UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
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"What do dividend reductions signal? Evidence from South Africa"

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Abstract

This study was conducted in an attempt to understand the rationale behind dividend decrease announcements by Johannesburg Stock Exchange listed firms over the period 1990 to 2012. In 2010 Jensen, Lundstrum and Miller conducted a study in the United States in which they attempted to understand why firms which reduced their dividend, experienced an earnings increase in the years after the decrease. The authors hypothesised that it was as a result of the free cash-flow hypothesis. In reality, firms were allowing growth opportunities to expire as part of broader cost-cutting initiatives, which in turn lead to an uplift in earnings figures. This study aimed to understand whether the same relationship existed between dividends and a firm's performance, subsequent to a dividend decrease in South Africa over the sample period.

The study used an event study methodology to consider a 95 (665 firm-years) observation dividend-decrease sample and a 95 (665 firm-years) observation peer sample, comprised of firms which did not experience a dividend decrease in the event year. Each observation was accompanied by financial and market data for three-years before and three-years after the event year.

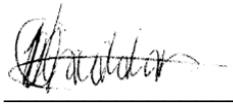
The evidence in this study suggested that dividend-decrease firms in South Africa experienced lower earnings levels, reduced profit and higher costs in the years after the dividend decrease, even though firms attempted to rationalise costs such as their workforce. Given the internal inefficiencies, investments made by the firm's management failed to produce the anticipated growth, even with increased capital expenditure. The results aligned to Jensen et al. (2010)'s research in the sense that they did not find support for the free cash-flow hypothesis. However, the announcement of a dividend decrease additionally appears to be largely driven by a liquidity shortage in the event year.

Declaration

I, the undersigned, Christine Mikaella Haddon, hereby declare that this research is my own, unaided work. It is being submitted in partial fulfillment of the requirements for the degree of Masters in Finance at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

I further declare that:
I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
I have followed the required conventions in referencing the thoughts and ideas of others. I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.

SIGNED AT The University of the Witwatersrand ON THIS 2nd DAY OF June 2014



Signature

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1. Introduction

In 1956 Lintner proposed the concept of signalling theory. Signalling theory seeks to explain why firms pay dividends, even though they are costly for both the firms and investors. Signalling theory suggests that managers communicate new information about the firm and its financial health to investors through a dividend payment. In other words, the firm effectively uses the dividend payment as a signal. Logically, the idea that dividends are a signal and communicate information is appealing, however, subsequent research has either disproved the theory or found only marginal support for it (Bhattacharya, 1979; Miller & Rock, 1985; John & Williams, 1986). Within the South African context, Wolff and Auret (2009) also failed to find support for signalling theory. Consequently, researchers have attempted to explain the behaviour that the signalling theory was unable to, through multiple additional theories such as the clientele effect (Modigliani & Miller, 1961), the free cash-flow hypothesis (Easterbrook, 1984; Jensen, 1986) and the catering theory (Baker and Wurgler, 2004).

Traditional signalling theory suggests that dividend decreases occur to signal a future reduction in a firm's earnings to the firm's investors. However, research has found that dividend decreases are often associated with future earnings increases as shown in Bernartzi, Michaely and Thaler (1997). Jenson, Lundstrum and Miller (2010) conducted an analysis on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and the National Association of Securities Dealers Automated Quotation System (NASDAQ) between 1967 to 2006. The authors wanted to understand whether the relationship between dividend reductions and a firm's subsequent earnings could be explained by the free cash-flow hypothesis. Jensen et al. (2010) concluded that the free cash-flow theory did not explain the relationship between the dividend decrease and earnings; rather, the authors found that firms reduced their dividend as a last resort and subsequently conducted internal restructuring activities. The authors noted that whilst dividend-decrease firms experienced an earnings rebound in the years following a dividend-decrease announcement, it resulted from the firm allowing growth options to expire (Jensen et al., 2010). This study attempted to understand whether the relationship between earnings and dividend reductions on the Johannesburg Stock Exchange (JSE) were consistent with Jensen et al. (2010)'s findings over the period between 1990 and 2012.

This study conducted an event study of JSE listed firms which analysed 62 dividend-decrease observations across 54 firms against a control sample of 62 dividend observations. The methodology followed a four step approach. Initially, the event study considered the share return data across a nine-day announcement window surrounding the event day. Secondly, firms were ranked by their control-adjusted market-to-book (M/B) ratios whereby the M/B ratios acted as a proxy for investment opportunities. Changes in these M/B figures were considered at various intervals within a seven-year period. Thirdly, Return-On-Assets (ROA) was used as a proxy for operating performance. The changes in ROA across a seven-year period were analysed in relation to the peer sample to determine how operating performance was related to the decision to reduce dividends. Finally, multiple variables such as CAPEX, employee figures and total costs shown were analysed in order to determine if firms were restructuring in response to a dividend decrease as Jensen et al. (2010) found.

When considering the return data during a nine-day announcement window, there was only evidence of a minor, median, positive return on the event day. This failed to support signalling theory, as signalling theory would have hypothesised that there should be negative return data on and around the event day. However, the findings in this research were aligned to previous research conducted on the topic in a South African context.

In terms of the investment opportunities for a firm, the changes in M/B ratios were analysed across the seven year period surrounding and including the event year. The data supported the results found by Jensen et al. (2010) that firms allowed growth opportunities to expire. There was a definite decline in the change in M/B between year t = -1 and t = 1, although there was a rebound in the change in M/B measure thereafter.

ROA was analysed as a proxy for a firm's operating performance. The data suggested that ROA levels were relatively constant in the years before the event year with levels around 16%, but the level of ROA dramatically reduced in the event year and declined further thereafter to a stable 11% level.

Multiple variables were considered in the final step, to test both Jensen et al. (2010)'s result that dividend-decreasing firms reduced their dividend as part of restructuring activities, but also to give further insight into the drivers of dividend decreases in a South African context. Key to the findings was that dividend-reducing firms saw a steady increase in employment of capital levels before and during the event year, but experienced a decline in levels thereafter. Operating profit mirrored trends seen in the employment of capital figures in that the

dividend-decrease firms noted a reduction in the year after the event year. However, the level of operating profit failed to rebound to the pre-dividend decrease levels. Dividend-decrease firms also experienced a large reduction in cash available during the event year. CAPEX levels largely mirrored the changes seen in the cash available figures in that dividend-decrease firms reduced their level of CAPEX in the event year. These firms also reduced their employee levels in the event year but it was only in year t = 2 that there was a significant drop in the level of employees. This result did not fully align with Jensen et al. (2010)'s result. Costs declined in the event year but increased notably in the years after the event year which was counter to Jensen et al. (2010)'s findings that firms restructured and attempted to reduce costs after the dividend reduction.

Minimal inferences could be drawn from the levels of turnover, depreciation and fixed assets as they remained largely constant over the seven-year period.

Previous dividend research in South Africa considered both dividend increases and decreases; this research represents a departure from that model. Jensen et al. (2010) states that circumstances surrounding dividend increases and decreases are fundamentally different and, as such, the dividend events should be modelled separately. The authors explain that a dividend reduction indicates that a firm's operations have deteriorated to a point whereby management is required to make a significant change. As dividend reductions have much broader implications than dividend increases do for changes in future firm operations, Jensen et al. (2010) argue that dividend decreases should be studied and analysed independently.

The remainder of this study is organised as follows: the first section is a literature review; the second section explains the sample construction, followed by the third section which details the methodology used. The fourth section explains the data and related findings, whilst the final section concludes the research.

2. Literature review

The literature review discusses four themes regarding dividend research, whilst considering of the South African context. The themes are:

2.1. Key tenets of dividend payments and the rationale of dividend increases and decreases
2.2. Market reactions to dividend payments
2.3. Dividend-related evidence from South Africa
2.4. Methodological approaches for dividend studies

2.1. Key tenets of dividend payments and the rationale of dividend increases and decreases

Over the years, there has been an abundant amount of research which has been conducted in an attempt to both understand and explain the rationale behind the payment of dividends. The perplexity surrounding dividends was partially driven by the fact that both the firms and the investors generally incurred costs through the payment of dividends. Firms incurred expensive direct costs, as well as the indirect costs associated with foregone investment opportunities. As for investors, in many countries they were required to pay taxes on the dividends that they received (Easterbrook, 1984). Yet, irrespective of the costs, firms still paid dividends and investors still demanded them.

In 1956, dividend theory involved a new dimension when John Lintner published the article, "Distribution of incomes of corporations among dividends, retained earnings and taxes". In the article, Lintner (1956) interviewed managers from 28 different firms with respect to their dividend policies. Lintner (1956)'s research suggested that firms were quite deliberate with respect to their dividend policies. Lintner (1956) observed two important factors with respect to a firm's dividend policy: firstly, that companies tended to set long-term target dividend-to-earnings ratios relative to growth opportunities (projects with a positive net present value (NPV)), and secondly, that managers were only likely to increase dividends when they believed that the higher earnings levels experienced were sustainable (Lintner, 1956). Lintner (1956) also discovered other characteristics of dividends which included the notion that: dividends were "sticky" (in other words, that managers were typically very unwilling to reduce dividends unless absolutely necessary); that dividends were "smoothed" from year-to-

year and that dividends were more likely to be paid by mature firms (DeAngelo, DeAngelo & Skinner, 1992).

Counter to Lintner (1956)'s findings, Modigliani and Miller (1958)'s research declared that dividends were in fact irrelevant as investors were able to create their own dividends through their trading activities, if they so desired (Modigliani & Miller, 1958). Additionally, they stated that there should be no impact on a firm's capital structure or share price, irrespective of whether or not the firm paid dividends (Modigliani & Miller, 1958).

As firms continued to pay dividends, it became apparent that Lintner (1956)'s hypotheses appeared to be better than Modigliani and Miller (1958)'s irrelevance theorem at representing reality. The signalling theory and the information content of dividends hypothesis were largely borne from Lintner (1956)'s findings. The rationale surrounding the informational content of dividends and the signalling theory of dividends was that firstly, investors were not always privy to the operating cash-flows of a firm, as financial figures could be constructed to mislead investors and, as such, dividend payments were seen as a proxy for these. This was because firms had only two options with respect to their cash-flows and they were to either pay out any excess cash, or retain the earnings for future investments. Secondly, it had long been noted that dividends were costly for a firm to pay out, and, as such, they did not represent an efficient way for a firm to return excess earnings to investors. Largely as a result of these factors, the hypothesis concluded that dividends must be acting as a signal for information not yet known by the market (Hillier, Grinblatt & Titman, 2012). Throughout the literature, the concepts of dividends acting as a signal and containing informational content were largely related and generated much interest and research. The results of this research were mixed: authors such as Bhattacharya (1979), John and Williams (1985), Miller and Rock (1985) and Nissim and Ziv (2001) found evidence of signalling properties, whereas Bernartzi et al. (1997), Grullon, Michaely, Bernartzi and Thaler (2005) and Wolff and Auret (2009) failed to find evidence of such a relationship.

In 1961 Modigliani and Miller suggested the initial tenets of the clientele effect. The clientele effect is based on the fact that in reality, dividends did present investors with direct costs and thus investors were likely to have different preferences for dividends based on these costs. For example, tax costs were likely to guide investors in high tax brackets to favour firms that did not pay dividends (Hillier et al., 2012). Easterbrook (1984) countered Modigliani and Miller (1961)'s theory and explained that the clientele effect did not produce a satisfactory

rationale for the payment of dividends. He stated that firms reach a point where an equilibrium between the firms' differing investors and their preferences towards dividends, capital gains and repurchases is established. He also concluded that it is difficult to explain the equilibrium state reached by a firm through the lens of the clientele effect (Easterbrook, 1984).

Easterbrook (1984), however, argued that, a problem with signalling theory was that whilst it could perhaps be argued that dividends acted as a signal, the signals were typically ambiguous as to the prospects of a firm. In addition to this, Brav, Graham, Harvey and Michaely (2005) found that managers viewed the signalling properties and informational properties of dividends separately. The managers interviewed by Brav et al. (2005) also stated that whilst they did not believe that dividends acted as a signal, that dividends did convey information to investors regarding their firms. However, the managers felt that this information was always communicated beforehand to investors and analysts and as such was never new. Wolff and Auret (2009), however, stated that regardless of the ambiguity surrounding what exactly the dividend might signal, investors still interpreted the dividend as a signal and this was why firms were likely to experience a movement in their share price and market value. Easterbrook (1984) explained that the ambiguity of the signal was potentially why research had been inconclusive as to what the dividends signalled. Additionally, investors were unable to decipher the meaning of an unexpected change in dividends. Traditionally, signalling theory suggested that a dividend increase meant that a firm's prospects were positive and that investors reacted well to the news. Likewise, the announcement of a dividend decrease was a sign of a firm's difficulties and, as such, investors were likely to react negatively. However, Hillier et al. (2012) highlighted the fact that testing these assumptions was crucial. In reality, a dividend increase may have reflected that the firm's operating cash-flow was higher than expected or it could have meant that the firm generated cash for the higher dividend by cutting back on investment which would have impacted the firm's future operating cash-flows and its ability to generate higher dividends. A dividend decrease could have been interpreted to mean that a firm planned to increase its expenditure on investment opportunities. This could be viewed as either good news or bad news, depending on whether investors believed that the firm would invest in positive or negative NPV projects (Hillier et al., 2012). This serves to further highlight why dividend research is important. The greater the understandings firms have regarding the market reaction to dividend payments changes, the more they can attempt to tailor their

communication to their shareholders to ensure that the market is fully aware of the firms reality.

An additional element to Lintner (1956)'s paper was that he determined that a firm's bottom line net income was a key factor in the dividend payment decision. However, Linter (1956)'s analysis focused mainly on dividend increases. DeAngelo et al. (1992) conducted research which attempted to see whether they could extrapolate Lintner (1956)'s findings to dividend decreases. Their hypothesis stated that low bottom line earnings (including annual losses and transitory losses) would influence or drive a firm's decision to reduce dividends (DeAngelo et al., 1992).

DeAngelo et al. (1992) constructed a sample from the industrial sector which included 167 NYSE firms with at least one annual loss in the time period 1980 to 1985, and 440 NYSE firms which experienced no losses over the same period. Each firm was additionally required to have ten or more prior years' worth of positive earnings and dividends. Through the use of a control sample (comprised of firms from any sector, but excluding a financial or utility firm, without annual losses) the authors concluded that an earnings loss was a necessary, but not sufficient, condition for a dividend reduction. The authors determined that there were two types of dividend payers: The one type of dividend payer included firms which experienced continuing and severe earnings troubles which typically reduced their dividend. The other type of dividend payer included firms which experienced once-off earnings troubles and did not reduce their dividend. This finding illustrated that the extent and duration of the earnings troubles were important considerations for a dividend reduction (De Angelo et al., 1992). The authors also found that when considering the bottom line figures, analysing net income was insufficient as it was equally important to be able to analyse the components of that figure to determine the key drivers of the loss. The ability to determine unusual items assisted in the ability to profile dividend-reducing firms (De Angelo et al., 1992). The authors also found that firms with transitory losses were unlikely to reduce dividends. DeAngelo et al. (1992) concluded that a dividend reduction informed investors that future earnings prospects were poor.

Throughout the 1990s and the years thereafter, dividend research continued. Additional theories such as the maturity hypothesis (Grullon, Michaely & Swaminathan, 2002) and the catering theory (Baker & Wurgler, 2004) were borne to explain the dividend behaviour that previous literature had failed to explain.

Yoon and Starks (1995) investigated both the cash-flow signalling hypothesis (signalling theory) and the free cash-flow hypothesis of dividends (initially proposed and discussed by Easterbrook (1984) and Jensen (1986)) to explain the wealth effects associated with a dividend change announcement. The cash-flow hypothesis was based on the idea that managers had more firm-specific information than investors and that ultimately they had an incentive to send a 'signal' to the market regarding current or future cash-flows via their dividend announcements (Yoon & Starks, 1995). Jensen (1986) suggested that the definition of the free cash-flow hypothesis of dividends was that a firm would reduce its dividend when it had a high level of growth opportunities to ensure that it had sufficient earnings to be able to exercise these options.

Yoon and Starks (1995) conducted their research using a sample of 3 478 dividend increase and 431 dividend-decrease announcements of NYSE stocks between 1969 and 1988. The authors considered the investment opportunity set for all of the firms in the sample by using Tobin's *q* as a proxy for the level of investment. The authors analysed the characteristics between low and high investment firms using firm variables, namely: dividend yield, firm size and the magnitude of the dividend which acted as proxies for the clientele effect, information asymmetry and signalling theory respectively (Yoon & Starks, 1995). The evidence from the paper suggested that low-*q* firms which had higher dividend yields, were smaller in size and experienced larger dividend changes.

Yoon and Starks (1995) also investigated investment opportunities and abnormal returns. They concluded that the stock price reactions observed best aligned to the cash-flow signalling hypothesis. The authors also considered the impact of dividend change announcements on capital expenditures. Yoon and Starks (1995: 1016) found that "dividend increase (decrease) firms experienced significant increases (decreases) in capital expenditure over the three years following the dividend change". The authors concluded that these findings were counter to the free cash-flow hypothesis. The authors suggested that, whilst their findings indicated that the free cash-flow hypothesis did not explain the information effects of dividend change announcement, there might be a possibility that the free cash-flow hypothesis could explain the cross-sectional differences in dividend policy (Yoon & Starks, 1995).

