The short-term market reaction to share repurchase announcements on the Johannesburg Stock Exchange (JSE)

By

Clayton Redford

Student number: 389261

MASTER OF COMMERCE (FINANCE)

In the

SCHOOL OF ECONOMIC AND BUSINESS SCIENCES

At the

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Supervisor: Mr. David McClelland

A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand in partial fulfilment of the requirements for the degree of Master of Commerce in Finance.

Date of submission:

31 March 2015

SCHOOL OF ECONOMIC AND BUSINESS SCIENCES

Declaration Regarding Plagiarism

I (full names & surname):	Clayton Redford
Student number:	389261

Declare the following:

1. I understand what plagiarism entails and am aware of the University's policy in this regard.
2. I declare that this assignment is my own, original work. Where someone else's work was used (whether from a printed source, the Internet or any other source) due acknowledgement was given and reference was made according to departmental requirements.
3. I did not copy and paste any information directly from an electronic source (e.g., a web page, electronic journal article or CD ROM) into this document.
4. I did not make use of another student's previous work and submitted it as my own.
5. I did not allow and will not allow anyone to copy my work with the intention of presenting it as his/her own work.

31 March 2015

Signature Date

ACKNOWLEDGEMENTS

I would like to thank my supervisor, David McClelland. The thought-provoking guidance you have given me over the past few months has been invaluable. To Nigel, Petra, Hayley, Bradley and Kirstin, who have provided me with unwavering support, thank you for understanding the commitment and dedication required to complete this research, and for keeping me motivated throughout. Lastly, I would like to thank Irma Cheval for all the time and effort that she puts in to make our academic lives that much easier.

DEFINITION OF KEY TERMS AND ABBREVIATIONS

Abnormal Return – The difference between actual returns and expected returns.

B/M – Book-to-market ratio

CAPM – Capital Asset Pricing Model

CGT – Capital Gains Tax

Event Study Methodology – Methodology used to measure the impact of an event on the value of a firm.

Free Cash Flow Hypothesis – The view that share repurchases will decrease free cash flow within the firm, creating shareholder value by decreasing funds available for misappropriation by management.

JSE – Johannesburg Stock Exchange

Market Efficiency – The notion that prices reflect all available information. Furthermore, in a semi-strong context, prices will assimilate instantaneously to new information when it reaches the market.

Market Timing Theory – The belief that a firm's capital structure is the result of repeated attempts, by management, to time the capital markets.

Market Underreaction - The belief that the market does not fully assimilate, initially, to the information contained in the repurchase announcement.

NPV – Net Present Value

SA – South Africa

SARS – South African Revenue Service

SENS - Stock Exchange News Service

Share Repurchase (Buy-back) – The instance whereby a company reduces its issued share capital by repurchasing outstanding shares. These shares are absorbed within the company and, given that the concept of treasury stock does not exist in South Africa (SA), the rights associated with these shares are cancelled. In SA, repurchases may be conducted by means of a general, or specific, repurchase or a derivative transaction.

Signalling Hypothesis – As a result of information asymmetry, managers will attempt to pass on inside information about the prospects of the firm to shareholders via a share repurchase. This is likely to occur when the shares of the firm have become undervalued in the market.

TRA – Tax Reform Act of 1986

U.K. – United Kingdom

U.S. – United States

VAT – Value added tax

ABSTRACT

Given the increased use of share repurchases to pay out excess cash to shareholders, this study aims to examine the short-term market reaction to share repurchase announcements on the Johannesburg Stock Exchange (JSE). In particular, the study examines the link between repurchase motives and the short-term reaction of the market, as well as other characteristics which may have an effect on the market reaction. Using event study methodology, the study covers 146 general share repurchases on the JSE from 2004 to 2014. The findings suggest that the market reacts positively to repurchase announcements, although the market does tend to underreact at the time of the announcement, consistent with past literature. The study provides support for the information signalling, market timing and free cash flow hypotheses. Furthermore, the reaction of the market is seen to not be affected by capital gains tax changes, ownership concentration and shareholder protection, considerations.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND AND MOTIVATION FOR THE STUDY

In recent times, share repurchases, as a mechanism for paying out excess cash flow, has seen substantial growth with annual increases in repurchase activity of 26.1% from 1980 to 2000 (Grullon & Michaely, 2002). This has provided firms with a viable alternative to paying out excess cash as dividends, or reinvesting within the firm. Furthermore, given the agency problems associated with excess cash flow, as put forward by Jensen (1986), paying out excess cash will keep firms in the capital markets where monitoring of managers can be achieved at a lower cost.

Firms are reluctant to change their dividend policy, especially if the excess cash flow generated is relatively impermanent (Brav, Graham, Harvey, & Michaely, 2005). As an alternative, given the sometimes transient nature of excess cash flow, firms may pay out excess cash by repurchasing outstanding shares. The advantage of doing so, compared to paying out a regular dividend, lies in there being less of a long-term commitment whilst still attempting to maximise shareholder wealth.

The hypothesized motivations behind the repurchase decision are numerous. The most popular of which, is the undervaluation, or signalling, hypothesis (Vermaelen, 1981). Given that there are many elements which drive the price of a firm in the secondary market, it is conceivable that the market value of the firm will deviate substantially from the value that managers place on the firm. Since managers are mandated to maximize shareholder value, when the firm becomes undervalued they will attempt to signal the apparent undervaluation to the market. This can be achieved by undertaking a share repurchase. Put differently, this signals the belief, by management, that investing in their own firm is the best use of available resources. This theory leads to the somewhat similar theory that managers use repurchases to time the market, taking advantages of price fluctuations and undervaluation. This is consistent with the market timing theory put forward by Baker and Wurgler (2002), which states that a firm's capital structure is a result of the repeated attempts by management to time the capital market, in lieu of the static capital structure theories put forward by the likes of Modigliani & Miller (1958).

In addition, paying out excess cash instead of reinvesting within the firm, with the risk of misappropriation, provides a viable explanation of why firms repurchase shares, consistent with the free cash flow hypothesis of Jensen (1986).

Tax implications may also play a role in the decision to repurchase, as managers are more likely to repurchase when shareholders have a relatively lower tax on capital gains as opposed to dividend income (Lie & Lie, 1999). This is due to the differential tax rates, and methods of taxation, of capital gains and dividend income. Takeover deterrence has also been suggested as a motive for repurchase. Non-tendering shareholders are likely to place a higher valuation on their shares and their fractional ownership will become more concentrated as a result of the repurchase, making it more difficult for a takeover to take place (Bagwell, 1991; Bagwell & Shoven, 1989; Denis, 1990). In addition, a firm may use a repurchase to adjust its capital structure towards its optimal point, as the earnings-performance of the firm may cause it to deviate away from this point (Hovakimian, Opler, & Titman, 2001).

The above motives of share repurchase are likely to manifest in the reaction of the market to the repurchase announcement. Furthermore, certain firm characteristics are likely to affect the reaction. Stephens & Weisbach (1998) note that the market reacts more positively to repurchase announcements for firms that have had poor prior returns, consistent with the observations of Peyer and Vermaelen (2009). Ikenberry, Lakonishok and Vermaelen (1995) note that high B/M firms are more likely to have undervaluation as a motivation for a repurchase and will therefore experience a more positive market reaction. McNally (1999) note a positive relationship between the size of the repurchase and the reaction of the market. Zakaria, Zulkafli and Muhammad (2013) hypothesize that the reaction of the market to the repurchase announcement will be more favourable for firms that have a more highly concentrated ownership structure. Rau and Vermaelen (2002) note that the reaction of the market to the repurchase announcement is more favourable in environments which favour repurchases, from a tax and regulatory perspective. Wang, Strong, Tung and Lin (2009) note that low Tobin's Q-value firms respond more positively to repurchase announcements. Ginlinger and L'Her (2002) note that the market reacts more positively to a repurchase announcement when there is a greater degree of minority shareholder protection.

In light of the above, this study aims to test the validity of certain motives by examining the reaction of the market to the announcement, depending on certain firm characteristics.

1.2 PROBLEM STATEMENT

To test the reaction of the market to share repurchase announcements from 2004 to 2014 on the JSE. This study is conducted to test the motives behind a repurchase by examining the market reaction to the repurchase announcement. This will add to the vast literature on repurchases and, most importantly, add to the limited coverage of repurchases in South Africa, as well as providing a recent account on the topic.

1.3 RESEARCH OBJECTIVES

The purpose of the study is to provide an account of the market reaction to share repurchase announcements on the JSE. In so doing, the study will examine the motivations behind share repurchases, by observing the reaction of the market, as well as examining how different factors affect the nature of the market reaction. The objectives of the study are listed more specifically below:

- To test whether there is a positive reaction to repurchase announcements on the JSE, consistent with international studies, as well as Bhana (2007) in a South African context. More specifically, to whether the market reacts positively to the announcement, whilst initially underreacting to the announcement.
- To test whether the book-to-market ratio, as a proxy for undervaluation (signalling), has an effect on the reaction of the market to the repurchase announcement (Ikenberry, Lakonishok, & Vermaelen, 1995).
- To test whether the previous 6-month returns, as a proxy for undervaluation (signalling) and market timing, has an effect on the reaction of the market to the repurchase announcement (Stephens & Weisbach, 1998).
- To test whether the proportion of outstanding shares repurchased, as a proxy for undervaluation (signalling), has an effect on the reaction of the market to the repurchase announcement (McNally, 1999).
- To test whether Tobin's Q, as a proxy for over- and underinvesting and the free cash flow theory, has an effect on the reaction of the market to the repurchase announcement (Wang, Strong, Tung, & Lin, 2009).

- To test whether the level of ownership concentration, as a proxy for agency costs, has an effect on the reaction of the market to the repurchase announcement (Zakaria, Zulkafli, & Muhammad, 2013).
- To test whether the ratio of the second largest to largest shareholding, as a proxy for corporate governance and shareholder protection, has an effect on the reaction of the market to the repurchase announcement (Ginlinger & L'Her, 2002).
- To test whether a change in the Capital Gains Tax (CGT) rate has an effect on the reaction of the market to the repurchase announcement (Lie & Lie, 1999).

1.4 IMPORTANCE AND BENEFITS OF THE PROPOSED STUDY

Given the substantial rise in repurchase activity, as documented by Grullon and Michaely (2002), an examination of the motives behind repurchases, and the reaction of the market thereof, should provide valuable insights into the corporate pay-out decision which has been subject to much debate in the realm of finance. If, in the event that a firm has generated excess cash flows, knowing how the market will react to a pay-out decision, given certain firm characteristics, will add value to those making corporate pay-out decisions. This would be particularly valuable to companies that generate large amounts of excess cash in light of declining positive Net Present Value (NPV) opportunities.

Furthermore, this is a relatively unexplored topic in a South African context. Although Bhana (2007) does provide a fairly comprehensive study on repurchases, consistent with international studies, subsequent literature does not exist to test the validity of these results, as well as build upon them. Extending this study further to examine the reaction of the market under different conditions, as well as examining the different theories on repurchase motives, will provide a meaningful account of repurchases in a South African context.

Furthermore, in light of the South African context, the study provides an account of the relevance of corporate governance and shareholder protection with respect to repurchases. Naturally, one would expect the market to be more receptive to corporate actions, and the credibility thereof, when there is a requisite level of shareholder protection. This is particularly relevant, as share repurchases are likely to result in the increase of proportional ownership of non-tendering shareholders, further entrenching the control of large shareholders. Furthermore,

the study tests the free cash flow hypothesis, as a motive for repurchase, which has not been documented in South Africa.

