805.

Fama, E.F. & French, K.R. 1996. Multifactor explanations of asset pricing anomalies. *Journal of finance.* 51(1):55-84.

Fuller, K. & Goldstein, M. 2011. Do dividends matter more in declining markets? *Journal of corporate finance.* 17(3):457-473.

Gertler, M. & Gilchrist, S. 1994. Monetary policy, business cycles, and the behaviour of small manufacturing firms. *Quarterly journal of economics.* 109(1):309-340.

Holden, M. T. & Lynch, P. 2004. Choosing the appropriate methodology: Understanding research philosophy. *The marketing review*. 4(4):397-409.

Hong, H. & Stein, J. 1999. A unified theory of under reaction, momentum trading and overreaction in asset markets. *Journal of Finance*. 54(1):2143–2184.

Hvidkjaer, S. 2006. A trade-based analysis of momentum. *The review of financial studies*. 19(2):457-491.

Jegadeesh, N. & Titman, S. 1993. Returns to buying winners and selling losers: Implications for stock market efficiency. *Journal of finance.* 48(1):65–92.

Daniel, K. D. & S. Titman, 1999. Market efficiency in an irrational world. *Financial analysts journal*. 55(6), 28-40.

Kiyotaki, N. & Moore, J. 1997. Credit cycles. *Journal of political economy.* 105(2):211-248.

Lee, C.M.C. & Swaminatha, B. 2000. Price momentum and trading volume. *Journal of Finance.* 55(5):2017-2069.

Li, X., Miffre, J., Brooks, C. & O'Sullivan, N. 2008. Momentum profits and time-varying unsystematic risk. *Journal of Banking & Finance*. 32(4):541-558.

Meissner, F. 2012. Technical training series: MACD indicator. *The street.* 2 March. Available at http://www.thestreet.com/story/11400365/1/technical-training-series-macd-indicator.html [10 November 2015].

Miller, M.H. & Modigliani, F. 1961. Dividend policy, growth and the valuation of shares. *Journal of business.* 34(4):411-433.

Moskowitz, T. & Grinblatt, M. 1999. Do industries explain momentum? *Journal of Finance*, 54(4):1249-1290.

Nathan, N. & Bureau, E.T. 2013. How to use RSI indicator to take decisions on buying and selling stocks. *The economic time.* 8 April. Available at http://articles.economictimes.indiatimes.com/2013-04-08/news/38374193_1_rsi-overbought-zone-swing.html [10 November 2015].

Neill, H.B. 1954. *The art of contrary thinking*. Caldwell, United States of America: Caxton Press.

Nørregård, M. 2008. Momentum investment strategy: An empirical and explorative study on price momentum. MCom thesis. Copenhagen Business School.

Page, D., Britten, J. & Auret, C.J. 2013. Momentum and liquidity on the Johannesburg stock exchange. *International journal of economic and finance studies.* 5(1):56-73.

Verardo, M. 2009. Heterogeneous beliefs and momentum profits. *The journal of financial and quantitative analysis.* 44(4):795-822.

Zhang, F.X. 2006. Information uncertainty and stock returns. *Journal of Finance*. 56(1):105-137.