Fama and French (2001) approached dividend policy from a new perspective in that they noted that whilst dividends may be important, that the landscape of dividend payments and

payers was changing. In fact, Fama and French (2001) initiated their research on the premise that dividend payers appeared to have been disappearing as a regular feature within the United States stock markets. The authors attempted to determine whether the changing landscape was a function of dividend payers having a reduced propensity to pay dividends or whether the characteristics which typically defined dividend payers were becoming less prominent in the market (Fama & French, 2001).

To test their hypothesis, Fama and French (2001) constructed a sample of dividend payers between 1926 to 1999 on the NYSE and AMEX. Data from the NASDAQ was included after 1972. The authors used logit regressions to understand the impact that the characteristics of profitability, investment opportunities and size, had on the disappearing dividend phenomenon (Fama & French, 2001).

Fama and French (2001) found that dividend-paying firms, generally, were larger, more profitable firms with earnings levels aligned to their level of investment opportunities; whereas non-payers were typically smaller, less profitable firms with larger investment opportunities than earnings. Grullon et al. (2002)'s study confirmed this finding. Fama and French (2001) found that in 1999 only 20.8% of firms paid dividends compared to 68% of firms which paid dividends in 1978. The author's paper attributed the decline to fewer firms being characterised by the features highlighted for dividend payers, whilst simultaneously, increasingly more firms were characterised as non-payers. The level of non-payers was largely a function of the fact that firms perceived the benefit of dividends to have declined over time and, as a result, they had become less inclined to pay them (Fama & French, 2001).

Grullon et al. (2002) built on Fama and French (2001)'s findings and studied the relationship between dividend changes and firm maturity. The authors constructed a sample of dividend announcements from the NYSE and AMEX over the period 1967 to 1993. The authors used a regression-based methodology to understand the impact of multiple firm level variables on the dividend announcements namely: ROA, operating income, net income, common dividends, book value, capital expenditure, cash and short-term investments (Grullon et al., 2002). Through the analysis, the authors found that their data disproved the central idea of signalling theory which was that dividend changes signalled changes in profitability in the same direction. Grullon et al. (2002) found that, in fact, Jensen (1986)'s free cash-flow hypothesis was better supported empirically. However, the authors found that Jensen (1986)'s hypothesis was not able to fully explain their findings. As such, Grullon et al. (2002)

suggested an alternative theory, the maturity hypothesis. The maturity hypothesis suggests that dividends paid were a function of where a firm was in its growth phase. The authors argued that in a growth phase, a firm had many positive NPV projects, whereas once a firm moved into a mature phase, the number of positive NPV projects declined. A growth phase was characterised by large economic profits, high capital expenditures, low free cash-flows and rapid growth in earnings. Given the need to reinvest in these projects, firms in a growth phase were likely to pay declining levels of dividends. In a mature growth phase, firms increased dividends to avoid the agency conflicts which could have resulted from the large free cash-flows the firm generated (Grullon et al., 2002). The managers in Brav et al. (2005)'s paper supported this idea, especially in the case of large 'cash cow' type firms.

In 2004 Baker and Wurgler suggested the initial tenants of the catering theory for dividend initiations and omissions. Baker and Wurgler (2004)'s catering theory argued that the decision to pay dividends was driven by investor demand. Investors placed a stock price premium on firms which paid dividends (payers) versus firms which did not (non-payers); in such a scenario, managers catered for the investors and paid dividends when the premium for the dividends was highest (Li & Lie, 2005). Baker and Wurgler (2004)'s theory suggested that managers would pay dividends when demand was high and refrained from paying dividends when the demand was low (Baker & Wurgler, 2004). In Baker and Wurgler (2004)'s initial work on the catering theory, they limited their observations to initiations and omissions as they found that beyond initiation, the varying increases and decreases of dividend payments appeared to be driven by firm-level profitability more than by the valuations of payers and non-payers (Li & Lie, 2005).

Li and Lie (2005) subsequently expanded on Baker and Wurgler (2004)'s findings to include dividend increases and decreases. Li and Lie (2005) used a sample spanning 1963 to 2000 which considered 1 815 dividend decreases and 18 964 dividend increases. The authors ran a multinomial logistic regression to determine whether the probability of dividend changes was related to the dividend premium (Li & Lie, 2005). The results of the regression showed that firms were more likely to increase their dividends if they were large and profitable and the past dividend yield, debt ratio, cash ratio and market-to-book ratio were low, whereas firms were more likely to reduce their dividends if they had a combination of poor operating income, low cash balances and a low market-to-book ratio. A low market-to-book ratio was implicit in both the increase and the decrease of dividends. The authors argued that for dividend increases, the ratio could signify growth opportunities and as such firms with less

opportunity in the future required fewer funds for investment and therefore increased their dividends. Alternatively, for dividend decreases, the market-to-book ratio measured past and expected future performance and where poor performance was noted, firms reduced their dividend (Li & Lie, 2005). The implication of this rationale behind the dividend decrease was counter to the free cash-flow hypothesis which suggested that a firm would reduce its dividend and rather retain its earnings when it wanted to exploit available investment opportunities.

Li and Lie (2005) found that, irrespective of the role that profitability played in the decision, investors deemed both the payment of dividends and the size of the payment to be important. These findings proved that market demand played, at a minimum, an ancillary role in the dividend decision process. Li and Lie (2005) thus expanded the catering theory and stated that mangers 'catered' to market demand for dividends and, as such, paid dividends and dividend increases when the premium for dividends was highest (Li & Lie, 2005). Easterbrook (1984)'s paper aligned to the principles implicit in the catering theory as the paper attempted to determine if dividends were a way to align manager and investor interests.

In 2006, Amihud and Li approached their research of the rationale behind dividend payments from a different angle, in that they constructed their research on the foundation of the informational content of dividends and the clientele effect of dividends. Specifically, Amihud and Li (2006) hypothesised that the percentage of institutional investors in a firm's shareholders could significantly impact the payment and information content of dividends. The authors further hypothesised that the information content of dividend announcements was declining a result of declining asymmetry of information, as investors were increasingly more informed given advances in technology and reporting, as well as in the information provided by analysts. In their paper, Amihud and Li (2006) assumed that investors, especially institutional investors were more informed and would exploit this information. The authors also assumed that as institutional investors and well-informed players such as hedge funds had large cash and shareholdings, movements by these players in the market would assist information to be quickly incorporated into the realm of known market information (Amihud & Li, 2006).

Amihud and Li (2006) analysed a sample of all dividend announcements on the NYSE and AMEX between 1962 and 2000. The authors divided their analysis into two parts. The first part was focused on how different variables impacted dividends, considering both dividend

increases and decreases. The second part considered the impact of institutional investors, but the analysis only considered dividend increases (Amihud & Li, 2006).

The authors found that the cumulative average return (CAR) had declined for dividend increases and had improved for dividend decreases since the 1970s. This suggested that the stock price reaction to dividend change announcements had lessened over time. The time-frame considered by Amihud and Li (2006) aligned to other studies on similar topics which could explain why some authors had failed to find evidence of the information content of dividends or signalling theory since the 1970s. The data showed support for Baker and Wurgler (2004)'s catering theory in that there appeared to be a correlation between a firm's propensity to pay dividends and the price reaction to announcements (Amihud & Li, 2006). The authors also considered the trend shown in the CAR, relative to the magnitude change of the dividend as this too should have communicated an informational signal to investors (Amihud & Li, 2006). Yet, the results suggested that, over the sample period, the magnitude of dividend changes had become increasingly less informative (Amihud & Li, 2006).

The second part of the analysis considered the impact of institutional investors in dividend-paying firms. Amihud and Li (2006) hypothesised that given the size of these institutional investors and the resources as their disposal, that their presence should have a notable impact on various elements surrounding dividend payments. The authors considered this broad hypothesis through a series of questions and regressions using the quarterly reports on institutional holdings and dividend increase announcements from 1980 to 1998 (Amihud & Li, 2006). The authors noted the following relationships, namely: that there was a negative correlation between the size of the institutional holdings and the market reaction to a dividend increase; a larger percentage of institutional holdings was found to be attributed to reduced asymmetry in information or new information prior to the dividend announcement; institutional investors were found to exploit any information that they had which had not yet been disseminated by the market before the dividend announcement; and finally, it was found that firms with a higher percentage of institutional holdings were more unlikely to increase their dividends (Amihud & Li, 2006). This latter point showed support for the catering theory in that it suggested that the composition of the firm's investors partially guided the dividend decision.

Brav et al. (2005) chose to move away from empirical evidence to more qualitative research to find support for or against signalling theory and the information content hypothesis. In

2005, the authors attempted to build on Lintner (1956)'s research by interviewing and surveying 384 CFO's and treasury managers to determine the key factors that drove dividend policy and repurchases (repurchases were included in an attempt to reflect the updated nature of the market since Lintner (1956) conducted his research).

Brav et al. (2005) detailed the key differences and similarities between their results and Lintner (1956)'s results. The main similarity was that dividend policy was approached quite conservatively during both studies, even though there were approximately 50 years between the two studies. The key factor driving the conservatism was that management were found to be reluctant to reduce their dividend, irrespective of their circumstances. Reducing a dividend was seen as an absolute "last resort" and only acceptable at times when a firm was in severe financial trouble or had an excellent investment opportunity that needed funding (Brav et al., 2005). The majority of managers interviewed believed that there were negative consequences associated with reducing their firm's dividend, even if the firm communicated a very plausible explanation to the market. This conviction was fuelled by the belief that shareholders favoured stable dividends and placed a premium on dividend payers who did not need to reverse previous dividend payment decisions (Brav et al., 2005). Aligned to this was the asymmetry which management perceived between dividend increases and dividend decreases. More specifically, management believed that there was limited benefit associated with increasing a dividend in comparison to the adverse consequences associated with reducing a dividend. Dividend policy was inherited by managers who often wanted to reduce dividends. The managers stated that they were more likely to reduce their dividend at a time when many of their competitors did, as an industry-wide move was less likely to be penalised by investors (Brav et al., 2005). This was an interesting finding as signalling theory suggested that a dividend decrease was associated with financial troubles in a firm, whereas this insight indicated that it was more likely to be an industry-wide decision designed to rectify historical dividend policy and better align it with current management strategy.

The key differences with Lintner (1956)'s research that Brav et al. (2005) discovered was that: firstly, firms no longer appeared to have a target dividend pay-out ratio, rather management appeared to focus on a particular dividend per share target. Secondly, that repurchases had become an increasingly popular and important pay-out form, as they were seen to be more flexible than dividends.

In 2010, Jensen et al. (2010) aimed to elaborate on Jensen (1986)'s work on the free cash-flow theory but in the context of dividend decreases. However, through their study, the authors failed to find support for the free cash-flow hypothesis. In the literature, multiple authors reported that there was a correlation between dividend decreases and future earnings increases (Bernartzi et al., 1997; Nissim & Ziv, 2001). Jensen et al. (2010) sought to investigate this correlation and discovered that a dividend decrease was a firm's last resort and assisted the firm in restoring a level of internal financial flexibility. This process necessitated that the firm allowed its growth options to expire, counter to the free cash-flow hypothesis. Growth options formed part of a firm's value along with real assets. As a result of this, the authors suggested that investors reacted negatively to the dividend-decrease announcement because it signalled the expiration of growth options and not because of the reduced absolute value of the dividend payment (Jensen et al., 2010).

In order to test why firms, which reduced their dividend, experienced an earnings increase in the year after the event year, the authors constructed a sample which included dividend decreases on the NYSE, AMEX and NASDAQ and spanned from 1967 to 2006. Through a four step event study, the authors considered the following variables: firms' share price returns, ROA figures, M/B ratios, expenditure on fixed assets, expenditure on research and development and level of employees, which could have impacted the dividend decision or an investor's reaction to a dividend decision.

The authors found that abnormal returns surrounding the dividend announcement were large, negative and statistically significant. Jensen et al. (2010) additionally considered the impact of operating performance on the dividend-decrease decision and found that a dividend decrease was more likely when ROA figures were low and frequently negative. Evidence surrounding firm employee numbers, expenditure on fixed assets and research and development, showed that firms which reduced their dividend expenditure experienced an earnings rebound as a result of the cost savings associated with the restructuring activities. The restructuring activities were aimed at reducing resources as the firms had decided to allow their growth opportunities to expire. This finding was counter to the free cash-flow hypothesis which assumes that a firm would reduce its dividend in order to invest in growth opportunities (Jensen et al., 2010).

Andres, Betzer, Van den Bongard, Haesner and Theissen (2013) also considered traditional dividend policy questions in their study, but in a German context. Their research, which

considered the share price reaction to surprise positive dividend announcements in Germany, found evidence in support of signalling theory and the clientele effect.

Between the years 1996 to 2006, the authors found evidence in support of signalling theory. Andres et al. (2013) found that when a dividend announcement and an earnings announcement were made on the same day that the dividend announcement provided more information to the market than the earnings announcement did. The authors noted that there was a clear relationship between firms which paid higher dividend yields and shareholders who valued higher dividends. These firms also experienced a stronger share price reaction to dividend news (Andres et al., 2013). Both findings aligned to the clientele effect.

As can be seen throughout the literature, there was, and still is, no conclusive dividend theory. However, the research clearly indicates that dividends are relevant and can impact both firms and investors. As such, it is important that research continues to investigate the various aspects of dividends and the ways in which differing methodologies and geographies impact them.

2.2. Market reactions to dividend payments

Through the various avenues of research, authors have attempted to; firstly, understand whether historical data impacted a present dividend decision, or whether it was merely present data which drove the decision; secondly, to uncover whether there was indeed a correlation between present data and future data; thirdly to investigate whether the data in the future followed the hypothesised trend, for example, that a dividend increase was correlated to a future earnings increase and finally, to analyse the market reactions which resulted from dividend increases and decreases.

There appeared to be limited support in recent literature for Modigliani and Miller (1958)'s irrelevance theorem. The theory failed to explain dividend policy and shareholder reactions surrounding dividend announcements, no matter how logical the tenets of the theory were. A key belief in recent years was posed by Sadeghi Sharif, Alipour and Amozghar (2013) and supported by Olsen and Wallen (2013), which stated that there were numerous investors who based their investment strategies on which companies paid dividends or paid more dividends than the market average. This hypothesis was supported by the authors who concluded that there was evidence of both the relevance and importance of dividends.

Based on this, researchers invested heavily in attempting to understand market behaviour surrounding the announcement of dividend increases and dividend decreases.

Olsen and Wallen (2013) found support for Modigliani and Miller (1958)'s irrelevance theorem in their analysis of share price reactions to dividend announcements (it was not specified whether they were dividend increases or decreases) on the Dhaka Stock Exchange (DSE) in Bangladesh. The authors conducted an event study using a sample of 74 listed firms between January 2011 and December 2011, in an attempt to analyse the informational efficiency of the Bangladesh capital market (Olsen & Wallen, 2013).

The authors considered an event window of 61 days for their study. Olsen and Wallen (2013) found that investors had experienced significant, negative returns on the day of the dividend announcement. The authors rationalised this finding by suggesting that negative returns could have been as a result of information regarding the dividend announcement being leaked before the actual announcement took place. The authors then extended their analysis throughout the trading window and found that there were positive gains before the announcement but none that were statistically significant and that the returns were negative, but not statistically significant either, after the announcement (Olsen & Wallen, 2013). These findings suggested that the dividend announcement was not a surprise to the market.

In 1961 Modigliani and Miller stated that dividends could have informational content in a case where markets were incomplete; Bernartzi et al. (1997) used this hypothesis as the starting point for their study which investigated whether dividend increases or decreases signalled informational content for past or future earnings. Research during the 80's built on the initial theories by Modigliani and Miller (1958) and Linter (1956), and suggested that more than just having informational content, dividend increases and decreases were explicit signals regarding the direction of future earnings (Bernartzi et al., 1997). Brav et al. (2005) refuted this in their research of management perspectives, whereby managers themselves stated that they did not use dividends as an explicit signal. Given the debate around the signalling properties of dividends and minimal empirical evidence, Bernartzi et al. (1997) constructed a sample of 1 025 listed firms and 7 186 firm year observations from the NYSE and the AMEX over the period 1979 to 1991, to test whether changes in dividend payments had informational content for past or future earnings. The authors aimed to analyse unexpected earnings which were the earnings over and above the earnings a firm would have expected to accrue under normal circumstances (Bernartzi et al., 1997). The authors also

considered whether there was a correlation between the size of the dividend and the level of unexpected earnings (Bernartzi et al., 1997).