1.5 LIMITATIONS

This study is limited to share repurchase announcements on the JSE and, therefore, does not provide a more global examination of the topic. Data for the study was retrieved from INet BFA. Unfortunately, repurchase announcements on the INet BFA database were only available from 2004 onwards. Therefore, the study excludes the initial years of repurchase behaviour on the JSE as documented in Bhana (2007). Furthermore, the unavailability of data, relating to the cross-sectional information of certain firms, resulted in the exclusion of numerous observations. The study is only focussed on repurchase announcements, and it would have been valuable to include the market reaction to special dividend announcements, also seen to be once-off cash flows to shareholders similar to Howe, He and Wenchi Kao (1992). Further, this would have also provided an account, in a South African context, comparable to Grullon and Michaely (2002) which examined the substitution hypothesis between dividends and repurchases. From a methodological perspective, only event study methodology was used to test the short-term reaction of the market which may limit the value of the results. Furthermore, the study only examines the short term reaction, limited to 30 days after the announcement. As such, comparisons with Bhana (2007)'s examination of buy-and-hold abnormal returns to test for underreaction, over a 3-year period, are not possible, although some valuable inferences can be made over the 30 day period.

The remainder on the study will proceed as follows: Chapter 2 provides a review of key literature, Chapter 3 documents the methodology used in the study, Chapter 4 presents the results of the study and, finally, Chapter 5 provides a conclusion of the topics examined.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews the key literature examined in this study. The chapter begins with a brief overview of the pay-out decision faced by the firm. Firms must first determine whether to reinvest excess cash within the firm or pay it out to shareholders. Second, in the event that the firm does choose to pay out, it must determine which method of pay-out is more beneficial to shareholders, dividends or share repurchases. The chapter proceeds onto the topic of share repurchases. This provides an overview of repurchase mechanisms, repurchase motives and the reaction of the market to repurchase announcements. The chapter ends with a brief summation of the topics discussed.

2.2 THE DECISION TO PAY OUT

Free cash flow is defined as "…cash flow in excess of that required to fund all projects that have positive net present value (NPV) when discounted at the relevant cost of capital." (Jensen, 1986, p. 323). In light of this understanding, in the instance that a firm has generated excess cash flow, it will need to decide whether to reinvest the cash back into the firm, or pay it out to shareholders.

Assuming no transaction costs, no taxes and no signalling, the value of the firm will change with a pay out to shareholders, depending on the availability of positive NPV projects within the firm. Assuming the firm does not have such projects available, the cash should be paid out to shareholders (Hillier, Grinblatt, & Titman, 2012). If the cash is reinvested within the firm, in this instance, one can assume that there will be misappropriation of funds by the managers of the firm. This introduces the potential agency problems of free cash flow, as articulated in Jensen (1986).

If the decision has been made to pay out to shareholders, the managers of the firm will need to consider the payment mechanisms available to the firm. The two most common mechanisms

available are dividends and share repurchases. Under a number of assumptions - no information asymmetry, no taxes, no transaction costs and no agency conflicts - the choice between paying out excess cash in the form of a dividend, or through a share repurchase, is essentially a matter of indifference, and the value of the firm will be unaffected (Miller & Modigliani, 1961). Tendering shareholders, in the case of a repurchase, receive the same amount of cash through the sale of their shares, as if the excess cash was paid out as a dividend. In the case of a dividend pay-out, one would be able to buy shares with the cash paid out, to attain the same wealth effects as a non-tending shareholder in the case of a repurchase (Shoven, 1987).

In documenting the repurchase of common stock, Bierman and West (1966) developed a model to examine, and analyse, the pay-out decision. The paper suggests that the market value of the firm is related to the factors listed below:

- Level of earnings available for distribution
- Interest rate
- Pay-out mechanism (dividends and/or repurchases)
- The taxation rate on dividend income and capital gains

In an environment of no taxes, the value of the firm will be a function of the earnings available and the interest rate, and will not be affected by the method of pay-out. With the inclusion of taxes, however, the choice of pay-out will then become a function of the marginal tax differential between the two forms of pay-out. The other important consideration is the tax exemptions that certain shareholders are likely to benefit from, which highlights the potential for a clientele effect. The tax implications of share repurchases are further documented in this chapter, in the discussion on taxation.

In a related study, Abuaf (2012) examined the pay-out strategies to shareholders. The paper suggests a pecking order of priorities with respect to the use of cash. First, firms should retain enough cash to finance all regular corporate activities. Second, the firm should use the cash to adjust its capital structure towards its optimal point. Third, the firm should attempt to match its dividend pay-out policy with that of its competitors, unless it wants to send a specific signal to the market. Last, firms should repurchase shares only if it is apparent that the share price will not decrease substantially in the long term. It is noted, however, that if a firm has an irregular level of excess cash, which cannot support an increase in regular dividends, it would be better to pay it out as a special dividend. Although, if managers have superior information about the

firm, as a result of information asymmetry, and consider the firm to be undervalued, it will be more beneficial to repurchase shares.

Woods & Brigham (1966) provide an overview of the pay-out decision of the firm, considering the relative advantages and disadvantages of paying out dividends and/or repurchasing shares. According to the paper, from a shareholder's perspective, share repurchases provide a relative tax advantage, can remove a large block of overhanging stock fairly expeditiously and allows shareholders relative optionality as they have the choice to tender their shares. The disadvantages from a shareholder's perspective, however, include the potential indifference of shareholders to the pay-out choice, or preference to dividends in the case of many institutional investors. Furthermore, tendering shareholders may be naïve to the implications of the repurchase caused by information asymmetry. In addition, the price paid by the firm to repurchase the shares may be too high and, therefore, become value-destroying for non-tendering shareholders.

Further, from Woods & Brigham (1966), from the perspective of management, repurchases allow management to avoid the relatively permanent nature of regular dividends. Repurchased shares can be used for acquisitions and can be reissued in the event that managerial share options are exercised. If managers have a large shareholding in the firm, repurchases will be preferred due to the relative tax advantages and the potential consolidation of control in the firm. Repurchases provide management with the ability to deter hostile takeovers, by increasing the price of the firm's equity as well as consolidating the firm's shareholdings. Conversely, management may be disadvantaged in the use of repurchases due to information asymmetry, as the market may misinterpret management's intentions. Furthermore, information asymmetry may manifest in the inability of management to accurately assess the pay-out preference of shareholders. Lastly, the choice to repurchase may have legal implications, which could possibly result in the destruction of shareholder value if incorrectly employed by management.

In a similar vein to Jensen (1986), Easterbrook (1984) examined the use of corporate pay-outs, specifically dividends in this case, in reducing agency costs within the firm. The paper proposes that paying out dividends will keep firms in the capital markets, where they will need to raise funds externally. The raising of funds in these markets will allow the firm to access monitoring at a reduced cost, to better align the incentives of management and shareholders. Keeping the

firm in the capital markets will also aid the firm in taking on the value-maximizing level of risk, as risk averse managers may tend to avoid risky projects.

Grullon and Michaely (2002) examined the development of the trend of more firms repurchasing shares, as opposed to paying out dividends. The paper introduces the substitution hypothesis, which posits that firms are substituting dividends for share repurchases due to a number of relative advantages. From the mid-1980s in the United States (U.S.), more firms have taken the decision to initiate share repurchases instead of paying out dividends. Although the two pay-out decisions have previously been seen as complementary, the findings of this paper support the substitution hypothesis. In addition, the negative market reaction for firms that decrease their dividend pay-out is substantially less when the firm also takes part in repurchasing activity. Interestingly, the documented positive reaction to repurchase announcements was seen to decrease after the Tax Reform Act (TRA) of 1986 in the U.S., as the relative tax advantage of repurchases, over dividends, was seen to decrease. Overall, the findings of this paper propose that firms are indeed substituting share repurchases for dividends, which is contrary to previous studies on the matter.

Focusing on once-off cash disbursements, Chhachhi and Davidson (1997) examined, and compared, the market reaction to specially designated dividend announcements and tender-offer share repurchases. The two methods of pay-out are similar, as they do not have an implied commitment to follow through with the pay-out, arguably giving the firm more flexibility to time the market. However, the two methods are dissimilar in a number of aspects. Taking cognisance of the information asymmetry argument, managers may choose to repurchase, rather than pay a special dividend, because of the signalling aspect of share repurchases. Signalling requires a cost, such that it is not easily replicable by those who are trying to imitate the behaviour of firms with a better reputation (Sanders & Carpenter, 2003). The cost, in this instance, is the consolidation of the manager's shareholding which, assuming the manager does not have a diversified shareholding outside the firm, will increase his level of idiosyncratic risk. There is no similar 'cost' to signalling with a special dividend. The next important consideration is the tax implications of the pay-out decision, as dividends are taxed as income, whereas repurchases are taxed through capital gains. The authors also note that repurchases are generally larger than special dividends. The reaction of the market presents an interesting result. After controlling for size and frequency, the paper found that the market reacts more positively to repurchases. Firms that prefer special dividends are seen to have a higher dividend yield, which suggests a potential clientele effect.

Allen, Bernardo and Welch (2000) suggest that paying out dividends is a signal of a good quality firm. Institutional investors are assumed to be good monitors, because they generally hold large block holdings of a firm's stock. Given their large shareholding, these institutional investors have a greater motivation to align the incentives of management with that of their own. A large number of these institutional investors have tax-exemptions which make dividend income more attractive, likely to result in higher institutional ownership of high pay-out firms. Therefore, given that institutional investors are better monitors and that dividend-paying firms attract institutional investors, the choice to pay out dividends will be beneficial in signalling the firm's high quality to the market. This provides motivation as to why some firms will choose to pay out in the form of dividends.

Grinstein and Michaely (2005) expanded the investigation into the relationship between the pay-out decision and institutional ownership. The paper confirms the evidence that institutional investors prefer dividend-paying firms. Interestingly, however, institutional investors do not prefer firms that have a relatively higher dividend yield. Therefore, firms would not be able to further attract institutional investors by increasing their dividend pay-out, although increasing dividends may be attractive to individuals, according to the findings of the paper. The paper also provides insight into the relationship between institutional ownership and share repurchases. The evidence presented suggests that there is a direct relationship between institutional ownership and share repurchases, as the movement in share repurchase activity is mirrored by the level of institutional ownership of the firm. This relationship is strongest with firms that repurchase more, and on a regular basis. Finally, the paper finds that the level of institutional ownership, and ownership concentration, does not cause firms to pay out more.

Lie (2005) examined the relationship between the decision to increase, or decrease, pay-outs and changes in operating income levels and certainty. The findings of the paper support the notion that firms, who increase pay-outs, concurrently experience a positive shock to operating income. In addition, firms that increase pay-outs tend to have lower past volatility of operating income. This can be interpreted as managers only increasing dividends when they are positive about the sustainability of operating income. According to Lie, there are two important implications from this result. First, managers take the level, and volatility, of operating income into consideration when making pay-out decisions. Second, given the presence of information asymmetry, a change in pay-out may convey information to the market, signalling a change in the operating risk of the firm, often affecting its market value. Further, firms will rather

repurchase shares when they are unsure of the permanence, and volatility, of changes in operating income.

Hausch and Seward (1993) investigated the corporate pay-out choice by comparing the pay-out decision between a deterministic (dividend) and stochastic (repurchase) policy. Dividends are considered deterministic in this case, as their date and quantity are known with certainty. A repurchase is considered stochastic as certain aspects are unknown, or may be contingent on certain information that is not yet available. The paper discusses the method of signalling, repurchases or dividends, which is preferred by the firm depending on the absolute risk aversion of the firm's production function. The findings of the paper suggest that, with increasing risk aversion, firms will prefer to signal with dividends (deterministic). The paper delves further into the intuition behind this finding, relating signalling to risk aversion as a function of the cash available within the firm.