Through their study, the authors failed to find any evidence that dividend changes had informational content about future earnings. There did, however, appear to be a link between past earnings and present dividend payments but this link was not predictive. For instance, the authors found that firms which experienced an earnings increase in year -1 and year 0 were only likely to increase their dividend in year 0. This supported the hypothesis that firms only increased their dividend once they were able to confirm that their earnings increases were not transitory. As Jensen et al. (2010) found, and Bernartzi et al. (1997) also concluded, the only predictive feature of dividend changes that was supported by the data was that dividend decreases reliably signalled a future increase in earnings.

An interesting element highlighted through Bernartzi et al. (1997)'s research was the question of robustness. More specifically, the authors asked whether their results could be explained by the fact that dividend-increasing firms, because of the money that they paid out, had reduced earnings to reinvest in their firms the following year. This hypothesis touched on elements of the free cash-flow hypothesis. The authors analysed the hypothesis by making "an adjustment that adds back the money that firms would have earned on the extra dividend had it retained it" (Bernartzi et al., 1997: 1025). The results indicated that this adjustment had no impact on the results, suggesting that the payment of dividends had little impact on a firm's ability to reinvest.

Nissim and Ziv (2001) conducted a similar study to Bernartzi et al. (1997) but altered the linearity of earnings assumption from that used in Bernartzi et al. (1997) and Grullon et al. (2005). As a result, Nissim and Ziv (2001) found clear evidence of information content in dividend announcements which Bernartzi et al. (1997) and Grullon et al. (2005) did not. Nissim and Ziv (2001) conducted their research using a sample of dividend increases, dividend decreases and no change observations from the AMEX and NYSE between 1963 and 1998. The authors found that dividend changes were positively related to earnings (namely future earnings changes, future earnings and future abnormal earnings) changes for at least the two years succeeding the dividend announcement. The authors additionally found that dividend increases were related to changes in future profitability for at least 4 years beyond the dividend announcement, whereas dividend decreases showed no relationship with future profitability (Nissim & Ziv, 2001). It was interesting to note that Nissim and Ziv

(2001) found conclusive evidence with respect to dividend increases but not for dividend decreases. Jensen et al. (2010) would argue that, this finding might not be the case if the dividend decreases had been considered separately. Jensen et al. (2010) stated that dividend increases and dividend decreases were the result of very different circumstances and, as such, were materially different. Considering both types of dividend announcements using the same assumptions could result in incorrect results.

Nissim and Ziv (2001) also examined the relationship between dividend changes and the level of future profits looking at earnings and abnormal (unexpected) earnings. It was the author's findings regarding dividend decreases that were of particular interest as they were counter to the common results typically found with respect to dividend decreases. Nissim and Ziv (2001) stated that, based on the high level of correlation between dividend decreases and current year earnings, the information content of dividend decreases may be captured by current earnings as the announcement of the earnings was after that of the dividend announcement. However, Nissim and Ziv (2001) found that dividend decreases were unable to explain future earnings. The authors offered two explanations for this: firstly, the authors stated that the findings were consistent with the accounting concept of conservatism (the idea that losses were recognised when they were anticipated, whereas profits were only actualised when they occurred); secondly, that dividend decreases did not explain future earnings as management tended to favour taking a "big bath" in the face of bad news (the idea that management opted to reduce future depreciation and amortization charges upfront as opposed to delaying the impact on earnings).

Similar to Nissim and Ziv (2001), Sadeghi Sharif et al. (2013) found evidence in support of the information content hypothesis. Sadeghi Sharif et al. (2013) conducted a study on the Tehran Stock Exchange (TSE) looking at how investors reacted to a change in a company's established dividend trend. The authors considered firms whose dividend policy deviated from an established increase, decreasing or constant dividend payout trend (Sadeghi Sharif et al., 2013). The authors required each of the firms to have three years of historical data to identify a trend. Sadeghi Sharif et al. (2013) considered data from non-financial firms over the period 1995 to 2007. The final sample comprised of 47 significant increases, 45 continuous increases and 50 decreases for firms with an ascending dividend payout trend; 50 increases, 50 unchanged samples and 50 decreases for firms which had an unchanged dividend trend; and 44 decreases, 43 continuous decreases and 50 increases from firms which had a decreasing dividend trend.

Using CAPM and Fama and French (1993)'s 3-Factor Model, the authors concluded the following: investors reacted positively to an increase in dividends, irrespective of the firms' historical trend; investors showed little reaction to firms which left their dividend payout levels unchanged until several days after the announcement when positive returns were noted; and finally, the authors found that investors reacted negatively when firms reduced their dividend from an increasing or unchanged trend but that investors reacted positively if firms reduced their dividend from a decreasing trend (Sadeghi Sharif et al., 2013). The authors noted that the results clearly added to the literature which supported the information content of dividends hypothesis.

Grullon et al. (2005) published a paper, "Dividend changes do not signal changes in future profitability" in response to Nissim and Ziv (2001)'s paper which suggested that dividend changes do signify future profitability. (The fundamentals behind the debate were for the most part methodological which will be addressed in the final part of this literature review). The authors analysed the "forecastability of dividend changes explicitly accounting for the parameter uncertainty faced by investors who had access to only historical data" (Grullon et al., 2005: 1661). The authors constructed a sample of 2 778 firms listed on the NYSE and the AMEX over the period 1963 and 1997. This sample equated to 14 235 dividend increase, 974 dividend decrease and 23 334 no change dividend event observations (Grullon et al., 2005). Some trends in Grullon et al. (2005)'s data were that dividend cuts were the least common dividend change events but that the size of the reductions were more severe in magnitude when compared to the other dividend changes. Dividend increases were more common but generally announced by larger firms which had been more profitable than other firms in the years before the reduction.

Grullon et al. (2005) concluded that dividend changes were uncorrelated with future earnings and, as such, they did not add any explanatory value in models designed to forecast earnings changes. The authors stated that their paper was not an exhaustive analysis on signalling theory and whilst dividends may signal something, they did not signal abnormal increases in future earnings nor abnormal increases in future profitability.

In their 1985 paper, Eades, Hess and Kim considered how the market responded to dividend announcements, paying attention to two elements in particular: firstly, the timeliness of investor's responses and secondly, the unbiased stance of the responses. The author's argument for this approach was that there had been multiple event studies considering market

reactions to events which generally tended to assume an element of market efficiency. Yet "if prices do not react quickly and unbiasedly to new information, little economic insight can be gained from observing stock returns around the announcement of various financial or economic events" (Eades et al., 1985: 581). The authors hypothesised that, as dividend announcements were generally regular and anticipated events, the market should react efficiently to such events (Eades et al., 1985).

The authors considered dividend increases, dividend decreases and occasions where dividends did not change. The sample was made up of dividend events for common stocks on the NYSE between July 1962 and December 1980 (Eades et al., 1985). The author's initial findings suggested that the market interpreted dividend increase and decrease announcements largely in line with signalling theory. Dividend increases were found to be viewed as good news, dividend decreases were regarded as bad news and lastly, but most interestingly, that no change announcements produced a positive reaction from investors (Eades et al., 1985). This aligned to what Brav et al. (2005) found when they interviewed managers, in that managers believed that their stock price would not be penalised if they opted to keep dividends at a stable level. Eades et al. (1985) ensured that the announcement effect and ex-dividends effect were controlled for, to ensure that the effects could not confound the results. It was found that the standardised excess returns for dividend-increase announcements were only significant in the first two days after the announcement. These results confirmed that the market responded timeously to dividend announcements (Eades et al., 1985).

The second element the authors considered was the extent to which the market responded unbiasedly. In order to test for an unbiased market response, the authors required a sample without any ex-post selection bias (Eades et al., 1985). The authors formed their sample from 1962 to 1980 which consisted of continuous, regular dividends and dividend omissions (Eades et al., 1985). The authors followed a similar methodology as used in the paper's previous section and from the results, determined that the market's expectations of dividends were biased and at conflict with market rationality (Eades et al., 1985: 598). The data implied that "the market is either overly pessimistic in forecasting dividends or overly optimistic in assessing the informational content of dividend announcements" (Eades et al., 1985: 603). The author's research thus suggested that investors do assume that dividends contain signalling properties and/or informational content but that these assumptions were driven more by investor perception than they were by reality.

Below and Johnson (1996) again considered the share price reaction to a dividend increase or decrease but they looked at the reactions during different market phases, namely bear and bull markets. The authors used the information content hypothesis as the rationale for their hypothesis in that investors should have derived relatively more information from dividend-change announcements which ran counter to strong market cycles. This meant that dividend cuts in a bull market or dividend increases in a bear market should contain more information than dividend increases in a bull market and dividend decreases in a bear market (Below & Johnson, 1996).

The authors studied two bull and two bear market phases from the S&P 500 index between 1970 and 1982. The market phases were required to be adjacent or nearly adjacent and exceed 12 months in duration (Below & Johnson, 1996). Below and Johnson (1996) found that the reaction to dividend-increase announcements in bear markets was larger than the reaction found for dividend-increase announcements in bull markets. This suggested that investors reacted well to firms which were seen to do well (better than the average firm) during tough economic conditions. In terms of dividend decreases, the reaction in a bull market was larger than in a bear market. This suggested that the market would penalise firms which performed poorly in favourable economic conditions (Below & Johnson, 1996). As expected, dividend increase yields were larger in bull market phases and dividend decrease yields were larger in bear market phases which would typically be expected. As a result, Below and Johnson (1996) concluded that the size of the dividend did not influence how investors reacted to a dividend announcement. The authors concluded that dividend increases (suggested as good news) and decreases (suggested as bad news) were perceived differently depending on the market phase (Below & Johnson, 1996). The author's research suggested that it was the combination of the market phase and the dividend-announcement change which potentially contained signalling and informational content for investors.

2.3. Dividend-related evidence from South Africa

Sealy and Knight (1987) conducted a dividend study on the JSE looking at dividend policy, share price and return data between January 1973 and 1981. The authors used a methodology whereby they split the dividend-paying firms into three groups based on their payout ratios and then again by their dividend yields. The authors opted to look at the patterns of returns which emerged from these groupings.

In the first case, return results were considered in relation to the firm's payout ratios although no clear pattern developed. In the second case, the return results were considered in relation to the dividend yields, but again, no clear difference was noted. Sealy and Knight (1987) concluded that dividend payout ratios and dividend yields did not significantly influence the levels of return earned by shareholders and thus did not influence the value of a firm.

In 2009, Wolff and Auret investigated the relationship between dividend changes and future earnings in South Africa. Whilst the authors suggested three different methodologies to conduct such a study, they opted to perform a categorical analysis, aligning to Bernartzi et al. (1997), and regression analysis, as performed by Nissim and Ziv (2001). The authors constructed a sample of 107 firms and 749 firm years; these firms traded on the mainboard of the JSE and had declared at least one dividend per annum for the period 2000 to 2007. The time period selected by Wolff and Auret (2009) was one in which the JSE All Share Index experienced an annualised gain of 16.84% year-on-year.

For the categorical analysis, similar to Bernartzi et al. (1997) the authors defined the unexpected earnings for each firm in order to analyse the relationship between dividends and unexpected future earnings (Wolff & Auret, 2009). Through this analysis, the authors concluded that the relationship between dividend changes and present earnings changes was positive and strong. However, there was no significant evidence of signalling with respect to earnings in years one and two (Wolff & Auret, 2009).

The author's regression analysis was used to determine whether the size of the dividend change impacted the magnitude of the unexpected earnings in the future. The authors considered dividend-increase firms only and analysed the impact of Return-on-Equity (ROE) and deflating the change in earnings by the book value of equity. The results of the analysis mirrored those from the categorical analysis in that there was no evidence of signalling in year one and two (Wolff & Auret, 2009). The authors stated that their findings were consistent with research conducted by Nell, Hamman and Smit in 2001 who had attempted to mirror the study conducted by Bernartzi et al. (1997) in South African but for a larger sample of firms (Wolff & Auret, 2009).

Two years after Wolff and Auret (2009)'s study, Vermeulen and Smit (2011) tested the hypothesis that firms in South Africa which paid dividends would have less financing available for investment opportunities and growth. The author's research aimed to determine the relationship between dividend payout and future earnings growth for listed companies.

The results were compared to those of similar studies conducted in the USA and Australia. A study of listed firms in the USA conducted in 2003 found that firms with higher dividend payout ratios experienced higher growth in future earnings that those with lower payout ratios (Vermeulen & Smit, 2011).

Vermeulen and Smit (2011) considered a time period of 40 years spanning from 1973 to 2009. They followed a multivariate regression methodology suggested in a paper by Zhou and Ruland in 2006 (as cited in Vermeulen and Smit, 2011) who had analysed the earnings growth of American firms. Zhou and Ruland (2006) also separated the firms into long, intermediate and short timeframes (depending on how long the firms were listed for) to better represent how shareholders choose to invest (Vermeulen & Smit, 2011). Zhou and Ruland (2006) had found a positive relationship between dividend payout and future earnings growth through their study (Vermeulen & Smit, 2011).

Through the multivariate regression which included variables such as earnings yield, ROA, asset growth, leverage, past earnings growth and the dividend payout ratio, Vermeulen and Smit (2011) concluded that the payout ratio of South African firms had a significant impact on the firm's future earnings growth. The results from the South African firms compared well to those of the USA. "Both countries showed a significant positive correlation between dividend payout and future earnings growth, and a significant negative correlation between dividend payout and past earnings growth" (Vermeulen & Smit, 2011: 45). The authors noted that the South African results were not consistent with the results of other developing countries such as Malaysia and this suggested that a blanket conclusion for all developing countries could not be reached (Vermeulen & Smit, 2011).

2.4. Methodological approaches for dividend studies

There were multiple methods used in the literature to evaluate the relationship between a firm's dividend announcement or dividend policy changes, and a firm's present and future earnings. Typically, the studies followed a multiple step approach, given the complexities associated with analysing the relationship between share price movements, earnings, unexpected earnings and firm characteristics over time. The more popular methodologies were an event study, portfolio-based analysis and regression analysis which were frequently used in line with categorical analysis, a control firm approach and panel data.

Jensen et al. (2010) and Andres et al. (2013) made use of an event study methodology in their respective studies. Wolff and Auret (2009) suggested using an event study methodology when studying dividends as it provides the possibility for more detailed analysis than a pure regression-based approach. Jensen et al. (2010) used a control firm approach as part of the event study, whereas Andres et al. (2013) opted to use the event study to analyse panel data.

Portfolio analysis is similar to an event study in that it is used to compare how different variables alter performance against a particular benchmark. Eades et al. (1985) used a portfolio approach when studying the market's response to dividend announcements between 1962 and 1980. The authors formed "equally weighted portfolios of all securities that make a regular dividend announcement on each portfolio trading day" (Eades et al., 1985: 583). The authors compared the portfolios by calculating each portfolio's standardized excess returns, using the returns which followed the dividend announcement. The authors argued that return data from after the announcement, is independent of the nature of the announcement and avoids any bias should dividend payment information leak before the actual announcement. Eades et al. (1985)'s results were largely in support of signalling theory. Michaely, Thaler and Womack (1995) also opted to use a portfolio approach but considered only dividend initiations and omissions. Their study followed a very similar period to Eades et al. (1985)'s study in that it spanned from 1964 to 1988. Michaely et al. (1995) approached the portfolio analysis slightly differently to Eades et al. (1985) in that they calculated excess returns from a buy-and-hold strategy for their initiation and omission samples and then compared the resultant returns to the returns of four benchmark portfolios. The authors found that the sample of firms which initiated dividends performed well in the year prior to the initiation and conversely, firms which omitted dividends, performed worse than the benchmark portfolios in the year prior to the omission. Michaely et al. (1995)'s findings were consistent with the results in DeAngelo et al. (1992)'s paper.

In the literature, a popular methodological approach when considering the relationship dividend announcements and earnings was a regression-based approach. Bernartzi et al. (1997)'s paper conducted a regression analysis aimed at examining whether dividends acted as a signal for past or future earnings. More specifically, the authors examined "the correlation between the rate of change in dividends per share in the year 0 and the changes in earnings in years 0, 1 and 2, scaled by the market value of equity at the beginning of the dividend change year" (Nissim & Ziv, 2001: 2115). The sample period stretched from 1979 to 1991. The authors constructed a sample of 1 025 firms (7 186 firm year observations) was

constructed from across the AMEX and NYSE. The paper's methodology became a benchmark against which other papers were written. Firstly, in 2001, Nissim and Ziv argued that Bernartzi et al. (1997)'s fundamental linearity assumptions were incorrect which had biased their results and that dividend announcements do, in fact, support the signalling hypothesis. Secondly, Grullon et al. (2005) wrote a paper in support of Bernartzi et al. (1997)'s approach.

Nissim and Ziv (2001) considered a large sample of over 100 000 dividend increases, decreases and no change observations spanning 1963-1998. The sample and the sample period were both larger than those studied in Bernartzi et al. (1997). The authors began their investigation by repeating Bernartzi et al. (1997)'s study. Following Bernartzi et al. (1997)'s approach, Nissim and Ziv (2001) concluded consistent findings with Bernartzi et al. (1997)'s findings. Nissim and Ziv (2001) subsequently altered the two specification "errors" in Bernartzi et al. (1997)'s model. The errors related to the estimation measurement error (1) and omitted correlation variables of unexpected earnings (2). For the first error, the authors altered the earnings variable to incorporate an element of linearity. For the second error, the authors included ROE as an explanatory variable. The rationale behind the latter change was that there was a positive correlation between dividend changes and current ROE which suggested that there may be a negative correlation between unexpected earnings changes and dividend changes. The authors hypothesised that a lack of correlation between earnings changes and dividend changes would indicate that dividend changes contain information with respect to future earnings (Nissim & Ziv, 2001).