Chowdhry & Nanda (1994) argue that a firm may choose not to repurchase its stock when the repurchase price is higher than its true value, despite its tax advantages over dividends. Therefore, the firm may be faced with one of two decisions regarding its pay-out decision. First, the firm may choose to pay out in the form of dividends in the current period. Second, it may choose to hold onto excess cash until the shares of the firm become undervalued, making it more economically viable to repurchase. The authors argue that it is optimal for the firm to pay out a certain portion of its excess cash in the form of a dividend, whilst saving some of the excess cash until the firm becomes undervalued. When the requisite level of undervaluation is reached, the firm must use all of its available excess cash to repurchase shares. The paper also makes some observations on the reaction of the market to these pay-out decisions. The main observation is that firms with higher dividend yields, and that repurchase infrequently, will see a larger reaction from the market. Judging by the 'saving' of excess cash mentioned earlier, until undervaluation it at a high enough level, it should, logically, signal to the market that the stock is significantly undervalued, such that the firm has had to wait until this point to repurchase shares. This seems to be a plausible explanation for the well-documented positive market reaction to repurchase announcements.

The relationship between stock market liquidity and pay-out policy was examined by Banerjee, Gatchev and Spindt (2007), focusing mainly on dividend policy. The results of the paper suggest that, in illiquid markets, there will be a higher demand for firms with a higher dividend yield. In the instance of a highly liquid market, the authors argue that investors are easily able

to create ‘homemade dividends’. Therefore, companies in less liquid markets are more likely to pay out excess cashflows to shareholders in the form of dividends. The authors suggest that the observed decrease in dividend pay-outs, in the U.S., is a result of the increased liquidity of the market. Importantly, the authors note that their results are not driven by the increase in popularity of share repurchases, as previously suggested by the likes of Grullon and Michaely (2002). Last, the results suggest that stock market liquidity and dividends act as substitutes, as firms will initiate dividend pay-outs to reduce the sensivity of their stock prices to aggregate liquidity.

2.3 SHARE REPURCHASES

Fundamentally, a repurchase is an investment, by a firm, in its own stock. This corporate action will reduce the number of shares outstanding in the secondary market. Put differently, a share repurchase exchanges cash flows held by the firm, occasionally financed by debt, for outstanding stock. The repurchase of a firm’s common stock changes the firm’s capital structure, changes the mixture of assets held by the firm, alters the ownership proportions of shareholders and expels excess cash flow to shareholders in a way which is taxed differently to a dividend pay-out (Dann, 1981).

A number of mechanisms exist for a firm to repurchase its own shares. First, and most common, a firm may repurchase directly in the open market at the prevailing market price. Second, a firm may repurchase through a fixed-price tender offer. In this instance, the company will announce the tender process and shareholders will have the opportunity to tender a portion of their shareholding. The amount of shares that the company is aiming to repurchase is disclosed in the tender offer, including the approximate price that the firm is willing to pay. Third, a firm may use a Dutch-auction tender offer whereby the firm specifies a range of prices for which shareholders may tender their shares. The shareholders, whose bids are successful, are paid the highest acceptance price from the auction. Last, the firm may issue transferrable put rights. These rights will give current shareholders the right, but not the obligation, to sell their shares back to the company at a predetermined price. The number of rights issued is generally a function of proportional shareholding, and the amount of shares that the company is aiming to repurchase. In this instance, a secondary market is likely to exist where shareholders would be

able to trade these rights, if they are unwilling to tender their shares to the company (Gay, Kale, & Noe, 1991).

2.3.1 Definitions and Regulations in South Africa

In terms of South African company law, when a company repurchases its stock, according to the provisions of the Companies Act 71 of 2008, the preferences, rights and limitations associated with the stock, will be cancelled. The concept of treasury stock is not recognized according to SA company law, and therefore shares will cease to exist once repurchased (IBA Corporate and M&A Law Committee, 2014).

More specifically, repurchases are governed by sections 46 and 48 of the Companies Act. A company may buy back its shares in a general repurchase where the company will purchase these shares from shareholders according to their proportional ownership in the firm. Alternatively, the firm can undertake a specific repurchase where shares are bought back from specific shareholders. A firm may not repurchase more than 20% of its issued share capital in a financial year, unless by way of special resolution.

Both general, and specific, repurchases need to comply with the JSE listing requirements regarding public disclosure. For both forms of repurchase, the firm needs to issue a circular with a notice of general meeting to all shareholders. With regards to a general repurchase, the firm will need to disclose when more than 3% of the issued share capital has been repurchased, and every 3% thereafter, by means of a SENS announcement which is required to disclose price, value and volume information about the repurchase. Specific repurchases, alternatively, require the firm to disclose the full details of the repurchase via a SENS announcement as soon as the issuer has agreed on the terms of the repurchase with the respective shareholders. In addition, the JSE will need to approve the circular sent to shareholders and the firm will need to apply for the delisting of the repurchased shares. (IBA Corporate and M&A Law Committee, 2014)

2.3.2 Why do firms repurchase Shares? Empirical Evidence

The comprehensive study on repurchase motives by Dittmar (2000) documented that a firm's decision to repurchase is a function of its distribution, corporate control, capital structure, compensation, and investment, policies. Using a 20-year sample of repurchases, the paper investigates the hypotheses relating to the above-mentioned reasons for repurchase. In so doing, the paper provides a comprehensive account of repurchase motives, which include:

- The Excess Capital Hypothesis (Distribution Policy)
- Undervaluation Hypothesis (Investment Policy)
- Optimal Leverage Ratio Hypothesis (Capital Structure Policy)
- Management Incentive Hypothesis (Compensation Policy)
- Takeover Deterrence Hypothesis (Corporate Control)

After testing the above-mentioned motives, the paper found strong evidence to support the notion that firms use repurchases as part of a distribution and investment policy. In addition, the paper does find some support for other motives during certain periods. Although this paper is comprehensive in its coverage of the various motivations, it does not deal with issues such as taxation, ownership concentration and the role of corporate governance.

Medury, Bowyer and Srinivasan (1992) examined numerous characteristics of repurchasing firms, using multiple discriminant analysis to investigate the differences between repurchasing and non-repurchasing firms. Furthermore, the paper documented the differences between open-market, and tender offer, repurchases. The paper found that repurchasers differ from non-repurchasers with respect to profitability, dividend yields, market price, liquidity and financial leverage. Repurchasing firms are seen to have higher earnings, leading to higher levels of excess cash. In addition, these firms have less favourable investment opportunities. This, combined with having excess cash available, provides support for the free cash flow argument that firms will rather pay out excess cash instead of reinvesting in the firm for managers to misappropriate. The paper finds that repurchasing firms use less debt and may use repurchases to adjust financial leverage. This provides some support for the argument that firms use repurchases to optimize their leverage ratio.

2.3.3 Why do firms repurchase Shares? Survey Evidence

Guthart (1967) presented survey evidence on the rationale behind the repurchase decision. The paper surveyed twenty companies which, at the time of the study, had recently repurchased more than 10% of their outstanding equity. In addition, the study covered more than 100 other interviews with those involved with repurchases including academics, executives and lawyers. Contrary to numerous other studies, the paper found that the major motivation behind a repurchase was to decrease the equity capital base of the company. The company executives noted that the equity base was too large for the volume of business needed to be financed. Related to this, interviewees also noted that maintaining the current equity level going forward was an important consideration. Repurchases were also seen to be a good investment, as they were considered to be more lucrative than reinvesting funds into production and equipment, and offered better opportunities than purchasing common stock of other companies. It was mentioned that repurchases were used, less importantly, to eliminate smaller shareholders because the cost of servicing the needs of these shareholders was too large. Interviewees also noted that consolidating, and improving, control within the corporation was a motivating factor. This makes intuitive sense as non-tendering shareholders would increase their proportionate shareholding within the firm.

Wansley, Lane and Sarkar (1989) also followed the approach of documenting repurchase motives using survey evidence. The evidence from the survey suggests that the main motivation behind a share repurchase is the manager's belief that the firm's stock is undervalued. Signalling, with regards to future prospects of the firm, seemed to be a popular motivation amongst managers. The survey also showed that using share repurchases as a substitute for dividends does not seem to rank highly, relative to other repurchase motives. This contrasts the substitution hypothesis assertions of Grullon and Michaely (2002). Using repurchases as a takeover defense only ranked 9th highest as a motivating factor, casting some doubt on the theory of takeover deterrence.

Some years later, Brav, Graham, Harvey and Michaely (2005) surveyed 384 financial executives to determine the factors that drive dividend and share repurchase decisions. In terms of ranking, they found that the main motivation behind the repurchase decision was to signal information about the apparent undervaluation of the firm. The other main motivating factor was the availability of good investment opportunities, which was not mentioned in the

Wansley, Lane and Sarkar (1989) study. A mere 20.3% of managers consider managerial discipline, through paying out cash, to be an important factor, which may raise some doubts about the agency problem considerations of free cash flow. Interestingly, approximately 50% of managers mention the influence of institutional investors as an important motivation for share repurchases. This appears to be consistent with Grinstein and Michaely (2005) which mentions the direct relationship between repurchase activity and institutional ownership.

2.4 REPURCHASE MOTIVES: A DETAILED ACCOUNT

2.4.1 Signalling Hypothesis

During the course of a firm's operations, it is conceivable that managers will acquire information about the current, and future, prospects of the firms, which is superior to that of the market. This is likely to manifest in differing valuations of the firm by both management and the market. Information asymmetry, therefore, can often become costly to managers, particularly when their compensation is related to the firm's market value. Therefore, managers are incentivised to provide more information to the market (Hillier, Grinblatt, & Titman, 2012). Managers of the firm have the ability to signal their prospects to the market with the use of certain corporate actions. These actions can be in the form of cash inflows (equity issues) or cash outflows (dividends and repurchases) (Howe, He, & Wenchi Kao, 1992).

Given the presence of information asymmetry, it is conceivable that shareholders may not know the nature of the motivation behind the repurchase at the time of the announcement. As a result, the reaction of the market may be unpredictable (Dann, 1981). A noticeable advantage of share repurchases as a signalling mechanism, is the avoidance of disclosing firm specific information to competitors. These announcements are, however, regarded as credible because the announcement is both costly and visible to the open market (Sanders & Carpenter, 2003). A cost to signalling is necessary, as firms with ill intentions could easily mimic the actions of a well-intentioned firm with and achieve the same benefit. Given that it is unlikely that firms would incur costs to signal negative information to the market, it would seem that the suggestion by Dann (1981), about the predictability of the market reaction, seems somewhat unrealistic.

It seems apparent that firms have realised that repurchases are a less costly signal of favourable news than a dividend pay-out (Bagwell & Shoven, 1989). Bagwell and Shoven (1989) argue that firms may be reluctant to use signalling, by means of a corporate action, that the market does not accurately perceive. They further note that, as the market has become more familiar to share repurchases, the magnitude and frequencies of repurchases has increased.

Chan, Ikenberry and Lee (2004) found, when looking at both the short term and long term market reactions with regards to why firms repurchase stock, that the main driving force behind share repurchases is mispricing by the market. As a result, consistent with numerous previous studies, managers will repurchase shares to signal to the market that their shares are undervalued.

This notion of signalling was further expanded on by Comment & Jarrell (1991) who examined the signalling power of open-market share repurchases, dutch-auction and fixed-price tender-offers. The paper investigated a large sample of 165 tender-offers, of which 72 were dutch-auction. In addition the paper covered 1197 open-market repurchase programs. The three methods of repurchase all exhibited positive excess returns on announcement, although fixed-price tender-offers exhibited much larger abnormal returns (11%) compared to open-market repurchases (2%). The authors hypothesize that the reaction to fixed-price tenders is greater than the reaction to dutch auctions because they expose the wealth of managers to more risk. This is consistent with the belief that, for signalling to be effective, firms must incur a cost such that it is not easy replicable by other firms. The paper puts forward the assertion that the effectiveness of signalling is linked to firm-specific performance and not to the performance of the market as a whole, which makes intuitive sense. Although the reaction to open-market repurchases is relatively small, the findings suggest that open-market repurchases can, in the event that they are substantially large, have the same signalling power as dutch-auction tenders. This finding is particularly noteworthy as dutch-action repurchases will generally require the payment of a premium above the market price for the repurchased stock. Therefore, it would be more beneficial for the firm to use a large general repurchase to signal the firm's undervaluation.

Approaching this topic from a different angle, McNally (1999) examined the signalling effect of open market share repurchases by presenting a model which links the announcement, and the market reaction thereof, to the utility of the firm's controlling shareholder. The logic behind the model is that the controlling shareholder is unlikely to tender his/her shares, and will result

in an increase in proportional ownership. This is likely to increase the risk exposure to the controlling shareholder(s) in terms of idiosyncratic risk and, in the event that the repurchase was financed by a debt issuance, the firm will become riskier. This is exacerbated by a decrease in the firm's least risky asset, cash. Assuming controlling shareholders are risk averse, McNally proposes that insiders in highly profitable firms suffer less marginal disutility from the additonal risk than those of less profitable firms. The paper makes three noticable findings with regards to signalling and the reaction of the market. First, the reaction of the market is seen to have a postive relationship with the proportion of shares repurchased. This makes intuitive sense as it will increase the risk of the controlling shareholder, sending a stronger signal to the market. Second, consistent with previous studies, there is a postive relationship between the market reaction and the riskiness of the firm's earnings. Finally, the paper finds evidence to support the theory that there is a positive relationship between the level of controlling shareholder ownership and the market reaction. This, too, makes intuitive sense if one considers the principal-agent argument introduced by Jensen and Meckling (1976), where managers are less likely to act in the best interests of the firm when their ownership stake becomes more fractional.

Stewart (1976) looked at the longer term signalling, and undervaluation, effects of share repurchases. The main assertion of the paper, supported by results, was that signalling could only become credible in the long term. Initially, the market will be sceptical of management using corporate actions to signal the true value of a company. However, as more time passes and management has had more of an opportunity to prove that the firm has been undervalued, the performance of the firm's stock will improve. This can be seen graphically in Stewart (1976) where there is a clear divergence in price level in the long term between firms that have repurchased shares and those that have not, clearly illustrating the initial undervaluation of repurchasing firms.

Babenko, Tserlukevich and Vedrashko (2012) argue that a signal to the market is only reaction-worthy if the management of the firm acts in a way to make the announcement credible. This, according to the authors, is achieved if the insiders of the firm are observed to have recently purchased shares in the company. If an undiversified investor increases their shareholding in a particular company, they are subjecting themselves to a greater degree of idiosyncratic risk and this effect is exacerbated when the firm's stock is overpriced. Therefore, based on this explanation, managers will send a credible, positive signal to the market when they purchase shares in the firm before a share repurchase. The findings of the paper show that the firm's top

management is more likely to purchase shares when undervaluation is listed as a reason for the repurchase. This also suggests that the apparent abnormal trading trends prior to the repurchase announcement is, in effect, consistent with insiders trading on private information. The size of the announcement effect was found to be postively related to the size of the insider purchase prior to the repurchase announcement. This relationship was more pronounced with smaller firms with less analyst coverage, where undervaluation is more likely to occur.

Expanding on the topic of signalling credibility, Bonaimé (2012) examined the effect of the firm's reputation to follow through with announced repurchases. This stems from open-market share repurchases not being binding commitments on the firm. The results of the paper suggest that there is a direct relationship between the historical completion rate of repurchases and the reaction of the market to the announcement. This, therefore, suggests that a firm's reputation is an important consideration when evaluating the credibility of the firm's repurchase announcement, which manifests in the reaction of the market.

This notion is supported by Asquith and Mullins (1986) with regards to the credibility of signalling using share repurchases. They note that, as the truth behind a repurchase is revealed, the market will react such that the market price will drop to preannouncement levels, if negative, or potentially even lower depending on the premium paid to repurchase the shares. The level of market correction is likely to be a function of the firm's credibility based on their history of following through with announced repurchases.

2.4.2 Market Timing

Market timing relates to the repeated attempts by managers to time the equity market, which is to issue equity when it is seen to be overvalued, and repurchase equity when it is undervalued. As a result, a firm's capital structure will be the product of management's repeated attempts to time the capital markets (Baker & Wurgler, 2002).

D'Mello and Shroff (2000) performed a study on the relationship between share repurchases and the firm's fair value, examining whether repurchased shares are undervalued. The results of the paper suggest that 74% of repurchasing firms are considered to be undervalued. Furthermore, they find a significant number of repurchasing firms to be grossly undervalued, suggesting that managers will undertake a repurchase when significant mispricing exists. These

findings are centred on the idea of information asymmetry, where managers will attempt to time the market, taking advantage of their superior information about the future prospects of the firm.

In a related study, Stephens and Weisbach (1998), in their study on open-market share repurchases, found a negative relationship between share repurchases and prior stock returns. This relationship is consistent with the notion of information asymmetry, as managers, who are perceived to know the true value of the firm, will realise that the degree of undervaluation is large enough, after poor performance, to warrant repurchasing shares. The other main finding of the paper, which may have an influence on the firm's ability to time the market, is that repurchases are positively related to the cash position of the firm. This suggests that repurchase activity is determined by the market's valuation of the firm and the cash position of the firm to act upon the apparent undervaluation.

2.4.3 Free Cash Flow Theory

An alternative explanation for the positive price reaction around share repurchase announcements is centred on the free cash flow theory put forward by Jensen (1986). According to this theory, managers are likely to overinvest when the firm has excess cash flow. This overinvestment, generally speaking, will be on projects with negative net present value (NPV), or will have a lower after-tax return than one would earn if the money was paid out to shareholders (Hillier, Grinblatt, & Titman, 2012). In light of this assertion, one would expect to observe a positive price reaction when the firm announces a share repurchase, also seen as a reduction in agency costs.

In their paper on one-time cash flow announcements, Howe, He and Wenchi Kao (1992) examined the effects of specially designated dividend (SDD) announcments and share repurchases in light of Jensen's free cash flow theory. Their paper was premised on the findings of Lang and Litzenburger (1989) which found a difference in the size of the market reaction to firms which announced dividend increases, when catergorized as overinvesting firms or value-maximizing firms, according to Tobin's Q ratio. Further, they found that the market reaction was generally greater for the firms which were considered to be overinvesting firms. Since these firms were likely to have greater agency costs, the announcement was seen to be alleviating those problems by reducing the amount of free cash flow available.

Howe, He and Wenchi Kao (1992) extended this study to examine if the same could be observed for repurchase announcements. Although they did find a positive price effect for repurchase announcements, consistent with previous studies, the results seemed to be more in line with the signalling hypothesis as opposed to the free cash flow theory. The authors noted that although repurchases are similar in nature to dividends with regards to cash flow, the announcement effects were seen to be different. In contrast to the study of Lang and Litzenburger (1989), they found no difference in market reaction across firms that were considered overinvesting firms and those that were considered value-maximising. They found that the free cash flow theory has insufficient power to explain excess returns for repurchase announcements, concluding that agency cost reduction does not appear to be an important motive with regards to share repurchases.

Grullon and Michaely (2004) hypothesize that, as a firm's investment opportunities become more infrequent and less profitable, the need for financial resources should decline in line with the decrease in investment prospects. It can be understood that this is more likely to occur in a firm that is more mature, in terms of its life cycle, than a firm that is rapidly growing. The likelihood of a firm overinvesting is greater in this instance. Therefore, one would expect the market reaction to a share repurchase to be greater for a firm that is more likely to overinvest. This assertion of decreasing investment opportunities by Grullon and Michaely (2004) is supported by their finding that repurchasing firms significantly reduce their cash reserves over the three years subsequent to the repurchase announcement. This result supports the notion that firms repurchase shares to reduce excess cash. Furthermore, they document a decrease in systematic risk following a repurchase, lowering the cost of capital which provides further support to the argument of declining investment opportunities. The evidence from the paper provides support for the free cash flow theory.

In a U.K. context, Wang, Strong, Tung and Lin (2009) provide support for the free cash flow hypothesis. This study, which examined U.K. firms from 1997 to 2003, found that the free cash flow theory is especially supported when firms suffer from overinvestment problems, measured by a low Tobin's q value. The findings of the paper do not support the information signalling hypothesis because larger repurchases, as evidenced in the paper, do not convey more favourable information to the market as suggested by a number of previous papers. Interestingly, firms with a high Tobin's q-value are punished by the market when they make consecutive repurchases, and this effect increased with the size of the repurchase. This reaction

is seemingly based on the assumption that management is passing up potentially proftable investments.

In an emerging market context, Lo, Kehluh and Yeh (2008) examined the relationship between agency problems and share repurchases. They found that agency problems are significantly related to the pre-announcement undervaluation of repurchases and that firms with higher agency costs have a more positive market reaction to the announcement. The authors conclude that agency problems influence the repurchase decision and the market reaction to the announcement.

2.4.4 Taxation Theory

The premise behind including taxation as a motivating factor for repurchases is the differential treatment of dividends and repurchases with respect to taxation of earnings. Generally speaking, dividends are taxed as income whereas share repurchase 'income', or price appreciation, is taxed through capital gains. This distinction is important, not only from the view of differential rates, but also from the differential taxation mechanisms.

In the case of a repurchase program, assuming shareholders have the choice to voluntarily tender their shares, tendering shareholders will sell their shares back to the company either at a premium in the event of a tender-offer repurchase, or at the prevailing market price as in the case of an open-market repurchase program. For non-tendering shareholders, the price of their shares will be higher than if the cash was paid out as a dividend. The higher price results in accrued capital gain. This will attract capital gains tax (CGT), which can be deferred until the disposal of the shares (Bagwell & Shoven, 1989) .

The tax benefit of share repurchases, relative to dividends, is likely to vary depending on the tax regimes in different countries. Some countries follow imputation systems, which consider tax credits, whilst others follow the classical tax system. This may affect the pay-out preference of investors, as well as the differential tax rates on capital gains and dividend income, from a tax perspective (Hillier, Grinblatt, & Titman, 2012).

Elton and Gruber (1968) examined the effect of paying out cash through dividends and share repurchases on the value of the firm. They argue that, although there is a tax advantage of using repurchases, the advantage only exists for certain shareholders. In addition, they argue that the

tax advantage of share repurchases may be offset by transaction costs in certain firms. The paper further discusses the nature of the shareholders of the firm. As the level of heterogeneity of the shareholders increases, the transaction costs of repurchases decreases, whereas the transaction costs of dividends increases. However, given that the nature of these shareholders are heterogeneous, there will naturally be a dichotomy of preference concerning the preferred method of pay-out (clientele effect).

The effect of institutional ownership on pay-out policy, with respect to personal taxes, was examined by Lie and Lie (1999). If institutional investors are more powerful than ordinary investors and, if the presence of more powerful investors makes management have a higher consideration for the tax implications of their pay-out choices, then the higher the presence of institutional investors, the more sensitive management would be to their tax needs. The results of the paper confirm this theory and provide support for the idea that institutional investors directly affect managerial decisions. This finding is in line with the survey evidence put forward by Brav et al. (2005), confirming the importance of institutional investors. The most noticeable finding of this paper is the support for the idea of shareholder tax implications having an influence on the pay-out decisions of the firm.