Grullon et al. (2005) conducted a study largely in response to the paper written by Bernartzi et al. (1997) and the paper written by Nissim and Ziv (2001). The two papers debated methodological issues which Grullon et al. (2005) sought to clarify. Their study was aimed at determining what, if any, information dividend change announcements reflected regarding future earnings and profitability.

The authors began their study by repeating the analysis undertaken by Nissim and Ziv (2001) to ensure that their sample was well matched to the one used in Nissim and Ziv (2001)'s study (Grullon et al., 2005). Nissim and Ziv (2001)'s research had assumed that when studying the relation between dividends and earnings that the mean reversion process of earnings and the level of autocorrelation were linear; where, in fact, Grullon et al. (2005) stated they were highly non-linear, thus biasing Nissim and Ziv (2001)'s results. Grullon et

al. (2005) hypothesised that if this specification error was corrected, that there would be no relationship between dividends and future earnings, counter to Nissim and Ziv (2001)'s results. Grullon et al. (2005) went on to test whether dividends forecasted profitability through a cross-sectional regression using ROA. The authors found that firm profitability was not positively related to past changes in dividends. The authors then considered whether dividend changes were related to future earnings levels and again found no evidence of signalling theory. In both cases, the authors used a linear and non-linear specification for illustrative purposes. The authors concluded that, once the well-known non-linearities of the earnings were controlled for, that there was no correlation to be found between dividend changes and future earnings (Grullon et al., 2005).

Wolff and Auret (2009)'s research in South Africa made use of the lessons from Bernartzi et al. (1997), Nissim and Ziv (2001) and Grullon et al. (2005) whilst considering the relationship between dividend changes and earnings in the years subsequent to the dividend change. Their approach was heavily influenced by Bernartzi et al. (1997)'s approach in that the authors used categorical analysis to examine raw earnings under the assumption of a random walk (Wolff & Auret, 2009).

DeAngelo et al. (1992), Bernartzi et al. (1997) and Jensen et al. (2010) used a control firm approach in their studies. A control firm approach allowed the authors to identify abnormal behaviour in an underlying variable through a comparison of the behaviour of a benchmark sample (DeAngelo et al., 1992).

Bernartzi et al. (1997) utilised a control firm approach to interpret the results of their categorical analysis when considering unexpected earnings. Categorical analysis is a non-parametric method of analysis used when the questions asked are qualitative in nature and authors want to make inferences about two or more distributions (University of Notre Dame, 2013). Wolff and Auret (2009) also opted to use categorical analysis in their study of dividends in South Africa, and Li and Lie (2005) used it in their study of the catering theory.

Conversely, DeAngelo et al. (1992) and Jensen et al. (2010) used a control firm approach to analyse the relationship between earnings and dividend reductions. Although DeAngelo et al. (1992) were more interested in the relationship before the dividend announcement, Jensen et al. (2010) placed more emphasis on the relationship after the announcement. Both DeAngelo et al. (1992) and Jensen et al. (2010) required a large amount of firm-level dividend and financial data. DeAngelo et al. (1992) required each firm to have 10 years of financial and

dividend data before the event year, whereas Jensen et al. (2010) required five years of data both before and after the event year. Jensen et al. (2010) studied multiple relationships through the control firm approach. Similar to Grullon et al. (2002), Jensen et al. (2010) also made specific note of the relationship between firm characteristics and dividends.

Panel data is a type of cross-sectional data which allows observations of numerous variables over multiple time periods for the same sample of firms. Both Andres et al. (2013) and Khan (2006) made use of panel data in their research.

Andres et al. (2013) used panel data whilst conducting research which considered share price reactions to dividend announcements in Germany, between 1996 and 2006. The authors analysed the data through panel models designed to relate the share price reaction after the dividend announcement to the characteristics of the firm. Andres et al. (2013) used a random effects model rather than a pooled ordinary least squares (OLS) model which is aligned to the approach taken by Wolff and Auret (2009).

Khan (2006), conversely, used panel data to analyse whether there was any systematic relationship between dividends and the characteristics of a firm's ownership. Khan (2006) created an unbalanced panel of 330 firms (3030) observations between 1985 and 1997 in the United Kingdom. The panel data was used to control for firm heterogeneity. Khan (2006) noted a strong linear relationship between ownership concentration and dividends which remained, irrespective of how the shareholdings changed.

Throughout the various avenues of research, the methodological approaches used, whilst different, all contained some element of consistency. The event study methodology and control-firm approach used in this research are both well-tested within the literature as a mean to highlight the relationships between dividend-decrease paying firms and non-dividend paying firms.

3. Sample

The sample comprised of listed firms which had paid dividends on the JSE over the 22 year period which began in 1990 and ended in 2012. The study required firms to have three years of financial data before and after the event year, this meant that dividend data was required for the period 1990 to 2009 and financial data was required from 1990 to the end of 2012. All the data was sourced from McGregor BFA (dividend, market and financial data).

There were multiple considerations which were factored into the sample period selected:

i. **Sample size:** A risk of only considering dividend decreases in the South African context, was that the resultant sample size would be relatively small (Wolff & Auret, 2009). Li and Lie (2005) caution against the use of a small sample as it impairs the statistical power. This study attempted to mitigate these concerns and, as such, the period considered was extended as far as the data available allowed.

ii. **Tax implications:** Multiple tax changes have occurred in South Africa in the last 20 years which have had an impact on the level and number of dividends paid. There was a tax regime change in March 1990, prior to which all investors (except those in the lowest income bracket) incurred a dividend tax (Wolff & Auret, 2009; Ross, Westerfield Jordan & Firer, 2001). Beyond March of 1990, the newly instated secondary tax meant that a firm declaring dividends beyond March 1990 had to pay a tax. The implication of the tighter tax regime was that the level of dividends paid was more likely to have been depressed (Wolff & Auret, 2009). In April 2012, the secondary tax on firms was lifted, but the responsibility to pay tax was from then, again, borne by the investor. In this study, dividend decreases were only considered between 1993-2009. The additional requirement of an established dividend history, only required the firm to have (at a minimum) paid a dividend in 1990. As a result, the tax changes described were unlikely to have a significant impact on the results.

iii. **Apartheid:** In 1994, democracy was introduced in South Africa, with the demise of the Apartheid regime. This event had a material impact on the level of openness and investment in the capital markets and, as such, it was considered when interpreting the results. Whilst there could be an argument to be made for considering data only after 1994, Below and Johnson (1996) argue that cyclical data has the potential to provide an indicator of which external factors have a potential impact on the declaration of dividends.

There was frequent debate in the literature as to whether to include or exclude financial sector stocks when constructing a sample for dividend-based research. Grullon et al. (2005), Li and Lie (2005), Nissim and Ziv (2001) and Sharif et al. (2013) all chose to exclude financial sector stocks. However, Jensen et al. (2010) included financial sector stocks, as did Bernartzi et al. (1997). This study aimed to replicate the study by Jensen et al. (2010) where possible and as such financial sector stocks were included where possible. The inclusion of financial stocks thus ensured that the results between this study and Jensen et al. (2010)'s paper were comparable.

Jenson et al. (2010) stipulated that firms required a pre-drop consecutive, non-decreasing dividend payment history of at least five years. This requirement was enforced to ensure that the company had an established dividend. Below and Johnson (1996) required companies to have paid dividends for two years before each individual phase studied and two years thereafter to ensure that the companies had paid a long-term reliable signal to investors. The authors did not, however, require that the dividend pay-outs represent an increasing or decreasing trend. Bernartzi et al. (1997) only required a firm to have paid quarterly dividends for at least two consecutive years. Grullon et al. (2005) only required a firm to have paid a dividend in the quarter under analysis and the previous quarter. In the Iranian context, Sadeghi Sharif et al. (2013) stated that a three-year annual dividend payment (with a constant trend) was likely to be sufficient to satisfy the criteria that a company had an established dividend policy.

In the South African context, Wolff and Auret (2009) stipulated that a firm needed to have paid only one dividend a year, consistently for seven years, during their sample period. South Africa's capital markets lack the depth and maturity of the capital markets in the United States; as a result, the requirements on a company's pay-out history for this study were not as stringent as the requirements Jenson et al. (2010) stipulated. As there was no unanimous agreement in the previous literature, this study followed the precedent set by Sadeghi Sharif et al. (2013) and included companies which had a three-year pre-drop consecutive dividend payment history (with a constant or increasing dividend trend in the years before the event year).

In their paper, Jenson et al. (2010) only considered firms which paid a quarterly dividend. This was consistent with other research which had been conducted using data from the NYSE, AMEX or NASDAQ. The approach used in this research paper considered only firms

which had an established dividend history of paying semi-annual dividends. Whilst different from the specification in Wolff and Auret (2009)'s paper, there were two main reasons for this choice: firstly, the payment of semi-annual dividends appeared to characterise the established market practice within the South African market and secondly, this study considered firms which had a shorter dividend-payment history than Wolff and Auret (2009)'s paper. As this study required a three-year, semi-annual, dividend-payment history each firm had at least six dividend-payment observations. This was similar to Wolff and Auret (2009) as each firm in their sample had to have a minimum of seven dividend-payment observations.

Jensen et al. (2010) defined a dividend decrease as a payment reduction of 20% or more for a firm which had paid a positive, non-decreasing dividend over the required time period. Yoon and Stark (1995) only required a 10% change to represent both dividend increases and decreases. Sharif et al. (2013) considered a dividend decrease as a payment reduction of 30% or more. Grullon et al. (2005) did not specify what they defined as a dividend-decrease requirement but they found that the average decrease in dividends was 45.5%. This study followed the precedent set by Jensen et al. (2010) and classified a dividend decrease as a payment reduction of at least 20%.

This study analysed firms which paid semi-annual dividends, which complicated the application of the 20% reduction criterion mentioned above. South African firms tend to pay a much lower interim dividend than they do for a final dividend. However, the interim dividend does not represent a dividend reduction as the payments showcase a clear trend which was anticipated by the market. As a result of this, the 20% reduction criterion was applied on the final dividend payments only.

For a firm to be included in the dividend-decrease sample, each firm was required to satisfy multiple criteria:

i. Listed on the JSE for at least seven-years during the sample period.
ii. Semi-annual dividend payments three-years before and three-years after the event year.
iii. The final dividend payments for the three-years before the event year needed to follow an increasing or constant trend.
iv. A dividend decrease of at least 20% in the event year.
v. Financial and market data for three-years before and three-years after the event year.

An iterative approach was taken in terms of constructing the dividend-decrease sample. All listed firms on the JSE which had paid a dividend between 1990 and 2009 were initially considered. Whilst the dividend-decrease firms needed to satisfy the criteria as mentioned above, the initial step was to ensure that the firms had a sufficiently sizeable (minimum of 20%) year-on-year dividend decrease and satisfied the minimum dividend payment history (three years, six semi-annual dividend payment). Thereafter, all firms were checked to ensure that they satisfied the remaining sample criteria.

In order to conduct the event study, each dividend-decrease firm needed to have a representative peer (control) firm in order to form a control sample. The peer firms needed to satisfy four criteria, namely that:

i. The peer firm was in the same sector as the dividend-decrease firm.
ii. The peer firm's level of total assets was similar to that of the dividend-decrease firm in the event year.
iii. The peer firm did not have a dividend decrease in the year under analysis (the event year for the dividend-decrease firm).
iv. The peer firm had financial and market data available for the three-years before and the three-years after the event year.

If a peer was not found for a particular dividend-decrease firm, it was deleted. This highlighted a particular risk, in that, if more stringent criteria were enforced, it would have hampered the compilation of a representative control sample and ultimately, the size of the dividend-decrease sample that could have been analysed. Additionally, whilst the financial sector was not excluded, multiple firms such as banks and insurance companies were removed from the dividend-decrease sample as it was not possible to source a peer firm of relative asset size. The initial sample of dividend decreases was 95 observations; 12 of these from the financial sector were removed because a peer firm (based on asset size) could not be found, another 12 observations from multiple industries were deleted based on the inability to find an appropriate peer, and nine observations were deleted because the peers found did not have financial data available for the seven-year period under review. From the 95 observations (665 firm years) which were originally found, 33 were removed from the sample, leaving a final dividend-decrease sample of 62 observations (434 firm years) for the analysis. Wolff and Auret (2009) conducted their research using a sample of 107 firms (749 firm years) over the period 2000 to 2007.

As can be seen in Table 1, the final dividend-decrease sample comprised of 62 dividend-decrease observations from 54 firms. There were 47 firms which experienced only one dividend decrease between 1993 and 2009 which satisfied the selection criteria. Of the remaining seven firms, six firms experienced two dividend decreases and the one experienced three dividend decreases which satisfied the selection criteria. The final peer sample was made up of 62 observations from 56 firms. The dividend-decrease sample was much smaller than the sample considered by Jensen et al. (2010) which was anticipated. Jensen et al. (2010) identified 988 dividend-decrease events; however, 15 firms were deleted as a peer sample could not be identified. Ultimately the authors conducted their research on a sample of 973 firm-level dividend decrease events.

Table 1: Dividend-decrease sample composition

Composition of the dividend-decrease sample. Dividend reductions were identified for firms on the JSE which had experienced a minimum of a 20% reduction in their final dividend payment from a three-year increasing or constant dividend payment trend.

	Dividend decrease sample
Dividend decrease event observations that satisfy all the selection criteria (incl. peer firm)	62
Firms with one dividend decrease during the sample period	47
Firms with more than one dividend decrease during the sample period	7

Table 2 illustrates the peer sample when compared to the dividend-decrease sample (in the event year). The main variable which was considered in the selection process for the peer sample was total assets. Both samples were similar in terms of the number of firms and the level of total assets. Although it was not necessary, given the peer sample criteria, other variables were included in the comparison such as median number of employees, median turnover, median profit before tax (PBT) and median earnings before interest, tax, depreciation and amortisation (EBITDA) to ensure that the control sample was indeed representative of the dividend-decrease sample. The two samples were similar on most of the variables. The biggest discrepancy appeared in the comparison of median EBITDA, however, the average values over the period considered were closer in size. The dividend-decrease sample had an average EBITDA level of R421,220,000 and the peer sample had an average of R515,688,000. As the financial data of the peer sample and the dividend-decrease sample

were similar, the peer sample acted as a reasonable benchmark to compare the dividend-decrease sample characteristics. This assisted in developing a meaningful analysis of the dividend decrease behaviour in South African firms.

Table 2: Descriptive statistics – Dividend-decrease sample and peer sample

Attributes and descriptive statistics for the dividend-decrease sample and the peer sample.

	Dividend decrease sample	Peer sample (control-firm sample)
Number of firms	54	56
Median number of employees	3 437	4 390
Figures in ZAR,000:		
Median level of total assets	1 521 870	1 374 844
Median turnover	1 708 350	1 538 616
Median PBT	129 912	96 362
Median EBITDA	212 952	118 728

Source: McGregor BFA, 2013

Table 3 analysed both the dividend decrease and peer sample characteristics in more detail. During the period 1993 to 2009, there were dividend decreases each year, except for in 1996. The average size of the annual dividends was highly variable across both the dividend-decrease sample and the peer sample. As Table 4 shows, there were seven sectors represented; the majority of dividend decreases occurred within the industrial sector and the least number occurred in the technology sector. Within the South African economy, there are large size differentials between the sectors and, as such, little emphasis is placed on the influence that the representation of the sectors may have in the case of the payment of dividend decreases.

Table 3: Dividend characteristics – Dividend-decrease sample and peer sample

	Number of sample dividend decreases	Average sample dividend decrease	Average peer dividend		Number of sample dividend decreases	Average sample dividend decrease	Average peer dividend
1993	7	0.019	0.039	**2002**	2	0.014	0.010
1994	3	0.019	0.126	**2003**	1	0.156	0.012
1995	6	0.226	0.131	**2004**	2	0.042	0.152
1996	0	-	-	**2005**	6	0.021	0.038
1997	6	0.058	0.014	**2006**	4	0.020	0.120
1998	1	0.019	0.044	**2007**	6	0.152	0.054
1999	6	0.107	0.035	**2008**	2	0.119	0.052
2000	2	0.019	0.006	**2009**	7	0.068	0.091
2001	1	0.030	0.029				

Source: McGregor BFA, 2013

Table 4: Sector representation – Dividend-decrease sample

The sector representation in the dividend-decrease sample.