In a more recent account, Moser (2007) investigated whether the dividend tax penalty influences the firm's choice between share repurchases and dividends. The dividend tax penalty is defined, by the author, as the difference between individual shareholder tax rates on dividend income and long-term capital gains. Moser found that, as the dividend tax penalty increases, firms are more likely to distribute cash in the form of a repurchase. Furthermore, the paper examines the impact of institutional shareholders on the pay-out decisions of firms with respect to the dividend tax penalty. The findings suggest that the tax preference of large institutional shareholders will influence the pay-out decision of the firm. In addition, the paper finds the repurchase decision to be a function of the dividend tax penalty and the level of insider ownership. The paper concludes that shareholder taxes have a substantial influence on the corporate pay-out decision.

Contrary to numerous studies on the clientele effect, Jain (2007) finds evidence that questions the pay-out preference of institutional, and individual, investors. Institutional investors are seen to prefer firms who partake in large repurchases, relative to individual investors. Furthermore, lower-taxed institutional investors are seen to prefer low dividend yield stocks, whereas higher-taxed individual investors are seen to prefer high dividend yield stock. Controversially,

institutional investors are seen to prefer non-paying firms, opposed to individual investors who prefer dividend paying firms. The results of this paper are worth mentioning, as they appear to be in stark contrast to numerous other studies on the topic.

Hsieh and Wang (2008) examined whether the tax preference of firm insiders affects the corporate pay-out policy of the firm. The authors note that the advantage of examining insiders is that they are affected by the pay-out decision but, at the same time, have an influence on the decision itself. The paper examines 17,078 firms and finds evidence to support the belief that corporate pay-out decisions are strongly associated with the tax preferences of insiders such as directors and executives. Therefore, the level of insider ownership is, in fact, an important determinant of pay-out policy. This, according to the paper, is more pronounced when dividends are taxed more severely.

In a U.K. context, Rau and Vermaelen (2002) examined the interactions between taxes, regulations and share repurchases. The paper suggests that the U.K. tax and regulatory environment is far less favourable than the U.S and, as a result, there is far less repurchase activity in the U.K. The unpopularity of share repurchases in the U.K. is further evidenced by the less positive abnormal returns around the repurchase announcement. The main finding of the paper, with respect to tax implications, is that the tax system is an important determinant of pay-out policy and is consistent with the idea that large shareholders, such as pension funds, determine the pay-out policy of the firm, given the relative tax advantage of either share repurchases or dividends.

2.4.4.1 Capital Gains Tax in South Africa

Capital Gains Tax (CGT) was introduced in 2001 in South Africa as a mechanism to ensure that wealthier individuals are taxed at a higher rate and to ensure that taxpayers in equal economic situations have a similar tax obligation (Maroun, Turner, & Coldwell, 2014). Both natural and legal persons are required to pay CGT in respect of capital assets held both in SA and abroad. Capital assets can take the form of property of any kind, including tangible and intangible assets but excluding trading stock and certain assets, which qualify for income tax deductions. The capital gain portion, which attracts CGT, is the difference between the total base cost of the asset, and the proceeds upon disposal of the asset. Total base cost includes acquisition costs, incidental costs, costs of maintaining rights to the asset, enhancement costs

and value added tax (VAT) not claimed or refunded. Taxation on the capital gain is only triggered, or realised, when the asset has been disposed of. The rule of thumb in terms of recognising a disposal, although with exceptions, is when the ownership of the asset changes. Tax payable is settled with the South African Revenue Service (SARS) on an annual basis, and is included in one's normal income tax return. Although most of the exemptions for CGT are beyond the scope of this paper, institutions that are fully expect from normal taxation are also exempt from CGT. One of the mentioned relative taxation benefits of share repurchases, is that CGT can be deferred and rolled over. In addition, in certain instances the taxpayer may be granted relief in the event of deferral. Furthermore, legal persons are exempt from paying 75% of their net capital gain, where companies are exempt from 50% (South African Revenue Service, 2000).

It is pertinent to note that South Africa increased its Capital Gains Tax (CGT) inclusion rate from 25% to 33% for individuals, and 50% to 66.6% for companies, on 1 March 2012, which is said to enhance the integrity, equity and progressive nature of the South African tax system (Paulsen, 2012).

2.4.5 Takeover Deterrence

When firms have excess cash flow to distribute, takeover threats may shape the pay-out decision, as share repurchases are considered to be a form of takeover deterrence (Bagwell & Shoven, 1989). In the event of a takeover bid, the bidding firm will make an offer to the shareholders of the target firm to acquire control of the target firm. If the takeover attempt is successful, the bidding firm is likely to be in a position to control, or potentially elect, the management of the firm to best serve their interests (Shleifer & Vishny, 1997). Therefore, the current management of the firm may choose to repurchase shares to deter the threat of a takeover, effectively making the firm a less attractive prospect, as well as being more difficult to takeover.

Bagwell (1991) documents the use of share repurchases as a means of takeover deterrence. Shareholders who tender their shares are likely to have the lowest valuations on their stock. After their shares have been repurchased, the distribution of ownership is more likely to be skewed, and concentrated, towards shareholders with higher valuations. Therefore, bidding firms would need to attain shares at a higher price and from a more highly concentrated group

of investors. As such, the takeover cost to an acquirer would be higher after a repurchase, relative to the target firm paying out dividends or choosing to reinvest the surplus cash. Furthermore, the results of the paper suggest that the level of deterrence is greater when shareholder heterogeneity is large and the private benefit from the takeover is small.

This repurchase motive was further documented by Denis (1990) which investigated the use of defensive changes in corporate pay-out policy in order to deter hostile takeover contests. The findings of the paper indicate that markets generally react negatively to the announcement of a defensive share repurchase, as this tends to indicate that managers are using the defensive strategy for personal benefit at the expense of other shareholders. Furthermore, if the takeover was potentially value-additive, one would expect the reaction to be more negative upon announcement. Conversely, Cudd, Duggal and Sarkar (1996) found a positive reaction to repurchase announcements motivated by takeover deterrence, and suggest that this result indicates that the market does not see control motivated repurchases as promoting managerial entrenchment. Interestingly, this study did not use implied repurchase motives using financial statement variables, but rather used a direct questionnaire survey of repurchasing firms to better ascertain their repurchasing motives.

One method of takeover deterrence is to raise debt in the capital markets and distribute the proceeds of the issue to shareholders in the form of a repurchase. The bonding and monitoring induced by debt financing, as mentioned in Jensen and Meckling (1976), is an important consideration when funding a share repurchase through debt. In the event of a potential takeover, managers of the firm will invest enough in the firm to increase its value past a certain threshold, making the takeover attempt too expensive for the bidding firm. This self-incurred monitoring of the debt raising should be beneficial to the firm but will increase the probability of bankruptcy. Therefore, the firm will face a trade-off between the benefits of potentially avoiding the takeover and the increased probability of bankruptcy, and its related costs to the firm (Sinha, 1991).

Billett and Xue (2007) took a somewhat different approach to looking at the theory of takeover deterrence, with seemingly more focus on the 'deterrence' effect of share repurchases than other similar studies. The authors express their belief that the ex-ante, as opposed to the ex-post, takeover probability will better capture the takeover deterrent effect. Instead of the firm actually receiving a takeover bid, the paper focuses more on the probability of the firm becoming a takeover target by examining the characteristics of firms that have historically been

takeover targets. The findings of the paper suggest a significant relationship between repurchase activity and takeover probability.

According to Bagnoli, Gordon and Lipman (1989), managers of the firm, who are privy to private information about the firm, care primarily about job security and maximising shareholder value. This dichotomy represents a trade-off for the manager. With respect to takeovers, as previously mentioned, share repurchases act as a deterrent to bidding firms as they raise the price of the firm's shares. The issue, however, depending on the method of repurchase, is that the firm may end up paying too much to repurchase the shares, to the extent that the repurchase becomes value-destroying for the firm. Since the manager is motivated to keep his job, which manifests in his desire to deter takeovers, he essentially faces the trade-off of keeping his job whilst trying to maximise shareholder value. The paper further argues that repurchases may prevent takeovers which may actually result in additional efficiency for the firm. As a result, too few takeovers actually take place and inefficiences will exist in the market place.

In a South African context, takeover regulations, found in the Regulations to the Companies Act, effectively prohibit any repurchase of shares with the intention to delay or disrupt a takeover offer. A repurchase, in the circumstances mentioned above, would need to be approved by the Takeover Panel. In addition to the above restriction, regulations relating to the amount of issued capital repurchased within a financial year may further restrict the use of share repurchases as a defensive takeover mechanism (IBA Corporate and M&A Law Committee, 2014).

2.4.6 Target Leverage Hypothesis

In the seminal work of Modigliani and Miller (1958), the concept of capital structure irrelevancy was introduced. Under the assumptions of no arbitrage opportunities, no taxes and no transaction costs, the value of a firm is unaffected by how it is financed. However, if the assumption of no corporate taxes is ignored, but still assuming no personal taxes, the firm will include enough debt in its capital structure to fully eliminate its tax obligations. This is due to the tax deductibility of debt interest payments, known more commonly as the debt-tax shield. However, when firms increase their debt holdings, ceteris paribus, it will increase the costs of

financial distress. Therefore, firms will aim to find an optimal leverage ratio where the marginal cost of financial distress is equal to the marginal benefit of the tax savings from including debt. Furthermore, the firm also needs to consider the personal tax implications of their leverage ratio, which is a function of the corporate tax rate and the personal tax rates on debt and equity income (Hillier, Grinblatt, & Titman, 2012).

Hovakimian, Opler and Titman (2001) examined the hypothesis that firms will attempt to move towards a target debt ratio when issuing, retiring or repurchasing capital. This paper is premised on the idea that firms consist of growth opportunities and assets in place, and the interaction between the two will determine the firm's financial mix. In addition, firms will use debt to finance assets in place, and use equity to finance growth opportunities. The results of the paper suggest that the earnings-performance of the firm will cause the firm to deviate away from its optimal capital structure, and therefore require a corporate financing decision to bring the firm back towards equilibrium. The findings also suggest that capital structure is a much more important factor when repurchasing shares compared to the issuance of equity, and the size of the divergance away from the optimal capital structure will determine the size of the repurchase. This makes intuitive sense as firms will want to stay at the optimal point where the marginal cost of financial distress is equal to the marginal benefit of debt tax savings. Therefore, if the firm is underleveraged as a result of past profits, it will repurchase shares to increase its leverage towards its optimal point.

This idea was further examined by Hovakimian (2004), which investigated the role of a target leverage ratio with repect to capital raisings and repurchases, and whether or not firms use these mechanisms to adjust their capital structure towards the target. Noticibly, the findings of the paper suggest that only debt reductions have a significant effect in offsetting this cumulative divergence away from the optimal leverage ratio. The issuance of debt is actually seen to increase this deviation. Contrary to the target leverage hypothesis being suggested as a motivating factor for share repurchases, the evidence from the paper suggests that this is not the case as repurchases fail to significantly offset the cumulative deviation. Although this is the case, it does provide some support for the market timing hypothesis as firms will be able to use equity repurchases to time the market without having a permanent effect on the firm's capital structure.

2.5 MARKET REACTION TO SHARE REPURCHASE ANNOUNCEMENTS

It is apparent that there are two noticeable, and consistent, characteristics of the market's reaction to repurchase announcements. First, the market reacts positively to repurchase announcements, evidenced by positive abnormal returns at the time of the announcement (Vermaelen, 1981). Second, the positive abnormal reaction appears to persist over the long-run as the market is seen to underreact to the information contained within the repurchase announcement (Ikenberry, Lakonishok, & Vermaelen, 1995).