	Number dividend decreases	Sectors						
		Basic materials	Consumer goods	Consumer services	Financials	Industrials	Technology	Transportation services
1993	7	1	1	3	1	-	-	1
1994	3	1	-	-	-	2	-	-
1995	6	3	1	2	-	-	-	--
1996	0	-	-	-	-	-	-	-
1997	6	2	-	-	-	3	-	1
1998	1	-	-	-	1	-	-	-
1999	6	1	1	1	-	3	-	-
2000	2	1	-	-	-	1	-	-
2001	1	-	-	-	1	-	-	-
2002	2	-	-	1	1	-	-	-
2003	1	-	-	-	1	-	-	-
2004	2	-	2	-	-	-	-	-
2005	6	2	1	1	1	1	-	-
2006	4	-	1	1	-	1	1	-
2007	6	-	-	2	1	3	-	-
2008	2	1	-	-	-	1	-	-
2009	7	-	-	2	1	4	-	-

Table 5 separates the dividend decrease and peer samples according to three periods, namely: 1993 – 1999; 2000 – 2004, 2005 – 2009. The three periods were selected as each of the years

within the periods were characterised by similar economic and political climates. The objective of this analysis was to determine the extent to which the external environment could have influenced the firm's decision to reduce dividends. The periods 1993 – 1999 and 2005 – 2009 were similar in that they both had a median of six dividend decreases with an average dividend value of approximately R0.80. These two periods differed in the sense that 1993 – 1999 was a relatively low growth stage in the economy and was viewed as a volatile political and fiscal period for the country, given the transition from Apartheid which occurred. In light of this, the high number of dividend decreases could be explained. There was a high probability, given these factors, that firms found themselves in difficult circumstances. In contrast, the period 2005 – 2009 was a period of relatively high growth in South Africa's history with median annual Gross Domestic Product (GDP) growth of 5.28%. Throughout the world and global markets, this particular period was largely characterised by bull markets and profuse liquidity. The upward market trend turned in 2007 – 2008 as the markets were impacted by the global financial crisis. In a financial crisis, a higher level of dividend decreases could be anticipated but a dividend decrease would be somewhat counter intuitive during periods of high growth. The period 2000 – 2004 represented a middle ground when compared to the other phases in that the median number of dividend-decrease payments was only two and the average dividend-decrease value was lower at R0.04. The median annual GDP growth was 3.67%. Whilst the peer group did not decrease dividends during the years that the dividend-decrease sample did, the dividend values in the peer group still appeared to mirror the trend depicted in the dividend-decrease sample in that the average dividend values in the periods 1993-1999 and 2005 – 2009 were approximately R0.07, whereas the median dividend value in the period 2000 – 2004 was lower at R0.04. The data analysed indicated that there was a level of inexplicability surrounding the firm's decision to reduce dividends which should be explained by the analysis of firm level characteristics.

Table 5: Dividend characteristics – Various time periods

Attributes of the dividend-decrease sample across three separate time periods. GDP figures were included to provide context for the economic environment.

Period	Number of years	Median number of dividends	Sample median dividend (amount)	Peer median dividend (amount)	Median GDP growth (annual %)
1993 – 1999	7	6	0.019	0.053	2.65
2000 – 2004	5	2	0.025	0.013	3.67
2005 – 2009	5	6	0.032	0.054	5.28

Sources: McGregor BFA, 2013; World Bank (Global indicators), 2013; calculations

4. Methodology

This research attempted to follow the methodology used by Jensen et al. (2010) as far as possible. An event study was conducted using a 62-observation dividend-decrease sample and a 62-observation control sample (referred to as the peer sample) constructed to match the dividend-decrease sample by total assets and sector. The methodology was designed to identify any abnormal behaviour in the underlying variables analysed. There were four key relationships which needed to be considered through the following four steps (Jensen et al., 2010), namely:

i. the relationship between the dividend decreases and the subsequent announcement period returns;
ii. the relationship between the dividend decreases and perceived growth opportunities;
iii. the relationship between the dividend decreases and the firm's operating performance, and;
iv. the relationship between the dividend decreases and actual growth options.

For the steps two through four, data was sourced for both the dividend-decrease sample firms and the peer-sample firms for the three-years before the event year and the three-years after the event year. The event year (year 0) was defined as the fiscal year corresponding to the calendar year of the dividend announcement. As such, this research considered the year that the announcement took place as the event year, regardless of when in the year the announcement occurred (Grullon et al., 2002).

The first step in the event study was to consider the returns realised over the announcement period (days -5, 0, 5) for the dividend-decrease sample and the peer sample. Whilst Jensen et al. (2010) considered the returns for days (-1, 0, 1), a wider announcement window was analysed in this study to cater to the lower levels of liquidity in the JSE when compared to a more established exchange such as the NYSE.

The share price data for the 62-observation dividend-decrease sample and for the 62-observation peer-sample was collected for t (-5, 0, 5) where $t = 0$ was the day the dividend decrease was announced. Thereafter, the returns of the dividend-decrease sample and the peer sample were calculated using the following equation:

$$\text{Return}_t = (P_{t+1} - P_t + D_t)/ P_t \quad (1)$$

Where P_t was the price at time *t*, where P_{t-1} was the price at time *t*-1 and D_t was the dividend paid at time *t*.

The control-adjusted, abnormal returns were then calculated by subtracting the peer sample returns from the dividend-decrease sample returns. Finally, the cumulative abnormal returns were calculated by summing the control-adjusted abnormal returns over the nine-day announcement window.

The purpose of this analysis was to determine if the dividend decrease impacted the returns realised by the dividend-decrease sample, relative to the peer sample. To test the statistical difference between the two samples, *T*-tests were completed. Before the *T*-tests could be run, *F*-tests were calculated on the returns to ensure that the variances of the returns for the dividend-decrease sample and the peer sample were not equal. The null hypothesis states that the variance for the returns of the dividend-decrease sample are the same as that of the peer sample.

$$H_0: \sigma_{D1}^2 = \sigma_{P2}^2$$
$$H_1: \sigma_{D1}^2 \neq \sigma_{P2}^2$$

Where σ_D was the variance of the dividend-decrease sample-returns and where σ_P was the variance of the peer sample-returns.

A *T*-test was then used to test whether the means of the two populations were equal. The null hypothesis states that, for both the abnormal return data and the cumulative return data, that the mean of the dividend-decrease data is the same as the mean of the peer sample data.

$$H_0: \mu_{D1} - \mu_{P2} = 0$$
$$H_1: \mu_{D1} - \mu_{P2} \neq 0$$

Where μ_{D1} represents the mean of the dividend-decrease abnormal return and cumulative return data and μ_{P2} represents the mean of the peer abnormal return and cumulative return data.

The results of this step and all subsequent steps will be analysed and displayed in the results and analysis section of this study.

Step two involved determining the relationship between dividend decreases and perceived growth opportunities. Jensen et al. (2010) suggested using the M/B ratio as a proxy for the level of growth opportunities available to a firm. The analysis involved calculating the control-adjusted abnormal returns resulting from the M/B ratios of the dividend-decrease sample and the peer sample for the three-years before and after the event year.

The process followed began by calculating the M/B ratios for both the dividend-decrease sample and the peer sample. The control-adjusted returns were calculated by taking the difference between the M/B ratio of the dividend decrease sample and the peer sample. These values were then ranked by value and sorted into groups. Jensen et al. (2010) sorted their data into five quintiles. Given the sample size considered in this research, only three groups were used: Group one firms were those with a ΔM/B ratio less than zero, group two firms were those with a ΔM/B ratio equal to zero and group three firms were those with a ΔM/B ratio greater than zero. The division amongst the three groups is shown in Table 6.

Table 6: Ranked ΔM/B - grouped according to size

Three groups were created using the ranked ΔM/B figures for step two. The groups were formed for ΔM/B figures less than, equal to and greater than zero.

Group	Control-adjusted abnormal returns	Group size
1	ΔM/B < 0	17
2	ΔM/B = 0	36
3	ΔM/B > 0	9

Subsequently, the following temporal changes were calculated using the control-adjusted abnormal return data:

i. t (-3, -1)
ii. t (-1, 1)
iii. t (1, 3)
iv. Cumulative average return

The Wilcoxon Signed-Rank Test was used in step three as it is a non-parametric test which considers the magnitude of the difference between paired samples and whether the difference

is significant. Unlike a two-sample paired *F*-test, the Wilcoxon Signed-Rank Test does not require the data samples to be normally distributed. As such, the Wilcoxon Signed-Rank Test is frequently used in cases when it cannot be determined whether the underlying population is normally distributed (Dickinson & Chakraborti, 2003). The Wilcoxon Signed-Rank test has a null hypothesis which states that the median difference between the paired data points is zero (Dickinson & Chakraborti, 2003). In this case, by comparing the magnitude of a variable in the peer and dividend-decrease samples, failure to reject the null hypothesis would imply that the declaration of a dividend decrease did not lead to a significant difference in the variable considered. In the case where the sample size exceeded 10 (where the sum of the pairs, n $\geq$20), the distribution of the test variable *W* was approximated by the normal distribution. The *Z* score was then calculated and equivalently a *p*-value was calculated to determine whether there was sufficient evidence to reject the null hypothesis (Dickinson & Chakraborti, 2003).

The application of the Wilcoxon Signed-Rank Test differs when the sample is small (n<30 pairs of sample data) compared to when the sample is large (n>30 pairs of sample data). As this study was comparing 62 pairs of sample data, the methodology used for the Wilcoxon Signed-Rank Test on a larger sample was used. The larger sample also meant that it was possible to approximate the distribution of the test variable *W* and thus calculate the *Z* score.

The null hypothesis of the Wilcoxon Signed-Rank Test for this analysis stated:

> H_0: There was no difference in ROA between the dividend-decrease sample and the peer sample.

Step three was performed to understand the relationship between the dividend decreases and ROA which was a proxy for firm-operating performance. ROA was measured by EBITDA divided by total assets. The Wilcoxon Signed-Rank Test was performed on the ROA of both the peer and the dividend-decrease firms for the three-years before and after the event year, in addition to the event year itself.

The *Z* score was the number of errors that test statistic *T* was from the mean of the normal distribution curve that was used to approximate the distribution of test statistic *T* (Dickinson & Chakraborti, 2003). There were two pieces of required information to calculate this figure, the:

i. Mean (of test statistic *W*) = μ_w

ii. Standard deviation (of test statistic *W*) = σ_w

The mean of the normal distribution curve which was used to estimate the distribution of test statistic *W* (μ_w) was determined by the null hypothesis. In this case, as stated above, the null hypothesis was that there was no difference in ROA between the sample and the peer sample. As a result, the mean of the test statistic *W* and the normal distribution curve which was used to approximate its distribution equalled zero ($\mu_w = 0$) (Dickinson & Chakraborti, 2003).

The standard deviation of test statistic *W* (and the normal distribution curve) was approximated by the following equation:

$$\sigma_w = \text{SQRT}\,[(n \times (n+1) \times (2n+1))/6] \quad (2)$$

where *n* was the number of data pairs (n = 62).

The *Z* score of the test statistic *W* was then calculated by the following formula:

$$Z \text{ score} = (W - \mu_w \pm 0.5)/\ \sigma_W \quad (3)$$

The *Z* score above included a continuity correction to account for the fact that the normal distribution was a continuous probability function and the analysis was based on discrete data (Dickinson & Chakraborti, 2003). This meant that:

i. If the difference $W - \mu_w$ was negative, the continuity correction was + 0.5 (where $W < \mu_w$).
ii. If the difference $W - \mu_w$ was positive, the continuity correction was – 0.5 (where $W > \mu_w$).

Once the *Z* score was calculated, it was possible to calculate the *p*-value which was a function of the normal distribution, test statistic *W,* the mean of test statistic *W* and the standard deviation of test statistic *W*.

If, at a 95% level of certainty, the *p*-value of test statistic *W* was less than α, the null hypothesis was rejected.

The Wilcoxon Signed-Rank Test was also used in step four which was the final step in the data analysis. Jensen et al. (2010) wanted to be able to determine if firms were exercising growth options. The authors chose to consider expenditure on fixed assets, number of firm employees and expenditure on research and development. Their hypothesis was that, if firms opted to exercise their growth options, then they would need to increase their expenditure on fixed assets (especially in the case of manufacturing firms), hire more staff and invest more in research and development to shore up their investment pipeline (Jensen et al., 2010). The variables selected assisted in identifying whether firms were exercising growth options or whether the firms were allowing growth options to expire which would be anticipated in the case of a restructuring (Jensen et al., 2010).

Jensen et al. (2010) were able to leverage the substantial levels of research which had been conducted on American firms to create a very clear hypothesis (such as restructuring) on what could be causing the positive relationship between dividend decreases and future earnings. Within the South African context, there was far less historical research on dividends and specifically, dividend decreases, which meant that there was less certainty as to the rationale behind a firm's dividend reduction. An exact comparison of Jensen et al. (2010)'s paper would have questioned whether South African firms behaved the same as the firms in Jensen et al. (2010)'s paper and in the United States. However, such a study would not be in a position to explain the situation surrounding dividend decreases in South Africa if the South African firms' behaviour deviates from that found in Jensen et al. (2010)'s paper. As this study sought to understand the dividend behaviour of South African firms, a broader set of explanatory variables was selected in an attempt to expand on Jensen et al. (2010)'s research. 12 variables were chosen from the balance sheet, income statement, cash-flow statement and value-added statement in an attempt to understand a firm's financial position, to create a holistic representation of whether firms were exploiting investment opportunities or not, and to better understand what factors may be driving dividend reductions in South Africa. Table 7 lists the selection of variables considered.

Table 7: Variables considered

Variable	Description/ how it was calculated
Employment of capital	Calculated by taking total assets and subtracting current liabilities.
Cash available	Total of (as per the cash flow statement) cash ex-operating activity consisting of interest paid or interest received and taxation paid or taxation refunded.
Operating profit	Operating profit as per the published cash flow statements.
CAPEX	Calculated as the sum of the total assets value in the current year, minus the total assets value from the previous year, plus the depreciation value for the current year.
Increase-decrease in inventory	Net increase or decrease in inventory as per the published cash flow statement.
Total costs shown	Total costs experienced by the firm for the current year.
Cash and near cash	Total of cash (inclusive of cash available variables) and near cash values.
Increase-decrease in working capital	Represents the net total lines of: increase-decrease in stock inventory, increase-decrease in accounts receivable, increase-decrease in accounts payable and increase-decrease in interest free short-term loans received.
Fixed assets	The amount paid for fixed assets, including intangible assets as per the published cash flow statements.
Number of employees	Total number of employees of the company/ group at the balance sheet date.
Depreciation	Represents depreciation as per the published value added statements.
Turnover	The total turnover as reflected in the published financial statements of the company or group.

Source: McGregor BFA, 2013

The Wilcoxon Signed-Rank Test was performed on each of these variables for both the peer and the sample firms for the three-years before and after the event year, in addition to the event year itself.

The null hypothesis of the Wilcoxon Signed-Rank Test for this analysis stated:

> H_0: There was no difference in the variable selected between the dividend-decrease sample and the peer sample.

The same process for calculating μ_w, σ_w, Z score and the p-value which was used to perform the Wilcoxon Signed-Rank Test in step 3 was used for the multiple variables analysed in step four. As with step three, at a 95% level of certainty, if the p-value of test statistic W was less than α, the null hypothesis was rejected.

The findings and analysis section will illustrate the results of these calculations.

5. Results and analysis

Table 8: Control adjusted (abnormal) returns and cumulative returns

This table illustrates the dividend-decrease sample's stock abnormal returns experienced over the nine-day period surrounding and including the announcement day. Day 0 was the announcement date. The abnormal returns were calculated by subtracting the peer firms' return from the dividend-decrease firms' return. The cumulative abnormal return was reported for the four days before and the four days after the announcement day. The p-values were reported in parentheses and were based on two-tailed, t-tests.

Control adjusted (abnormal) return					
	Day -4	**Day -3**	**Day – 2**	**Day -1**	**Day 0**
Median:	0.000%	0.323%	0.000%	0.000%	0.003%
Average:	-0.748%	0.239%	-0.272%	0.210%	-0.370%
	(0.204)	(0.708)	(0.609)	(0.697)	(0.548)
	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day -4 through +4**
Median:	0.000%	0.000%	0.000%	0.000%	0.198%
Average:	0.002%	0.835%	0.030%	-0.213%	-0.288%
	(0.997)	(0.087)	(0.960)	(0.633)	(0.848)

Typically, studies which consider the impact of a dividend increase or decrease look at the abnormal returns experienced by firms for the days surrounding the announcement period. Authors such as Jensen et al. (2010), Bernartzi et al. (1997), DeAngelo et al. (1992) generally reported large, negative abnormal returns as a result of a dividend-decrease announcement.

Jensen et al. (2010) indicated that the focus of this first step was not to draw a direct correlation between the abnormal returns and the dividend announcement. The authors calculated return data in an attempt to align their research with previously conducted event studies. The aim of this step was to identify the financial characteristics of firms which announced a dividend decrease in departure from their usual dividend policy. As this study attempted to replicate the analysis conducted by Jensen et al. (2010), the same level of emphasis was placed on the abnormal return data.