2.5.1 Short-Term Positive Abnormal Reaction to the Repurchase Announcement

The positive reaction by the market may be the result of a number of factors. The leading explanation for the positive reaction is the information signalling, or undervaluation, hypothesis, as documented earlier in this chapter. Low B/M firms, or glamour stocks, are likely to repurchase shares for reasons other than undervaluation, whereas high B/M firms, or value stocks, are likely to have undervaluation as the primary motive for a repurchase. As such, a repurchase from a high B/M firm should signal undervaluation to the market, manifesting in a relatively larger positive reaction to the repurchase announcement (Ikenberry, Lakonishok, & Vermaelen, 1995).

Akyol & Foo (2013) examined the effect of different repurchase motives on the reaction of the market in Australia, with particular focus on the undervalution hypothesis. This paper seems to have a significant advantage over other international studies, as firms in Australia are required to publish the motive behind their repurchase. The findings of the paper suggest that the market reacts most postively to the repurchase announcement when the motivation is undervaluation.

Another leading reason for the positive market reaction is the market timing theory. The findings of Akyol and Foo (2013) suggest that firms repurchase shares after a period of poor performance, shown by a negative Cumulative Average Abnormal Return (CAAR) in the period leading up the announcement, supporting the theory that managers attempt to time the market when using repurchases. This is consistent with the findings of Stephens and Weisbach (1998).

Another leading explanation for the positive reaction is the free cash flow hypothesis, documented earlier in this chapter, which states that the market reacts positively to repurchases as it will reduce the level of cash available for misappropriation by management (Wang, Strong, Tung, & Lin, 2009). The reaction to the announcement may also be positive because of the market's tax preference for repurchases, and the nature of the reaction is likely to be affected by the relative tax advantage of repurchases over dividends (Grinstein & Michaely, 2005).

2.5.1.1 Corporate Governance, Ownership Concentration and the Reaction of the Market

In addition to the above-mentioned reasons for the observed positive reaction to the announcement, ownership concentration is examined as a potential cause of this reaction. The principal-agent relationship can be defined as a contractual relationship between one or more persons (the agent) and another (principal), where the agent performs certain tasks and duties on behalf of the principal. Both the principal and agent will attempt to maximize their own utility but it is often unlikely that their incentives will be aligned. This misalignment is the cause of agency problems, which is likely to result in the firm incurring costs to manage the divergence of incentives to maximize shareholder wealth. Jensen and Meckling (1976), in their seminal work on the theory of the firm, noted that when managerial ownership becomes fractional, the owner tends to expropriate non-pecuniary benefits as a function of the level of fractional ownership. This behaviour will incur monitoring costs and translate into a higher cost of funding for the firm. Therefore, within the framework of Jensen and Meckling (1976), it would appear beneficial to have a highly concentrated ownership structure, where there is better alignment of incentives and less costly monitoring of managers.

Shleifer and Vishny (1997) note that the presence of large shareholders, with more concentrated ownership, results in a strong interest in the profit maximization of the firm, as well as a large enough stake in the firm's assets to have an influence on the decisions of the firm. In addition, large shareholders may have the voting powers to oust a manager that is not acting in the best interests of shareholders. Therefore, the presence of large shareholders is likely to aid in mitigating, at least to a certain extent, issues emanating from the principal-agent problem.

Minority shareholders face two main concerns arising from agency conflicts caused by the separation of ownership and control. First, the costs of obtaining information about the firm's prospects often outweigh the benefits, highlighting the issues around information asymmetry. Second, the proportional ownership of smaller shareholders is often too small to have any influence on the corporate decisions undertaken by the firm (Zeckhauser & Pound, 1990).

Although there are benefits associated with concentrated ownership, one needs to consider issues relating to idiosyncratic risk. Following on from modern portfolio theory, if a shareholder holds a large position in a firm, assuming that they do not have an offsetting position in other assets, they will receive no benefits from diversification and will not be compensated for being exposed to diversifiable, firm-specific risk. Therefore, the benefits associated with diversification need to be weighed against the costs of less concentrated ownership, where monitoring managers will be an additional consideration (Huddart, 1993).

Shleifer and Vishny (1997) further mention the complications arising from having numerous large minority shareholders, citing issues relating to alliances as a cause of concern for managers. Managers will find it far easier to interfere with alliances between small minority shareholders and act in a self-interested manner, putting greater potential responsibility on the legal system of that country to protect the interests of smaller shareholders. As the ownership stake of the majority shareholder goes beyond a given threshold, it is conceivable that the shareholder will not act in the best interests of the smaller shareholders of the firm. Shleifer and Vishny point out that this is likely to be exacerbated by the majority shareholder having control rights largely in excess of cash flow rights. These findings suggest that, although it is important to have a large shareholder, it should not come at the expense of minority shareholders.

Leading on from these issues, Bloch and Hege (2003) examined the effectiveness of a firm with two large shareholders and multiple smaller shareholders, in improving levels of corporate governance. The authors found that the contest for control between the two large shareholders is likely to result in a favourable outcome for the firm. This is based on the premise that, for the competing shareholders to gain control, they would have to convince smaller shareholders to support their vision of the firm's future. This competition, therefore, is likely to limit the private-benefit-extracting behaviour of large shareholders.

The notion of having more than one large shareholder is extended to multiple large shareholders in Attig, El Ghoul and Guedhami (2009) which examined the role of multiple

large shareholders in nine East Asian economies by examining the valuation effects of 1252 publicly traded companies. The findings suggest that the presence of multiple large shareholders is associated with a higher firm valuation. Similar to the assertions of Bloch and Hege (2003), the paper shows that firm value is increased when there is contestability between the two largest shareholders of the firm, indicating the importance of a second, large shareholder.

Ginlinger & L'Her (2002) examined the market reaction to share repurchase announcements in France, with a particular focus on the relationship between ownership structure and the magnitude of the market reaction. First, the paper documents a positive reaction to the announcement which is consistent with previous studies. Second, and most noteworthy, is the finding that the reaction of the market is affected by the ownership structure of the firm. The paper further notes the importance of a second, large controlling shareholder to discipline the behaviour of the controlling shareholder to protect minority shareholders, and stresses that one cannot examine the reaction of the market to the announcement independent of ownership structure considerations. Therefore, in the instance of repurchase announcements, the market reacts more favourably when minority shareholders have better protection.

Having large shareholders is favourable with regards to lowering the costs of financing. The monitoring costs incurred by banks can be greatly reduced by large shareholders who are perceived to be acting in the best interests of the firm, as their ownership stake is large enough for them to align their incentives with that of the firm. As a result, because the lending institution does not have to incur these additional costs, the rate at which they can lend to the borrowing firm will be reduced, lowering the firm's cost of funding (Zeckhauser & Pound, 1990).

Gomes and Novaes (1999) presented three main findings in their examination of multiple large shareholders and corporate governance. First, it may be beneficial if the beliefs amongst the large shareholders are diverse. In this situation, the bargaining and negotiating between these large shareholders may protect the dilution of minority shareholder rights. Second, the bargaining and negotiating between these multiple large shareholders may incur costs. Third, an optimal ownership structure requires the presence of minority shareholders because it reduces the negotiating costs among controlling shareholders.

In a study on the relationship between corporate governance and the credibility of share repurchase announcements, Wu (2012) documents the importance of good quality corporate

governance and the resultant reaction of the market. The likelihood of completion of the repurchase program is seen to be positively related to the level of internal corporate governance. The paper documents an increase in the level of insider shareholding after the repurchase, which shows that well-governed firms aim to signal undervaluation to the market. Most notably, the paper documents that there is a positive relationship between the level of corporate governance and the abnormal returns around the repurchase announcement. This suggests that good corporate governance will lend to the credibility of the announcement, manifesting in the more positive reaction by the market.

Zakaria, Zukafli and Muhammad (2013) hypothesized a positive relationship between share repurchases and concentrated ownership. The authors argue that, with strong shareholder rights, managers are more likely to pay out excess cash, with reduced likelihood of misappropriating funds. To measure ownership concentration, the paper used the Herfindahl Index and the Concentration Ratio. The results, however, did not prove to be significant in a Malaysian context. Although this is the case, it may be worthwhile to examine if a relationship exists in a South African context.

In light of the above-mentioned literature on the level of ownership concentration, and its effects on corporate governance, it is hypothesized in this paper that there is a positive relationship between corporate governance and the reaction of the market to a repurchase announcement. The rationale behind this hypothesis is that managers are more likely to act in a way which is value-maximising when their ownership stake is less fractional. The decision to repurchase, therefore, will be more well-intentioned, which is likely to be associated with a more positive reaction by the market to the announcement.

2.5.2 Long-Term Market Underreaction

Ikenberry, Lakonishok and Vermaelen (1995) introduce the notion of the underreaction hypothesis, which states that the market will view the repurchase announcement with a degree of caution, causing the increase in price to only be realised over a longer period of time. This underreaction may stem from either the market ignoring a large portion of the signal, or the managers of the firm being too optimistic about the firm's value. This manifests in the results of the paper, which document a substantial long-term abnormal return for repurchasing firms.

This appears to be consistent with the assertion of Stewart (1976) that signalling can only become credible in the long-run.

In a South Africa context, Bhana (2007) examined the reaction of the market to repurchase announcements. The paper examined open-market repurchases on the JSE from October 2000 to March 2003 and covered a sample size of 117 share repurchases. The reaction of the market in SA is consistent with reactions documented in major international studies. A positive abnormal return of 4.38% was observed at the time of the announcement, consistent with international studies. When examining the long-term effects, Bhana found that the market tends to underreact initially, as repurchasing firms experienced a substantial three-year holding period average abnormal return of 14.35%. These findings support the signalling hypothesis that managers use share repurchases to signal to the market that their shares are currently undervalued. However, although the market reacts positively to the announcement, there seems to be a fair deal of scepticism as the reaction is incomplete around the announcement date.

Liu and Ziebart (1997) examined the relationship between the market reaction around the repurchase announcement and the price behaviour in subsequent periods. The paper segments initial reactions as being either good news or bad news, depending on the direction of the initial price movement. A general upward trend is observed in the period following the repurchase. However, when the initial reaction is relatively large, there appears to be a negative correlation with subsequent periods. This provides evidence to support the notion of a market overreaction, which appears to be inconsistent with other, prominent studies.

Peyer & Vermaelen (2009) revisted a number of anomolous findings from early studies on repurchases to examine whether these anomalies had persisted. If a certain anomaly existed and was well documented, as in the case of share repurchases, one would expect that trading rules based on these anomalies would trade them away. Contrary to this belief, this paper found that these anomalies still persist with a more recent data set. In particular, the well-documented long-run excess returns seen after a repurchase are still signficant and large. The paper puts forward three alternative theories to explain the favourable market movement after a share repurchase. The first of these alternatives is the risk-change hypothesis, which states that these anomalies are consistent with a change in the risk of the firm, as repurchases signal a decline in the firm's growth prospects, lowering the risk of the firm. In addition, the liquidity hypothesis states that share repurchases lower the liquidity of the repurchasing firm. Given that liquidity is said to be a priced risk of the firm, this would explain the observed excess

market returns. Lastly, the paper puts forward the overreaction hypothesis which states that the upward market movement is more to do with the correction of the overreaction of the market to previous unfavourable information about the firm. The paper's findings provide support for the overreaction hypothesis, as the firm's which exhibit the greatest positive abnormal returns after the repurchase had a noticably poor performance over the previous six months. Another interesting finding by the paper looked at the involvement of analysts. According to the authors, the firm may choose to repurchase shares to counteract the ratings downgrade by analysts. Since analysts are unlikely to change their recommendations in the immediate short-term, it may take time for the market to adjust to the repurchase announcement. This gradual readjustment by the market manifests in the observed longer-term abnormal returns.

2.6 CONCLUSION

This chapter introduced key literature on the topic of pay-out policy and share repurchases. The chapter reviewed a number of motives behind the repurchase decision. In addition, in line with these motives, the documented studies provided key insights into the behaviour of the market resulting from the repurchase announcement. This chapter, therefore, provides the foundation for developing the hypotheses for testing the market reaction to repurchase announcements in South Africa.