The abnormal returns were reported for a nine-day announcement period, which comprised of the four days before and the four days after the dividend decrease, and the day of the announcement (day 0). An important consideration for the analysis was, as Jensen et al. (2010) stated, that the reported returns aligned with the dividend reduction announcements, but that they could not be strictly attributed to the announcement as the sampling approach did not remove confounding events, such as earnings announcements. The objective of their paper was more of a general nature, than a pure event study. Their study aimed to understand the market's reaction to dividend-decrease announcements as it provided an indicator as to how important dividend announcements were when considered in the context of earnings announcements.

The abnormal returns were calculated by subtracting the peer sample returns from the dividend-decrease sample returns. The results of these calculations are listed in Table 8 and are inconsistent with previous dividend studies in that the median abnormal return results were either positive or not different from zero. If the average abnormal return level was considered, then a negative abnormal return was seen on day -4, day -2 and the event day; however, this practice was not consistent with the historical literature on the topic. The median abnormal return for the announcement day was marginally positive at 0.003%. This result was counter to the usual results in this field. The cumulative abnormal returns, which considered the entire announcement period, were also positive at 0.198%. In a dividend-decrease study, it would be anticipated that the abnormal returns would be negative and potentially significant, especially on the days closer to the announcement period. Previous literature (Eades et al., 1985; Yoon & Starks, 1995; Below & Johnson, 1996; Jensen et al., 2010), find that negative returns are the result of the investors' dissatisfaction over the announcement of a dividend reduction. As the abnormal returns were counter to the hypothesis typical to this type of study, the explanation cannot be as conclusive as those in previous studies. Positive abnormal returns on the day of the announcement suggest that the markets were efficient and that no new information was contained in the dividend announcement, which was counter to signalling theory. There were no significant returns noted on the days before, of and after the announcement, which additionally supported the idea that the dividend announcements did not contain any unknown information. This finding indicated that the market was potentially characterised by a high level of institutional investors as there was no new information within the dividend announcements to be traded on. The presence of larger portions of institutional investors in a market allows new

information to be quickly incorporated into the realm of known information (Amihud & Li, 2006). The trends in the data appeared to be better represented by the catering theory and the clientele effect, and suggested that shareholders placed more importance on the payment of dividends than on the absolute value of the dividends. This latter hypothesis could be as a result of the market norm being for firms to pay semi-annual dividends. In this case, investors might not be as aware of the variability in the absolute payment of the dividend as the interim values were usually smaller than final dividend payments.

At this point in the analysis, it appears that dividend-decrease announcements do not contain new information to the markets. This suggests that the markets were aware of the firm's financial position and the rationale behind the dividend decrease. As a result, the investors responded positively to the payment of the dividend rather than penalising the relative decline in its amount from the year before.

Table 9: Market-to-Book (M/B) ratios and cumulative returns

The median changes in control-adjusted M/B ratios are listed across three groups. The groups were formed based on ranked, control-adjusted M/B ratios at t = -3. The change in M/B ratios was given for the periods t (-3,-1), t (-1,1) and t (1,3). The median CAR were also listed for the period t (-1, 1). The CAR were listed as percentages.

Group	ΔM/B (-3, -1)	ΔM/B (-1, 1)	ΔM/B (1, 3)	CAR (-1, +1) (%)
1: ΔM/B < 0	0.455	0.160	0.285	-0.301%
2: ΔM/B = 0	0.460	-0.677	0.362	0.061%
3: ΔM/B > 0	0.331	0.050	0.662	0.274%

Jensen et al. (2010: 741) used M/B ratios and abnormal returns for the dividend-decrease sample relative to the peer sample to "evaluate investor perceptions regarding the influence that dividend drops had on firm growth prospects". The dividend-decrease sample firms were initially ranked according to their control-adjusted M/B ratios for the year t = -3 and then they were sorted into groups. Table 6, as seen in the methodology, described how the dividend-decrease sample was divided into the groups. Firms with the lowest (highest) control-adjusted M/B ratios were viewed as having the least (most) investment opportunities. Table 9 describes the various groups and their perceived investment opportunities over the following time periods: namely, between t = -3 and t = -1; t = -1 and t = 1; t = 1 and t = 3.

The data in Table 9 suggests that the perceived investment opportunities for firms with the lowest M/B ratios were highest initially, during the time period t = -3 to t = -1, but thereafter firms in the group with the lowest M/B ratios experienced a decline in the level of growth opportunities which only rebounded during the final period between t = 1 and t = 3. The firms which formed group two had a similar level of perceived growth opportunities to group one in the period between t = -3 and t = -1. Group two's level of perceived investments declined substantially and into negative figures between t = -1 and t = 1 and then rebounded again in the period between t = 1 and t = 3. Group three, which included the firms with the highest M/B ratios, when compared to the perceived investment opportunities of the other groups, experienced the lowest level of perceived investment opportunities during the first period between t = -3 and t = -1. As with the other two groups, group three experienced a reduction in perceived investment opportunities between t = -1 and t = 1. However, the firms in group three saw a marked improvement in perceived investment opportunities in the period succeeding the dividend decrease. The findings from group three are aligned with Jensen et al. (2010)'s conclusion that a dividend decrease did not appear to diminish the growth opportunities of firms which had lower levels of perceived growth opportunities at the beginning of the period under consideration. This suggests that the reduction in M/B was disproportionately experienced by firms which initially had higher levels of perceived investment opportunities. During the time frame between t = -3 and t = 1 the three groups had the following M/B ratios, namely: group one had a M/B ratio of 0.455, group two had a M/B ratio of 0.460 and group three had a M/B ratio of 0.331. However, during the period between t = -1 and t = 1, the M/B ratios had reduced to 0.160, -0.677 and 0.050 respectively. This was the time period directly surrounding the event year. These findings suggest that there was a relationship between a reduction in the levels of perceived growth opportunities and dividend reductions. It was further interesting to note that each group's level of investment opportunity rebounded in the period after the dividend reduction, although it was group three which had the lowest level of perceived growth opportunities during the first period considered, which had the highest level of growth opportunities in the final period (the opposite was true for the group which has the highest level of growth opportunities initially). This result indicated that investors penalised firms which reduced their dividend from a higher level of initial perceived growth opportunities, more than those who initially had lower levels of perceived growth opportunities. This finding aligned with those concluded by Jensen et al. (2010). Jensen et al. (2010: 741) had established that "dividend drops coincide[d] with reduced

funding for growth opportunities, which [was] viewed by investors to be most harmful for the prospects of firms with relatively abundant growth options".

The final column in Table 9 lists the cumulative abnormal returns for the period t = -1 to t = 1. The cumulative abnormal returns improved with the higher groups or as the level of perceived growth opportunities increased. However, as the cumulative abnormal returns were calculated for t = -1 and t = 1, there appeared to be no apparent systematic relation between the cumulative abnormal returns and the (change in the) control-adjusted level of M/B. This suggests that there were more variables than just the level of perceived growth opportunities which impacted the way in which investors reacted to a change in a firm's established dividend (Jensen et al., 2010).

Table 10: ROA

Table 10 contrasts the operating performance of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to the event year (dividend decrease occurred in event year 0). ROA was calculated as EBITDA divided by total assets. The median value was reported. The lower section of the table reported data on the temporal changes in the ROA figures during the period under consideration. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample ROA	Peer sample (control-firm sample) ROA	ROA difference	ROA difference (*p* value)
-3	16.29%	13.81%	2.48%	(0.091)
-2	17.51%	14.07%	3.44%	(0.011)
-1	16.38%	13.47%	2.90%	(0.059)
0	13.06%	12.93%	0.13%	(0.230)
1	10.58%	13.72%	-3.14%	(0.883)
2	11.55%	13.21%	-1.65%	(0.883)
3	11.32%	11.86%	-0.54%	(0.402)
Temporal change in ROA				
-3 to 0	-9.16%	-2.66%	-6.49%	(0.845)
0 to +3	7.73%	1.63%	6.11%	(0.328)

- Significant difference between the dividend decrease sample and the peer sample according to the Wilcoxon-Signed Rank method.

ROA was calculated as EBITDA divided by total assets, to replicate the calculations performed by Jensen et al. (2010). ROA indicates how efficiently a firm generates earnings from its assets (Larsen, Jensen & Carroll, 2001). There could be difficulties in comparing ROA across companies, and more specifically, industries, as the asset requirements across industries vary dramatically. In this study, the samples were representative of a variety of industries which assisted the analysis. The most important element of this analysis was to compare the differing trends between the dividend sample and the peer sample.

Jensen et al. (2010) rationalised the use of ROA as a way to test their hypothesis regarding dividend decreases, operating performance and restructuring activities. Typically, restructuring activities would have an impact on earnings levels which would be noted when evaluating ROA. In the case of restructuring activities, the trends anticipated included a decline in ROA levels initially, as managers would typically have opted to incur as many expenses as possible upfront (known as the "big bath" philosophy), in order to create the illusion of an earnings increase in the future (Jensen et al., 2010).

The dividend-decrease sample had relatively constant, high ROA figures between t = -3 and t = -1 but experienced a large drop in the event year. The ROA figures reduced even more in the year following the event year but then stabilised thereafter, although at a lower level than

was seen in the event year. The ROA levels before the event year did not suggest a problem with firm level efficiency. The dividend decrease appeared to be a reaction to problems which occurred during the event year and continued thereafter. In the years after the dividend decrease, there were further declines in ROA levels for the dividend-decrease sample. The decision to reduce the dividend appeared to be a "quick fix" solution by management in the event year in an attempt to alleviate any additional strain on the level of earnings. The lower levels experienced by the dividend-decrease firms in the event year continued in the three-years thereafter. The persistent decline suggests that the reasons for the initial ROA decline were more likely to be structural in nature than temporary. Management may have hoped that by reducing the dividend in the event year that they would be able to shore up earnings for future years. However, the short-term relief a dividend reduction may have originally produced was insufficient as a long-term solution. Management needed to have implemented longer term, restructuring changes. In comparison, the peer sample's ROA figures were relatively stable over the same period, fluctuating around 13.00%. It was only in t = 3 that there was a larger reduction in the peer sample's median ROA. In year t = -2 there was a significant difference between the two samples. It was the year in which both samples experienced their highest levels of ROA. This suggests that there were positive external factors at play during this period. As this analysis broadly considers the time frame between 1993 and 2009 and does not examine the dividend changes in relation to a particular year, it was not possible to suggest what the external factors at play were. In general, over the time period considered, South Africa experienced a great deal of financial and social reform as well as economic growth although there were certainly firm level constraints and issues faced at the same time. At the point in time in question, given the high levels of ROA seen after the event year, the peer sample's ROA figure were more likely to have benefitted from the positive changes underway than the problems faced by the country.

In terms of considering the temporal changes experienced by both samples, in the years leading up to the event year and including the event year, the dividend-decrease sample firms experienced a median decline of -9.16%. Over the same period, the peer-sample firms also experienced a decline in median ROA but to a lesser extent. This suggested that some of the decline in operating performance experienced by the dividend-decrease sample firms was attributed to general economic turmoil in the environment, such as high interest rates or volatile exchange rates. This finding was consistent with that of Jensen et al. (2010) as was the fact that the dividend-decrease sample firms and the peer-sample firms both experienced

a rebound in operating performance post the event year. The dividend-decrease sample saw a median 7.73% improvement and the peer-sample firms noted a median 1.63% improvement. The difference between the increases in median ROA was 6.11%. The difference was not statistically significant but it was stressed that the median improvement experienced by the dividend-decrease firms cannot be attributed purely to an improvement in the external environment. This latter finding was aligned to the previous findings seen with the return figures and M/B ratios. Investors did not react poorly to the dividend-decrease announcement which was attributed to the fact that the dividend decrease did not contain any new information and investors were aware of the firms' financial well-being. As a result, investors reacted positively to the absolute value of the dividend payment. The M/B ratios of the dividend-decrease firms noted a marked increase from their lowest levels (over the period containing the event year) after the dividend-decrease announcement. Both variables suggested, as did the temporal improvement in ROA, that investors were well informed of the firms' financial position. Whilst the dividend-decrease firms did not have the same financial figures as they did before the dividend decrease, there were still indicators that they were well-performing firms and were a reasonable investment option for investors.

At an annual median level, the dividend-decrease firms appeared to have experienced a gradual decline in operating performance, whereas the peer-sample firms experienced a largely constant level of operating performance. Whilst the temporal median changes supported the evidence found by Jensen et al. (2010), there was inconclusive evidence to suggest that the dividend-decrease firms reduced their dividends as part of restructuring activities. In fact, the data suggests that there was evidence to indicate that the dividend decreases appeared to be a reaction to event year circumstances, which was not the case in Jensen et al. (2010)'s paper.

The final step in the analysis was to consider whether firms were exercising their growth options or whether a firm was restructuring and reducing costs. Jensen et al. (2010) used capital expenditure, number of employees and research and development spend as proxies for the number of growth options exercised by a firm. As explained in the methodology section, this study expands on Jensen et al. (2010)'s variable selection in an attempt to understand dividend reductions in the South African context.

Table 11: Exercising growth options – Variables (proxies) used

Table 11 summarises the 12 variables which were analysed and in which years the difference between the dividend-decrease sample and the peer sample were significant. The samples size for each variable and the relevant financial statement were listed.

Variables considered	Sample size	Significant difference determined?	
Employment of capital	62	t = -3, t = -2, t = -1, t = 0, t = 1, t = 2	BS
Operating profit or loss	53	t = -3, t = -2, t = -1	IS
Cash available	54	t = -2, t = -1, t = 2	CF
CAPEX	62	t = -2	-
Increase or decrease in inventory	41	t = 2	CF
Turnover	50	-	IS
Fixed assets	51	-	BS
Increase or decrease in working capital	51	-	CF
Cash and near cash	62	-	BS
Total costs shown	58	-	IS
Depreciation	50	-	IS
Employees	31	-	VAS

Note: BS – Balance sheet; IS – Income statement; CF – Cash-flow statement, VAS – Value-added statement

The sample sizes, for the 12 variables selected for this part of the analysis, varied depending on data availability. At a reduced sample size, the analysis of the variables still contributed to the understanding of why firms reduce dividends.

Employment of Capital

Table 12: Employment of capital

Table 12 contrasts the employment of capital of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to event year (dividend decrease occurred in event year 0). The median value was reported. The

lower section of the table reported the growth figures for the temporal changes in the employment of capital figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample employment of capital	Peer sample (control-firm sample) employment of capital	Employment of capital difference	Employment of capital difference (*p* value)
		Measured in ZAR,000		
-3	838531	563063	275468	(0.013)
-2	906119	605921	300198	(0.001)
-1	1078177	667113	411064	(0.003)
0	1439628	1076744	362885	(0.003)
1	1297593	1111801	185793	(0.039)
2	1311503	1216548	94955	(0.044)
3	1279095	1345837	-66743	(0.071)
Temporal change in employment of capital				
-3 to 0	26.18%	35.51%	-9.33%	(0.162)
0 to +3	23.94%	32.89%	-8.95%	(0.240)

- Significant difference between the dividend decrease sample and the peer sample according to the Wilcoxon-Signed Rank method.

Employment of capital suggests that a firm is using capital to make an investment or investments for the firm. Growth in capital employed would suggest that a firm is intent on growing and expanding its business (Larsen et al., 2001). As a result, if the dividend-decrease firms were exercising growth options, the amount of capital employed should increase. In contrast, if the dividend-decrease firms were restructuring, this figure should decline.

For the dividend-decrease sample, there was a steady increase in the employment of capital from t = -3 to t = 0. The event year was the peak of this growth. Thereafter, the employment of capital declined slightly and remained relatively constant for the three-years thereafter. The peer-sample firms started with a lower median level of capital employed at t = -3, but experienced a much higher growth rate over the period than the dividend-decrease sample did. This suggests that the decline in capital employed seen in the dividend-decrease sample was more likely to be as a result of internal problems rather than as a result of external economic factors.

In considering the median temporal changes, the peer sample grew its median level of capital employed at a higher rate than the dividend-decrease sample, both before and after the event year with median growth figures of 35.51% and 32.89% respectively; whereas the dividend-

decrease sample experienced median growth figures of 26.18% and 23.94% respectively. The dividend-decrease sample capital employed figures are lower than the peer sample figures; this suggests a relative under investment in capital employed by the dividend-decrease firms over the period considered.

Investment occurred in the dividend-decrease firms, but post the dividend decrease, the level of the investment was reduced relative to the investment in the event year. By contrast, the peer sample steadily increased their employment of capital. The total growth in employment of capital shown by the peer sample was 58.16%, relative to the 34.44% growth experienced by the dividend-decrease sample over the sample period. This suggests that the peer-sample firms invested in their firms at a rate of almost double that of their dividend-decrease sample counterparts.

Cash available

Table 13: Cash available

Table 13 contrasts the cash available of the firms which experience a dividend decrease within their established dividends, against a control firm which does not decrease dividends in the year the dividend-decrease firm does. The years were reported relative to the event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the cash available figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample cash available	Peer sample (control-firm sample) cash available	Cash available difference	Cash available difference (*p* value)
		Measured in ZAR,000		
-3	163459	65424	98034	(0.077)
-2	147045	51148	95897	(0.000)
-1	150529	71717	78812	(0.038)
0	120392	91740	28652	(0.546)
1	173203	142831	30372	(0.767)
2	127039	164454	-37416	(0.021)
3	138668	148915	-10247	(0.310)
Temporal change in cash available				
-3 to 0	15.18%	40.66%	-25.48%	(0.002)
0 to +3	39.07%	37.55%	1.52%	(0.665)

- Significant difference between the dividend decrease sample and the peer sample according to the Wilcoxon-Signed Rank method.

Cash available could have multiple meanings for a firm. On the positive side, an increase in cash available could mean that the business is doing so well that excess cash is available; or more negatively, it could mean that a firm is forgoing investment opportunities in order to store cash for potential situations that may arise. It is also important to analyse how investors react to an increase in cash available. If investors believe that a firm will invest in worthwhile growth opportunities they would react positively, but if they do not believe this is the case, investors could react negatively. The role of communication in each instance would be crucial.

For this study, the hypothesis was that the level of cash available should decline for dividend-decrease firms in order to warrant the dividend decrease. If the level of cash available declined at the same time as CAPEX, fixed assets or capital employed, it would suggest that the firms in the dividend-decrease sample were experiencing a liquidity shortage rather than investing excess cash available into investment opportunities. Similarly, the hypothesis also subtly suggested that the peer sample should have experienced an increase in the level of cash available as they do not reduce their dividend. The results in Table 13 show that this was indeed the case as the data supported the hypothesis.

The dividend-decrease sample showed a steady decline in cash available from year t = -3 to the event year. Post the event year, there was a slight resurgence in year t = 1 but thereafter the cash available level returned to the level seen in the event year. The peer sample had a

cash available level of nearly a third of that held by the dividend-decrease sample at t = -3 but only experienced a reduction in cash available from t = -3 to t = -2. Thereafter, the level of cash available increased consistently over the sample period and from year t = 2, the median level of cash available for the peer sample exceeded the median level held by the dividend-decrease sample.

The growth in the median cash available levels between t = -3 and t = 0 was -35.78% compared to growth of 28.69% experienced by the peer sample. The temporal changes were calculated as the growth between the cash available figures for each firm in the years t = -3 and t = 0. The median of these figures was then calculated. The temporal changes were calculated as a result. In this case, the results of the median growth rates suggest that the median level of the growth rate between t - -3 and t = 0 was 15.18% compared to the 40.66% level experienced by the peer sample, even though the absolute value of the median levels of cash available declined. The implications behind these figures still aligned to the initial findings regarding the median absolute levels of cash available in that they suggested that the dividend-decrease firms had a significantly lower level of liquidity than the peer sample firms in the years leading up to the event year; however, this could have been aggravated by investment activities as the growth rate in capital employed was higher than the growth in cash available. Between t = 0 and t = 3, the dividend-decrease firms experienced an improvement in this figure. However, this rate far exceeded the growth rate in capital employed which suggests that the dividend-decrease firms were forgoing investment opportunities in order to sure up their levels of cash available.

In the years before the dividend decrease, the dividend-decrease sample firms experienced far higher levels of ROA than they did in the years after the dividend decrease. It was possible that whilst the firms experienced higher levels of operating performance, they were able to invest in their businesses at a higher rate than their levels of cash were growing. The event year, however, marked a sudden decline in operating performance which did not recover in the years thereafter. It could be suggested that firms attempted to increase available cash levels at the expense of investment.

Capital expenditure (CAPEX)

Table 14: Capital expenditure (CAPEX)

Table 14 contrasts the CAPEX of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to the event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the CAPEX figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample CAPEX	Peer sample (control-firm sample) CAPEX	CAPEX difference	CAPEX difference (*p* value)
		Measured in ZAR,000		
-2	152012	70818	81194	(0.014)
-1	195345	143402	51943	(0.061)
0	117261	139708	-22447	(0.764)
1	161615	128893	32722	(0.560)
2	147877	262799	-114922	(0.705)
3	3226146	4137958	-911813	(0.354)
Temporal change in CAPEX				
-2 to 0	46.78%	71.58%	-24.80%	(0.301)
0 to +3	96.47%	94.92%	1.54%	(0.950)

- Significant difference between the dividend decrease sample and the peer sample according to the Wilcoxon-Signed Rank method.

CAPEX (Capital expenditure) is investment expenditure by firms, designed to acquire or upgrade their physical assets. CAPEX is generally an indicator that a firm is attempting to grow its operations (Larsen et al., 2001). Capital expenditure (fixed asset purchase) was used frequently as proxy for the amount of growth options exercised by a firm; authors such as Jensen et al. (2010), Mayers (1998) and Anderson and Garcia-Feijoo (2006) used this proxy.

Jensen et al. (2010) and Yoon and Starks (1995) found that the level of CAPEX was significantly lower in the years t = 1 to t = 3 than the levels seen at t = -1. The data in this study did not follow these trends. Whilst there was a decline in investment in the event year, the level of investment returned to pre-drop levels in the years directly after the event year.

The CAPEX data was not fully aligned to the employment of capital data. In fact, the CAPEX data appeared to suggest that the dividend-decrease firms responded to reduced ROA levels in the event year by reducing CAPEX expenditure, only to increase the level of CAPEX spent after the event year which was potentially in an attempt to improve ROA levels. The temporal changes suggest that in the period t = -2 to t = 0 the dividend-decrease firms invested in CAPEX at a median rate of 46.78% which represented an under-investment of about 25% when compared to the median CAPEX investment growth of 71.58% experienced by the peer sample. This suggests that the relative under-investment by the dividend-decrease firms could have played a role in the decline in ROA and the need to reduce the dividend in the event year. In the period t = 0 to t = 3 the dividend-decrease firms invested in CAPEX at a higher rate than the peer-sample firms (96.47% compared to 94.92%) which appeared to be an attempt to improve the firms' performance after the dividend decrease.

The peer-sample firms were investing significantly less in their firms in year t = -2 than the dividend-decrease firms were, but experienced significant growth levels in the years thereafter which aligned the investment levels of the two samples. The peer sample also reduced their median CAPEX level during the event year and, in fact, the year following that too.

Given that both the dividend-decrease sample and the peer sample reduced CAPEX levels in the event year and that the difference was not significant, it suggests that there must be a broader set of variables influencing firm financials and particularly, the decision to reduce the level of CAPEX expenditure in the event year. The data did not appear to support the idea that the dividend-decrease firms were allowing growth opportunities to expire. The data did seem to support the idea that both the dividend-decrease sample and the peer sample underinvested during the event year but that they rectified this in the years subsequent to the event year.

Operating profit-loss

Table 15: Operating profit-loss

Table 15 contrasts the operating profit-loss of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to the

event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the operating profit-loss figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample operating profit-loss	Peer sample (control-firm sample) operating profit-loss	Operating profit-loss difference	Operating profit-loss difference (*p* value)
	Measured in ZAR,000			
-3	154807	61764	93043	(0.001)
-2	177608	56314	121294	(0.012)
-1	184892	75485	109407	(0.016)
0	167713	100357	67356	(0.266)
1	124181	127800	-3619	(0.851)
2	146452	152182	-5730	(0.719)
3	134193	124285	9908	
Temporal change in operating profit-loss				
-3 to 0	8.99%	51.95%	-42.96%	(0.000)
0 to +3	29.26%	45.50%	-16.24%	(0.045)

- Significant difference between the dividend decrease sample and the peer sample according to the Wilcoxon-Signed Rank method.

Operating profit or loss is a measure of the profit or loss that a firm earns off their normal core business operations (Larsen et al., 2001). Any gains or losses related to interest, tax and investments are not included in the measure. The expectation is that a dividend decrease would be far more likely in the years when the firm's operating profit declines or it experiences a loss.

The operating profit earned by the dividend-decrease sample was significantly different from the operating profit earned by the peer sample in the years before the event year. The dividend-decrease sample was performing two to three times better than the peer sample in terms of operating profit, yet it was the dividend-decrease sample that implemented the dividend decrease in the event year. The temporal change calculations suggest that the dividend-decrease sample only experienced an 8.99% increase in median operating profit over the period t = -3 to t = 0, whereas the peer sample experienced a significantly higher rate of growth at 51.95% over the same period. This suggests that the dividend-decrease firms were earning a far lower relative level of profit than the peer-sample firms which could partly explain the rationale behind the dividend decreases. Compared to the period before the

dividend decrease, the dividend-decrease sample noted a far higher level of operating profit growth at 29.26% during the period t = 0 to t = 3 but the peer sample still performed better as it experienced a growth rate of 45.50%. This difference was significant.

This data suggests that the dividend-decrease firms experienced a significantly lower level of operating profit in the years before and after the dividend decrease relative to the peer sample. This implies that the dividend-decrease firms were not operating as efficiently as the peer sample firms, as cash and investments were not being translated into operating profit at the same rate as the peer firms.

Increase or decrease in inventory

Table 16: Increase or decrease in inventory

Table 16 contrasts the increase-decrease in inventory of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the increase-decrease in inventory figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample increase-decrease inventory	Peer sample (control-firm sample) increase-decrease inventory	Increase-decrease inventory difference	Increase-decrease inventory difference (*p* value)
		Measured in ZAR,000		
-3	-22556	-10392	-12164	(0.944)
-2	-11555	-22877	11322	(0.282)
-1	-12200	-20171	7971	(0.151)
0	-24600	-20959	-3641	(0.806)
1	-1951	-12059	10108	(0.071)
2	-4300	-37032	32732	(0.023)
3	-13638	-19935	6297	(0.361)
Temporal change in increase-decrease inventory				
-3 to 0	46.61%	86.15%	-39.54%	(0.058)
0 to +3	80.53%	85.50%	-4.97%	(0.621)

- Significant difference between the dividend decrease sample and the peer sample according to the Wilcoxon-Signed Rank method.

Inventory is considered to be the raw materials, work-in-progress or finished goods that will be sold and form part of a company's assets. Ultimately, inventory is an input to the revenue generation of a firm and as such, there is a risk for a firm in holding too much or too little inventory (Larsen et al., 2001).

Hu and Sobel (2008) suggest that inventory is an important consideration, alongside liquidity and the payment of dividends in a firm's decisions regarding its capital structure. The authors do not suggest a definite answer regarding the optimal level of inventory a firm should hold as the level of inventory would be a function of a broader range of financial decisions that the firm would make.

The data in this study suggests that both the dividend-decrease sample and the peer sample had a net cash outflow in all of the years under analysis which was anticipated. It would pose a risk if a firm held too little or too much inventory. In year t = 2 the dividend-decrease firms held very low levels of inventory, whereas the peer sample firms held their highest level. This difference between the samples was significant. Interestingly, this was also the year that both samples experienced their highest post-dividend operating profit. This fact makes it difficult to infer a conclusion as to the most efficient level of inventory to be held.

In the years before and including the event year, the dividend-decrease firms appeared to have a higher level of net inventory outflow than the years after the event year. This period aligned to the highest levels of ROA experienced by the dividend-decrease firms. This suggests that there was likely to be a correlation between a higher level of inventory and the firms operating performance, which was not surprising. The lower levels of inventory held in the years after the dividend decrease could be attributed to poor management and an increase in inefficiency. However, as was suggested in the study by Hu and Sobel (2008), the data surrounding the level of inventory was largely inconclusive, which made it difficult to draw decisive inferences regarding the relationship between the payment of dividend decreases and the level of inventory held.

Employees

Table 17: Number of employees

Table 17 contrasts the number of employees of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to

event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the increase-decrease in inventory figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample employees	Peer sample (control-firm sample) employees	Employees difference	Employees difference (*p* value)
-3	2629	3882	-1253	(0.979)
-2	3010	4342	-1332	(0.636)
-1	3289	4184	-895	(0.783)
0	3097	3175	-78	(0.760)
1	5697	4249	1448	(0.811)
2	1310	3078	-1768	(0.883)
3	3300	5206	-1906	(0.973)
Temporal change in employees				
-3 to 0	4.07%	0.35%	3.72%	(0.952)
0 to +3	-3.91%	8.20%	-12.11%	(0.952)

A large decline in employees is typically an indicator of problems for a firm and is typically an attempt by the management to restructure. Conversely, an increase in employees is seen as a sign of a growing business and is typically an indicator that firms are exercising growth opportunities (Jensen et al., 2010). Given the levels of CAPEX indicated in the analysis above, the expectation would be that the dividend-decrease firms in South Africa were not restructuring and rather increased their median level of employees.

The dividend-decrease sample experienced a slight increasing trend from t = -3 till the event year. There was a peak in employee numbers in year t = 1 and a low in year t = 2 but the level in year t = 3 remained in line with the features before and during the event year. The temporal changes suggest that dividend-decrease firms increased the median level of employees in the period t = -3 to t = 0 by 4.07%, whereas the peer-sample firms only increased their workforces by 0.35%. This did not align with Jensen et al. (2010)'s hypothesis as the previous analysis showed that the dividend-decrease firms were underinvesting in this period relative to the peer sample. This finding further supports the idea that the dividend-decrease firms were not managed as effectively as the peer-sample firms.

The dividend-decrease firms reduced their employee base by a median level of 3.91% between t = 0 and t = 3, compared to the peer sample which grew its employee base by a median level of 8.20% over the same period. There did seem to be evidence that the dividend-decrease firms underinvested in their workforce after the event year. Again, this failed to align with Jensen et al. (2010)'s hypothesis and the growth in CAPEX investment over the period. The data appeared to suggest that the dividend-decrease firms were attempting to grow their firms through investment but off a smaller workforce. Reducing the level of employees could have formed part of cost-cutting measures after the dividend decrease, but this combination of factors did not equate to improved operating profit or ROA levels as seen previously.

Depreciation

Table 18: Depreciation

Table 18 contrasts the depreciation of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the increase-decrease in inventory figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample depreciation	Peer sample (control-firm sample) depreciation	Depreciation difference	Depreciation difference (*p* value)
	Measured in ZAR,000			
-3	31301	19787	11513	(0.313)
-2	31059	19394	11665	(0.388)
-1	33101	23334	9767	(0.299)
0	34300	38728	-4428	(0.425)
1	36873	44570	-7697	(0.707)
2	37328	44866	-7538	(0.677)
3	42774	49338	-6564	(0.666)
Temporal change in depreciation				
-3 to 0	25.78%	29.83%	-4.05%	(0.154)
0 to +3	21.48%	28.88%	-7.40%	(0.176)

Depreciation represents a method of allocating the cost of tangible assets over their useful life. In a poor economic climate, the value of an asset may decline faster (Larsen et al., 2001). It was not clear from the raw data which method of depreciation was applied or whether the reported depreciation was consistent across all firms. However, the sample size used should negate any issues this ambiguity may cause. It would be expected that depreciation aligns quite closely with the level of CAPEX or fixed assets.

The dividend-decrease sample experienced a relatively stable level of depreciation. The temporal changes suggest that the dividend-decrease firms increased their median level of depreciation by 25.78% in the period t = -3 to t = 0. The peer sample experienced a similar level of depreciation over the same period with a median growth rate of 29.83%. The same situation occurred in the period t = 0 to t = 3, although both the dividend-decrease sample and the peer sample had a slightly lower median growth rate level with figures of 21.48% and 28.88% respectively.

The depreciation-related data did not offer any significant insights into the rationale behind a dividend decrease and, as such, little could be inferred from it.

Fixed assets

Table 19: Fixed assets

Table 19 contrasts the fixed assets of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the increase-decrease in inventory figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample fixed assets	Peer sample (control-firm sample) fixed assets	Fixed assets difference	Fixed assets difference (*p* value)
		Measured in ZAR,000		
-3	210000	139572	70428	(0.101)
-2	237025	164235	72790	(0.143)
-1	316358	170000	146358	(0.147)
0	325382	201000	124382	(0.330)
1	283093	228500	54593	(0.364)
2	318589	247846	70743	(0.393)
3	328800	269986	58814	(0.433)
Temporal change in fixed assets				
-3 to 0	33.75%	29.94%	3.81%	(0.303)
0 to +3	23.93%	29.45%	-5.52%	(0.444)

The level of fixed assets was another proxy for the level of growth opportunities pursued by a firm. Both samples appeared to follow a relatively steady, increasing trend in terms their investments in fixed assets. This suggests that both samples were continuing to invest in their firms and attempted to grow them. There were no significant differences between the samples that would suggest that fixed-asset investment in anyway impacted the decision to reduce dividends in the dividend-decrease sample. This finding of a relatively constant trend aligned with the CAPEX analysis. Whilst the dividend-decrease sample had experienced a CAPEX decline in the event year, the peer sample also did, which suggests that the decline was largely as a result of external factors.