CHAPTER 3

METHODOLOGY, RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

This chapter documents the research designs and methodology used in the research paper. First, the process of sampling and data collection is discussed. Second, the chapter introduces the concept of event study methodology in examining the reaction of the market to new information. Third, the hypotheses examined in the study are introduced, followed by the formulas and calculations used to test these hypotheses. Last, the chapter concludes with a brief summation of the topics introduced in the chapter.

3.2 SAMPLING AND DATA COLLECTION

The INet BFA database was used to extract repurchase information, as well as price data and corporate action information. The study only examines general repurchase announcements, and excludes specific repurchases, as their differing nature may lead to spurious results. The reason for this exclusion is seen in Figure 1 below, which illustrates the differing behaviour of returns for both general, and specific, repurchases around the announcement date, day 0.

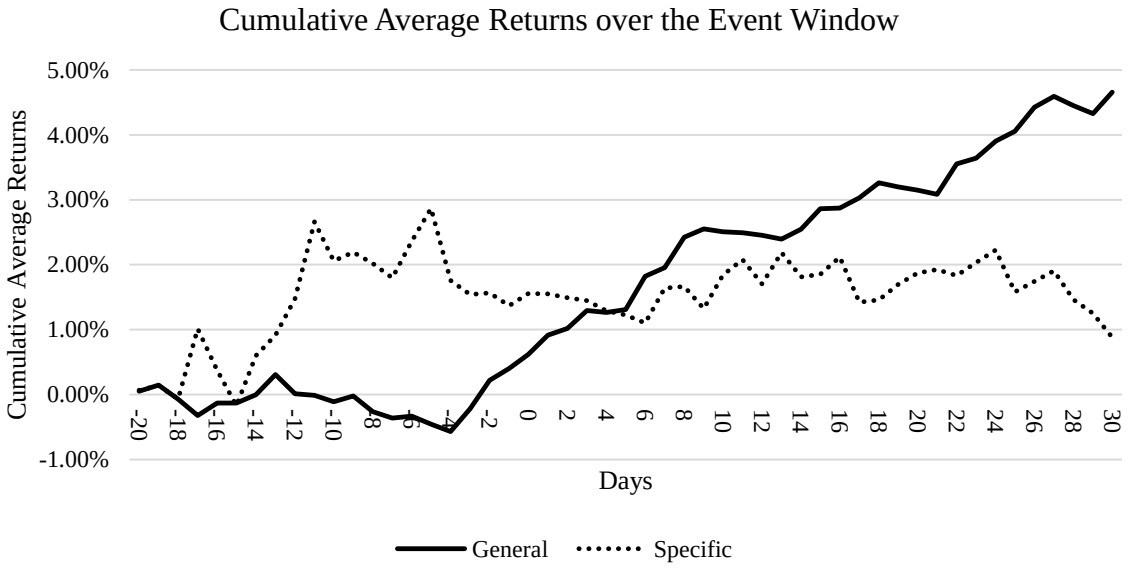


Figure 1: Cumulative Average Returns over the event window

The study covers the period from January 2004 to December 2014. This period was chosen for two reasons. First, to provide a more recent of the market reaction to repurchase announcements to test the validity of the findings of Bhana (2007). Second, repurchase data from before 2004 was unavailable on INet BFA and, to maintain consistency, only repurchase data from this source was used. Data points were excluded if the company had announced another repurchase, or had made another corporate action announcement, likely to materially affect the returns on the market, within the event window. Thereafter, returns within the event window were adjusted for subdivisions, consolidations and dividends which became effective during the event window to provide a more accurate representation of daily returns.

For a repurchase observation to be included in the sample, the following information had to be available at the time of the announcement:

- Price data for 520 days before the announcement. This allowed for 500 days within the estimation window to accurately calculate expected returns. This is further needed to calculate the actual return for the security over the six-month period before the announcement. This is used as a proxy for undervaluation and market timing, and one would expect firms with a relatively worse performance over the previous six months to have a more positive reaction to the announcement, consistent with the findings of Stephens & Weisbach (1998).
- The number of shares outstanding before the repurchase announcement and the number of shares to be repurchased. This is needed to calculate the proportion of outstanding shares repurchased as a proxy for undervaluation (signalling), following the assertions of McNally (1999).
- The percentage shareholding of the five largest shareholders at the end of the month before the repurchase. These figures are used to calculate ownership concentration, using the Concentration Ratio and the Herfindahl Index, and the level of corporate governance and investor protection, using the ratio of the second largest shareholding to the largest shareholding as a proxy variable.
- The book-to-market (B/M) ratio at the end of the month before the repurchase. This is used as a proxy for undervaluation (signalling). Firms with high B/M ratios are more likely to have undervaluation as the motive for a repurchase, resulting in a more positive reaction to the announcement for high B/M firms (Ikenberry, Lakonishok, & Vermaelen, 1995).

- The Tobin's Q value at the end of the previous financial year. This is used as a proxy for overinvestment, for a low Q-value less than one, and underinvestment, for a relatively high Q-value greater than one. This ratio is used to test the validity of the free cash flow theory. It is expected that low Q-value announcements will exhibit a more positive reaction to the announcement, as the repurchase will be seen as value-enhancing for shareholders due to a reduction in agency costs (Wang, Strong, Tung, & Lin, 2009).

The takeover deterrence hypothesis is not tested in this study because of the legal framework which exists in South Africa, which makes defensive repurchases difficult to undertake. These repurchases would need to be approved by the Takeover panel and, given the restrictions on the number of shares that can be repurchased in a given year, investigating this relationship seems unfounded (IBA Corporate and M&A Law Committee, 2014).

The optimal leverage hypothesis is also not tested in this study. If one examines the numerous theories of optimal capital structure as seen in Myers (1993), it would be extremely difficult to determine the optimal capital structure of the firms examined in this study. As such, one would not be able to determine if the repurchase is moving firms closer to, or further from, the optimal point.

After the above-mentioned data exclusions, a final sample of 146 general share repurchases were examined in the study.

3.3 EVENT STUDY METHODOLOGY

Event study methodology measures the impact of an event on the value of a firm. Additionally, it allows one to examine if abnormal returns exist as a result of a certain event (Peterson, 1989). According to Binder (1998), since the introduction of event study methodology by Fama, Fisher, Jensen and Roll (1969), this methodology has become the norm in examining the reaction of the market to an announcement. The paper further adds that there are two main uses of event study methodology. First, to test the assimilation, by the market, to new information as a result of an event or announcement. Second, assuming the assertions of market efficiency, to examine the impact of a given event on the wealth of shareholders. Nageswara Rao and Sreejith (2014) mention that studies concerned with market efficiency examine the speed and accuracy of the market reaction to new information. They further mention the use of this

methodology in studies concerned with information impact, examining the response of the market to a given event. Last, it is mentioned that some event studies segregate events into different sub-samples depending on a given characteristic, afterwhich, the reaction of the market, based on these sub-samples, is examined to better understand the nature of the reaction.

The logic behind event study methodology is fairly intuitive. One examines a period before the event, known as the estimation window, to better understand the behaviour of the market under assumed normal market conditions. Then, using an estimation model, one forecasts what would happen, under normal market conditions, over the event window. The pre-specified time period around the announcement, generally before and after, is known as the event window as seen in the diagram below. In the event window, one examines how the market behaves relative to what was expected based on the observations in the estimation window. This is illustrated graphically below:

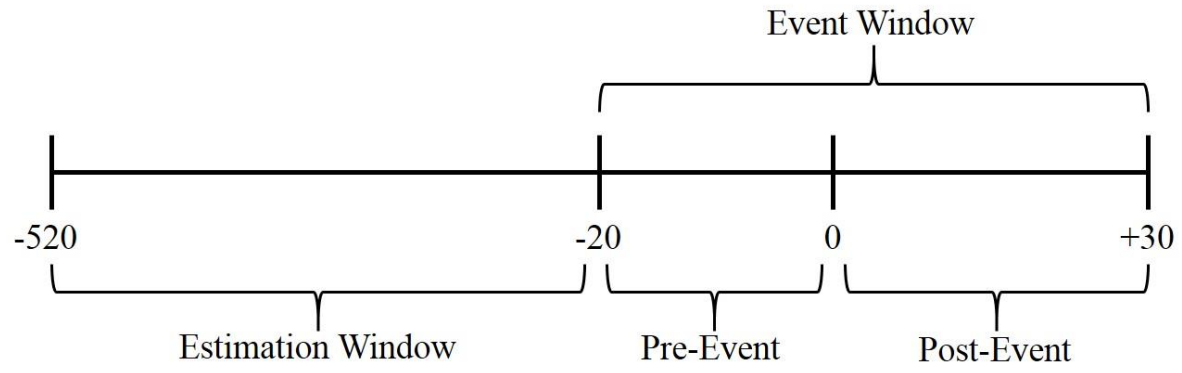


Figure 2: Event Study Methodology depicting the time frame examined in this study

Estimating the expected returns can be done in a number of ways. For the purposes of this research paper, the three methods examined in Brown and Warner (1980) are used. First, the mean-adjusted returns method is used, consistent with the CAPM under the assumption of constant systematic risk, and assumes a constant expected return. Second, the market-adjusted returns model is used, consistent with the CAPM, assuming that all securities have a beta equal to one. It further assumes that returns are constant across securities, but are not necessarily constant for a single stock over time. Last, the market and risk adjusted returns model is used. It is essentially a form of the CAPM and is considered to be a relatively more sophisticated model for calculating expected returns. When testing these methodologies, Brown and Warner found that the mean-adjusted returns method did not perform less poorly than the relatively

more sophisticated models in detecting abnormal performance. Similarly, Dyckman, Philbrick and Stephan (1984) found that the ability of the three methods to detect abnormal performance is fairly similar.

As a follow up to this study, Brown and Warner (1985) investigated if, and how, the statistical characteristics of daily stock returns affect the use of event study methodology. Interestingly, the findings of the paper suggest that the observed non-normality of returns does not significantly affect the use of event study methodology. With respect to excess returns, the mean excess return of securities converges to normality as the number of securities is increased within the sample. Other issues relating to autocorrelation and cross-sectional dependence, according to the paper, are only required to be corrected in special instances and will otherwise have minimal impact on the usefulness of event study methodology.

Boehmer, Musumeci, & Poulsen (1991) examined the effect of event-induced variance on the application of event-study methodology. The findings of the paper suggest that certain events will increase the variance of returns within the event window and, as such, lead to the more frequent rejection of the null hypothesis of zero abnormal return. To circumvent this issue, it is suggested that one use a non-parametric sign test to compliment the findings of the parametric testing. In light of the above, this research applies the Wilcoxon Signed-Rank test to compliment the parametric t-test.

3.4 HYPOTHESIS TESTING

For the purpose of testing, repurchase data is first presented as a full sample and is then sorted into quartiles according to a number of firm, and repurchase, characteristics. The quartiles are sorted from high to low, with high being the quartile of the highest values for a given characteristic, and low being the quartile with the lowest values. These characteristics are specified in more detail in the results section. The full sample, and quartiles, are tested using the following hypotheses.

Testing the Significance of Individual Days in the Event Window:

H_0: $AAR_t = 0$ The Average Abnormal Return (AAR) for a given day in the event window is not significantly different from zero

H_1: $AAR_t \neq 0$ The Average Abnormal Return (AAR) for a given day is significantly different from zero.

This test is used to examine if the AAR for a given day within the event window is significantly different from zero. This is done to identify the days where the market reacts most strongly to the announcement, which may provide valuable information about the reaction of the market as a whole. This is not used in sub-sample analysis because of inadequate data points.