The temporal changes suggest that both the dividend-decrease sample and the peer-sample experienced a slightly higher growth rate in fixed assets in the period t = -3 to t= 0 with median growth rates of 33.75% and 29.94% respectively. In the latter period between t = 0 and t = 3, the median levels of investment in fixed assets remained similar although the dividend-decrease sample experienced a larger reduction in their growth rate than the peer sample did. The dividend-decrease sample had a median growth rate of 23.93% which was about 10% lower than the previous period, whereas the peer-sample had a median growth rate of 29.45% which was only 0.50% lower than the previous period. This suggests that the dividend-decrease sample was under-investing in fixed assets relative to the peer sample. Relative underinvestment in fixed assets may have been a reaction by management to financial pressures. Slightly reducing the fixed-asset growth rate could have provided short-

term relief in times of financial strain but it did represent an inefficient decision by management when considered in the context of the future, especially as the competitors (the peer sample) had largely maintained their level of fixed-asset growth.

The temporal change median growth rates in the level of fixed assets experienced by both samples appeared to be aligned to the levels of depreciation experienced by the samples but were lower than the levels of CAPEX invested, especially in the period after the event year.

Increase-decrease in working capital

Table 20: Increase-decrease in working capital

Table 20 contrasts the increase-decrease in working capital of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the increase-decrease in inventory figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample increase-decrease working capital	Peer sample (control-firm sample) increase-decrease working capital	Increase-Decrease working capital difference	Increase-Decrease working capital difference (*p* value)
	Measured in ZAR,000			
-3	-10068	-2854	-7214	(0.928)
-2	-7536	-8339	803	(0.706)
-1	-17811	-4361	-13450	(0.790)
0	-9783	857	-10640	(0.995)
1	-3477	0	-3477	(0.657)
2	-2907	-24001	21094	(0.052)
3	-22116	-13856	-8260	(0.110)
Temporal change in increase-decrease working capital				
-3 to 0	82.12%	94.67%	-12.56%	(0.270)
0 to +3	95.80%	123.96%	-28.17%	(0.590)

Working capital is a measure of both a company's efficiency and short-term financial health. It calculates whether a company's short term assets are sufficient to cover its short-term

liabilities. Negative working capital is a risk to a firm as it may find itself in financial difficulties (Larsen et al., 2001).

The dividend-decrease sample experienced a variable level of working capital which was always an outflow (negative). There did appear to be a steady improvement in the level of working capital from t = 0 to t = 2, which suggests improved efficiencies over this period. At t = 3, however, there was a large decline in the level of working capital. It was also the largest negative balance over the seven year period considered.

The peer sample had negative levels of working capital for the majority of the period considered, but it had a positive level at t = 0 and at t = 1. The negative balances grew quite significantly after t = 1. However, the differences between the two samples were never significant.

The temporal changes suggest that the declines in working capital were largely similar for both samples over both periods. In the period t = -3 to t = 0 there was only a 12.56% difference between the median growth rates experienced by the samples. In the period t = 0 to t = 3, the dividend-decrease sample experienced a growth in the median, declining level of working capital of 95.80% which was better than that experienced by the peer sample which had a median, declining level of working capital of 123.90%. This suggests that after the event year, the dividend-decrease firms experienced slightly better levels of financial health, potentially through a process of rationalisation, than the peer-sample firms did, but relative to the previous period, both samples saw a deterioration in their financial health.

The median temporal change in working capital was 95.80% after the event year which aligned to the 96.47% median temporal growth in CAPEX. In terms of the other variables considered, the change in working capital was significantly higher than the growth in operating profit and liquidity. As working capital is a measure of efficiency, it suggests that the firms were improving but as the other variables figures grew at far slower levels. The data suggests that the dividend-decrease firms had plenty of capacity to improve efficiencies.

Total costs shown

Table 21: Total costs shown

Table 21 contrasts the total costs shown of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in

the year the dividend-decrease firm did. The years were reported relative to event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the increase-decrease in inventory figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample total costs shown	Peer sample (control-firm sample) total costs shown	Total costs shown difference	Total costs shown difference (*p* value)
	Measured in ZAR,000			
-3	55325	43948	11377	(0.425)
-2	44283	31688	12596	(0.449)
-1	69101	44244	24856	(0.599)
0	64464	57393	7071	(0.578)
1	80442	61616	18826	(0.572)
2	102890	84312	18578	(0.465)
3	95442	103328	-7886	(0.643)
Temporal change in total costs shown				
-3 to 0	34.53%	43.90%	-9.38%	(0.773)
0 to +3	32.26%	38.03%	-5.77%	(0.338)

Total costs shown should assist in determining whether firms were attempting to restructure as they would have aimed to achieve a reduction in costs, whereas without restructuring activities a growing firm, both in terms of operating performance and the number of employees, would expect to see a rise in costs. In this case, a growth in total costs after the event year would be a negative sign for the dividend-decrease sample as their ROA levels declined as did their workforce.

In general, both samples appeared to experience a constant increasing trend within their cost base over the period considered. The temporal changes suggest that the dividend-decrease sample experienced slightly higher costs in the period t = -3 to t = 0 than in the period t = 0 to t= 3 with median growth figures of 34.53% and 32.26% respectively. The peer-sample firms also experienced higher costs in the first period, with a median growth figure of 43.90% compared to a median growth figure of 38.03% in the latter period. The peer sample experienced higher growth in their median costs than the dividend-decrease firms did, although the peer sample began the analysis with a lower cost base. Given that both samples noted a reduction in costs in the latter period, it is quite probable that the dividend-decrease

firms did not see a decline in costs as a result of restructuring activities, but rather that the reduction in costs was a function of improved economic conditions in the external environment.

Cash and near cash

Table 22: Cash and near cash

Table 22 contrasts the cash and near cash of the firms which experienced a dividend decrease within their established dividends against, a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the increase-decrease in inventory figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample cash and near cash	Peer sample (control-firm sample) cash and near cash	Cash and near cash difference	Cash and near cash difference (*p* value)
		Measured in ZAR,000		
-3	73743	52305	21439	(0.203)
-2	98748	51738	47010	(0.328)
-1	130993	74705	56288	(0.336)
0	105127	87727	17401	(0.697)
1	145246	121046	24200	(0.932)
2	190950	155157	35793	(0.896)
3	220056	186579	33477	(0.664)
Temporal change in cash and near cash				
-3 to 0	23.51%	46.25%	-22.74%	(0.126)
0 to +3	39.75%	32.65%	7.10%	(0.304)

The temporal changes in cash and near cash aligned with the figures seen with the variable cash available. Again the temporal changes suggest that the dividend-decrease firms experienced a period of reduced liquidity in the years leading up to the event year. Over the period t = -3 and t = 0, the dividend-decrease sample experienced a median growth rate of 23.51% in the level of cash and near cash whereas the peer sample experienced a far higher growth rate of 46.25%. This suggests that the dividend-decrease firms had far less liquidity

than their competitors in the peer sample. During the period t = 0 to t = 3 the dividend-decrease sample saw an improvement in the median growth rate with a figure of 39.75% whereas the peer sample saw a decline with a median growth rate of 32.65%. The figures after the event year suggest that the dividend-decrease sample had seen an improvement and was better aligned to the industry in terms of liquidity but were potentially holding a little too much cash and liquid assets which could potentially have been better invested.

Turnover

Table 23: Turnover

Table 23 contrasts the turnover of the firms which experienced a dividend decrease within their established dividends, against a control firm which did not decrease dividends in the year the dividend-decrease firm did. The years were reported relative to event year (dividend decrease occurred in event year 0). The median value was reported. The lower section of the table reported the growth figures for the temporal changes in the increase-decrease in inventory figures during the period under consideration. Percentages were used. The p-values were reported in parenthesis for two-tailed Wilcoxon Signed-Rank tests.

	Dividend decrease sample turnover	Peer sample (control-firm sample) turnover	Turnover difference	Turnover difference (*p* value)
	Measured in ZAR,000			
-3	1894935	1410994	483941	(0.224)
-2	2094721	1650448	444273	(0.316)
-1	2233150	1900550	332599	(0.242)
0	2069360	1919652	149708	(0.437)
1	2449260	2246662	202599	(0.548)
2	2527780	2675628	-147848	(0.578)
3	2243650	2779792	-536142	(0.627)
Temporal change in turnover				
-3 to 0	28.40%	36.66%	-8.26%	(0.206)
0 to +3	22.75%	27.98%	-5.23%	(0.174)

Generally turnover refers to inventory or accounts receivable and the rate at which it is replaced (Larsen et al., 2001). As with many of the other variables considered, the turnover figures were not statistically significant between the two samples.

The temporal changes suggest that the dividend-decrease sample experienced lower than industry turnover in the period t = -3 to t = 0 as its median turnover growth rate was 28.40% compared to the 36.66% increase experienced by the peer sample. During the period t = 0 to t = 3 both samples experienced a decline in the level of turnover which suggests that there were factors in the external environment which had hampered the general performance of all firms. During the latter period, the median turnover growth rates between the two samples had moved to similar levels of those seen in the previous period but the dividend-decrease sample still had a lower median growth rate at 22.75% than the peer sample at 27.98%.

5.1. Summary of results

The decision to reduce dividends in the South African context relative to the years 1990 to 2012, appears to be as a result of a combination of liquidity issues and internal inefficiencies, the latter being exacerbated after the event year.

The period before the event year saw a reduction in CAPEX within the dividend-decrease sample which seemed to result in a lower level of operating performance (ROA) in the event year. The dividend-decrease firms also had a far lower median level of cash available and cash and near cash when compared to the peer sample firms in the period before the event year. The lower levels of liquidity were probably the largest factor in the decision to reduce the level of dividends paid, as in South Africa all dividends declared needed to be paid almost immediately and in cash.

The lower levels of cash, ROA and reduced CAPEX appear to be the first indicators that the internal problems in the dividend-decrease sample firms actually ran deeper. In the years after the dividend decrease, there seemed to be deterioration in the level of efficiency in the dividend-decrease sample firms. The variables analysed suggest that the dividend-decrease sample firms experienced a deterioration in financial health after the event year. There was also a reduction in the workforce for these firms. There were fewer inventories held in the years after the event year which appeared to negatively impact for the level of operating performance and operating profit experienced by the dividend-decrease firms.

In terms of the external environment, it appears that the reduction in total costs shown in the event year was a result of external factors. Similarly, the reduction in turnover also seemed to be as a result of factors in the external environment. Whilst the reduction in total costs in the event year was positive, especially given that there appeared to be a certain level of internal

inefficiency in the dividend-decrease sample firms, the reduction in turnover was detrimental. The reduced turnover was likely to also be a variable impacting the reduced operating profit and operating performance experienced.

The management teams at the dividend-decrease sample firms appeared to attempt to rectify the situation with an increase in CAPEX. There was also an improvement in the growth rate of cash available and cash and near cash, although these levels were higher than those seen by the peer firms which suggests that level of liquidity held by the dividend-decrease firms was not optimal and was detrimental to the level of investment in the firms. This latter hypothesis appears to be supported by the fact that the dividend-decrease firms experienced a slightly lower growth rate in fixed assets after the event year than that seen by the peer sample which maintained a similar growth rate across the entire period considered.

6. Conclusion

This study attempted to understand whether the relationship between earnings and dividend reductions on the JSE were consistent with Jensen et al. (2010)'s findings over the period between 1990 and 2012. The results suggest that, similar to Jensen et al. (2010), South African firms also opted to forgo investment opportunities. However, counter to Jensen et al. (2010)'s findings, it appears that South African firms were attempting to improve their liquidity situation after the event year as opposed to foregoing investment opportunities as a result of restructuring activities.

For the first step in the analysis, abnormal returns were considered for a nine-day period surrounding and including the announcement day: however, the results of this analysis were not consistent with previous literature. Previous literature (Jensen et al., 2010; Bernartzi et al.,1997; DeAngelo et al., 1992) noted large, negative abnormal returns in response to a dividend-decrease announcement. In this study, the median abnormal return figure for the announcement day was actually positive at 0.003%. The cumulative abnormal returns for the nine-day period were also positive at 0.198%.

Inferences from these results cannot be conclusive, but they do suggest that the market is efficient and that no new information is contained in the dividend announcement. This suggests that there is a high level of institutional investors in the market. It appears that investors in the South African market place more value on the payment of a dividend, rather than its absolute value. This return data failed to support signalling theory; although the analysis of the firm's financial data did suggest that the dividend reduction indicated poor financial conditions for the firms in the years after the event year.

Change in M/B ratios were used as a proxy for investment opportunities. A high (low) M/B ratio represented more (less) investment opportunities. The results aligned with Jensen et al. (2010)'s findings in that a dividend decrease does not appear to reduce the growth opportunities of firms which had lower levels of perceived growth opportunities at the beginning of the period under consideration.

Additionally, the results also indicate that investors penalise firms which reduce their dividend from higher levels of initial perceived growth opportunities, more than those which initially had lower levels of perceived growth opportunities.

ROA levels were measured as a proxy for operating performance and as an initial indicator of restructuring activities. The temporal change in ROA over the seven-year period suggests that the dividend decrease can partly be attributed to general economic turmoil in the external environment. In terms of annual figures, the evidence suggests that the dividend decrease is a reaction to event year circumstances, which is inconsistent with Jensen et al. (2010)'s findings.

Various proxies were used in the final section of the analysis to examine whether firms were exercising their growth options. The dividend-decrease firms experienced a steady increase in the level of capital employed in the years before the event year. It was only after the event year that this figure began to decline. CAPEX levels did not align to these figures in that the dividend-decrease firms noted their lowest CAPEX levels in the event year. CAPEX rebounded thereafter, potentially in an attempt to stimulate ROA levels. Operating performance followed a similar trend to that experienced by the capital employed figures in that there was a definite reduction in profits in the event year and a decline thereafter. Total cost figures steadily increase in the years after the event year which could partly explain the declining profit levels. Whilst total costs note this increase, employee levels actually decline over this period which suggests that the rise in costs represent internal inefficiencies.

Interestingly, the cash available figures for the dividend-decrease firms sharply decline in the event year. This result is as a result of adverse economic conditions, as the peer sample firms note a significant increase in cash during the event year and thereafter. This suggests that the dividend decrease is largely a function of a poor internal liquidity situation faced by the dividend-decrease firms.

South African firms are required to pay out dividends as cash. This rule appeared to be the catalyst for the dividend decreases. The poor liquidity position experienced by the firms appeared to be the first indicator that the dividend-decrease sample firms were headed into a difficult period. The situation appeared to be further exacerbated by poor management and internal inefficiencies.

Dividend-decrease firms continued to experience lower earnings levels, reduced profit and higher costs in the years after the dividend decrease, even though firms attempted to rationalise costs such as their workforce. Given the internal inefficiencies, investments made by the firm's management failed to produce the anticipated growth. These results aligned to

Jensen et al. (2010)'s research in the sense that they do not find support for the free cash-flow hypothesis.

This study highlights numerous potential areas of future dividend research in South Africa. In this study, the announcement of a dividend decrease marked a change from the firm's establish dividend payments. Specifically, the dividend reduction followed at least three years of positive dividend payments. It would be useful to consider how investor reactions would have changed if the firms had been paying dividends at a declining rate before the event year under consideration. The continued decline could be viewed positively by investors if the firm is using the funds to make investments or if it is part of on-going restructuring activities. However, by taking the size of the sample used in this study as a proxy, it is unlikely that a sample using different criteria will be useful for statistical inference.

In this study, the relationship between dividend decreases is considered in light of earnings levels after the event year. It would be interesting to consider the relationship between earnings and dividend reductions in the years before the event year and the event year itself. Further, it would be useful to determine whether there is a correlation between an earnings loss and the announcement of a dividend decrease in these years, as the loss would then act as a type of signal to investors.

Graham and Harvey (2001) argued that firms consider not only market risk but also interest rate risk, exchange rate risk, business cycle risk, and inflation risk when deciding on capital structure and future investments. This suggests that such variables could have influenced the payment of dividends and dividend decreases within South Africa, especially given that South Africa's economic situation was particularly volatile between 1990 and 2012. As such, it would be interesting to see how variables such as interest rate, exchange rate, inflation and GDP impact a firm's dividend decision.

Similarly, as suggested by Below and Johnson (1996), there could be insights gained by expressly considering how dividend decisions vary relative to economic cycles and market phases. This could provide insight into whether there is a correlation between market phases and the size of dividend announcements.

List of definitions and abbreviations

Capital Asset Pricing Model (CAPM) – A model which describes the relationship between risk and expected return.

Capital Expenditure (CAPEX) – Funds used by a firm to either acquire or upgrade existing physical property.

Cumulative Average Return (CAR) – The combined amount of the average gains or losses an investment has amassed over a specific time period.

Fixed asset – A long-term physical asset used by a firm in generating its revenues, such as real estate and buildings.

Gross Domestic Product (GDP) – A representative monetary value of all the goods and services produced within a country's borders over a specific period.

Near Cash – A measure of non-cash assets which are highly liquid.

Operating profit – A financial measure which indicates the level of profit earned by a firm's normal, core operating activities.

Ordinary Least Squares (OLS) – A statistical method used for estimating the unknown parameters in a linear regression model.

Return-on-Assets (ROA) – A financial ratio which measures how profitable a firm is relative to its assets.

Tobin's Q – The ratio of the market value of the firm's assets to their replacements costs. It can be used as a proxy for investment opportunities.

Working capital – A financial ratio which measures a firm's short-term financial health and overall efficiency.

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