Test of Significance for Event Windows:

H_0: $CAAR_{t, t+n} = 0$ The Cumulative Average Abnormal Return (CAAR) for the full sample, or a given quartile sorted according to a given characteristic, over the relevant sub-window, is not significantly different from zero.

H_1: $CAAR_{t, t+n} \neq 0$ The Cumulative Average Abnormal Return (CAAR) for the full sample, or a given quartile sorted according to a given characteristic, over the relevant sub-window, is significantly different from zero.

This test is used to examine whether the CAAR for a given sub-window, for a given repurchase characteristic, is significantly different from zero. This will illustrate a potential relationship, if any, between a given characteristic and the reaction of the market. In so doing, this will provide valuable inferences about the reaction of the market to the repurchase announcement.

Test of Significance for Event Windows:

H_0: $CAAR_{HC(LC)} \not> CAAR_{LC(HC)}$

The Cumulative Average Abnormal Return (CAAR) for a given high (low) quartile of announcements sorted according to a given characteristic, over the relevant sub-window, is not significantly greater than the CAAR for a given low (high) quartile.

H_1: $CAAR_{HC(LC)} > CAAR_{LC(HC)}$

The Cumulative Average Abnormal Return (CAAR) for a given high (low) quartile of announcements sorted according to a given characteristic, over the relevant sub-window, is significantly greater than the CAAR for a given low (high) quartile.

Examining the CAARs, and the significance thereof, of the various quartiles will provide insight into a potential relationship between a given characteristic and the reaction of the market to the announcement. To add further value to this process, the above hypotheses are used to distinguish whether there is a significant difference between the reactions of the two quartiles on the opposite side of the spectrum, being the high, and low, quartile. This testing process is explained further in the results section, and the setting up of the test is guided by prior literature.

3.4.1 Event Windows

The choice of sub-windows used to test the above hypotheses was formed as a result of past literature.

Although fairly consistent across studies, there have been some minor differences in the sub-windows chosen by various studies on the topic of repurchases. Generally speaking, there are three main types of sub-windows from the literature presented in this study. First, the lead up period to the announcement. Second, the short period around the announcement. Third, the fairly extended period after the announcement. Starting with the lead up period to the announcement, there are variations in the choice of sub-window amongst literature, illustrated below.

Research Paper	Lead Up Period Window
Lakinishok and Vermaelen (1990)	-40 to -1
Chhachhi and Davidson (1997)	-20 to -2
Yook and Gangopadhyay (2010)	-20 to -1
Ikenberry, Lakinshok and Vermaelen (1995)	-20 to -3
Akyol and Foo (2013)	-11 to - 1
Bhana (2007)	-20 to -3
Babenko, Tserlukevich, & Vedrashko (2012)	-43 to -4

Table 1: Lead up sub-windows used in previous research papers

In light of the above, the lead-up sub-window used in this study takes a combination of these windows into account forming a -20,-4 sub-window. The literature above further specifies short sub-windows around the announcement date. Without listing the variations of this sub-window, which are few, the general trend is a -2,+2 window, as well as a -1,+1 window which are both included in this study. If the market is considered to be efficient, the full reaction should be contained within these sub-windows as the market would assimilate instantly and accurately to the repurchase information (Fama, 1970). The post-announcement window, similar to the lead-up window, varies somewhat more than the short sub-windows around the announcement. The variations are displayed below.

Research Paper	Post-Announcement Window
Lakinishok and Vermaelen (1990)	+3 to +24
Chhachhi and Davidson (1997)	+2 to +20
Yook and Gangopadhyay (2010)	+3 to +30
Ikenberry, Lakinshok and Vermaelen (1995)	+3 to +10
Akyol and Foo (2013)	+2 to +11
Bhana (2007)	+3 to +20

Table 2: Post-announcement sub-windows used in previous research papers

If the market does underreact initially to the announcement, then one would expect the abnormal return over this window to be significant.

To add further thoroughness to the study, further windows are added for the sake of observation. Given the observed upward trend prior to the announcement (see Figure 4 on Page

54), a -3, +30 window was added to test the upward trend from the moment information appears to reach the market at day -3 until the end of the event window. To test for insider trading, the -5,-1 window was added. Lastly, the +1, +5 window was added to observe the behaviour of the market for the short period after the announcement.

3.5 FORMULAS AND CALCULATIONS

Market and company returns are calculated using geometric returns from daily security prices, as seen below. The returns are adjusted for dividends, such that returns within the event window are correctly stated.

$$R_i = \ln\left({P_t + div}/{P_{t-1}}\right) \quad (1)$$

P_t is the current price, P_{t-1} is the previous day's price, *div* is the dividend and R_i is the actual daily return.

Beta (B_i) is calculated using 500 days data prior to the start of the event window. This is calculated by taking the covariance ($Cov_{i,m}$) between stock returns and market returns and dividing it by the variance of the market (Var_m) over the 500 day period. The 500 day period is used to accurately document and estimate the relationship between the security, and market, returns.

$$\beta_i = \frac{Cov_{i,m}}{Var_m} \quad (2)$$

The beta of the stock is then used in the CAPM model to calculate expected returns ($E(R_i)$). The risk-free rate (R_f) is calculated as the daily effective yield on a composite measure for 1-3 year short term bonds. The return on the market is the geometric daily return (R_m) on the J203 All Share Index.

$$E(R_i) = R_f + \beta\left(R_m - R_f\right) \quad (3)$$

Mean-adjusted expected returns $E(R_i)$ are calculated as the average of the stock's returns over the estimation window ($\bar{R}_\iota$).

$$E(R_i) = \bar{R}_\iota \quad (4)$$

Market-adjusted expected returns are calculated as the average of the market's returns over the estimation window ($\bar{R}_m$).

$$E(R_i) = \bar{R}_m \tag{5}$$

Abnormal Returns (*AR*) are calculated by subtracting the expected return ($E(R_i)$) from the observed return (R_i).

$$AR = R_i - E(R_i) \tag{6}$$

To calculate Cumulative Abnormal Returns (CAR_t), one sums the abnormal returns over a given period.

$$CAR_t = \sum_{j=1}^{N} AR_{jt} \tag{7}$$

Average Abnormal Returns for a given day during the event window (AAR_t) are calculated by summing the abnormal returns (*AR*) for a given day, across firms, and dividing it by the number of observations (N).

$$AAR_t = \sum_{j=1}^{N} AR_{jt} \Big/ N \tag{8}$$

To calculate the Cumulative Average Abnormal Return ($CAAR_t$) for a given period, one sums the AARs for all days over a given test window.

$$CAAR_t = \sum_{j=1}^{N} AAR_{jt} \tag{9}$$

3.5.1 Parametric Testing

To test the significance of the abnormal returns over a given test window, one applies the cross-sectional statistical test statistic seen in equation (11) below, where the numerator is calculated in equation (10).

$$\hat{\sigma}_{CAAR_{(T_1,T_2)}} = \sqrt{\frac{1}{N(N-d)}\sum_{i=1}^{N}(CAR_i(T_1,T_2) - CAAR(T_1,T_2))^2} \tag{10}$$

N is the number of observations, *d* is the degrees of freedom.

$$T_{Cross} = \frac{CAAR(T_1,T_2)}{\hat{\sigma}_{CAAR(T_1,T_2)}} \tag{11}$$

To compare the CAARs of the high and low quartile using a two-sample t-test, the test statistic is calculated in (12) below,

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \tag{12}$$

Where $\bar{x}_1$ and $\bar{x}_2$ are the CAARs for the respective high and low quartiles. $\bar{x}_1$, in this equation, will be the quartile expected to have a higher CAAR which will be specified for each repurchase variable in the results section. s_1^2 and s_2^2 are the respective variances and $n_1$and n_2 are the respective number of observations in each quartile.

3.5.2 Non-Parametric Testing

Daily stock return distributions have historically been seen to depart from normality, often exhibiting leptokurtosis or 'fat tails' (Brown & Warner, 1985). Therefore, for the sake of robustness, non-parametric tests are used to compliment the parametric tests. The Wilcoxon Signed-Rank test is used, instead of the simpler Rank Test as it accounts for both the size and direction of abnormal returns. These tests are only used as robustness checks, as Brown and Warner (1980) found that the rank test and Wilcoxon Signed-Rank test do not reject the null hypothesis frequently enough.

$$z = \frac{W - 0.5}{\sigma_w} \tag{13}$$

W in Equation (13) is the sum of the signed ranks. As the sample sizes examined in this study are greater than 30, the distribution of *W* can be approximated as being normal and one can use the z-score (*z)*.

The standard deviation (σ_w) of the test statistic (*W*) is calculated below, where *n* is the number of observations.

$$\sigma_w = \sqrt{\frac{n(n+1)(2n+1)}{6}} \tag{14}$$

3.6 CONCLUSION

This chapter introduced a number of key areas with regards to the data and methodology used in the research paper. The use of event study methodology, as a tool to document the reaction of the market to new information, was discussed. The hypotheses tested, and the sub-windows used, were also documented. Furthermore, the formulas and calculations used to test the hypotheses were introduced.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter provides a detailed discussion of the results presented in this study. First, the chapter presents full sample results on the behaviour of the market around the repurchase announcement, testing both AARs and CAARs, using parametric and non-parametric testing methodologies. Second, this process is repeated by segregating data into quartiles to test their effect on the reaction of the market, using various firm, and repurchase, characteristics. Third, the chapter provides a discussion, and summary, of the results presented in the chapter.

4.2 FULL SAMPLE RESULTS

The full sample covered 146 repurchases on the JSE for the period 2004-2014. The graph below illustrates the actual average cumulative returns of the firms in the sample from day -20 to +30.

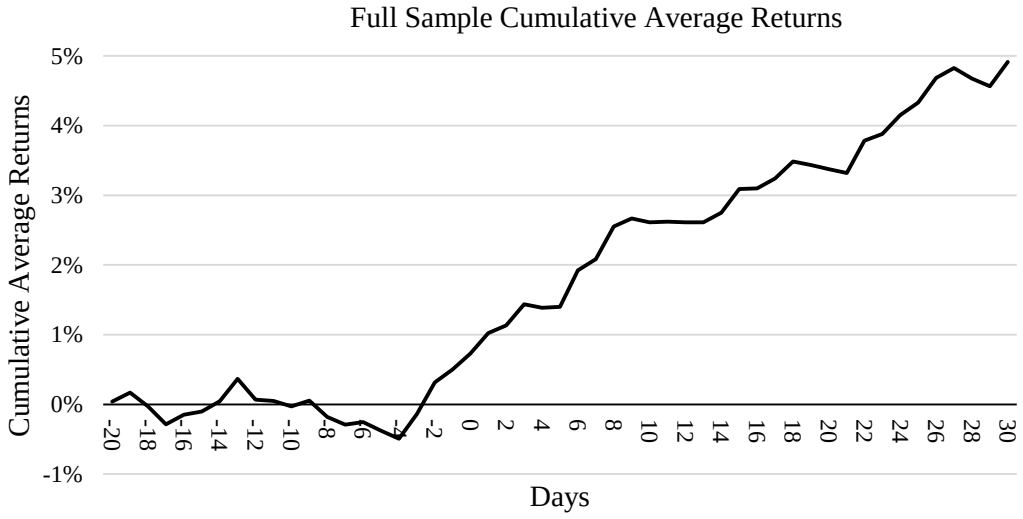


Figure 3: Full Sample Cumulative Average Returns (CARs)

For the period -20 to -4, there does not seem to be a consistent, noticeable, pattern of cumulative returns, with the average fluctuating around the 0% level. From day -3, however, there appears to be a consistent, noticeable, upward trend in cumulative average returns. This is consistent with the belief that markets react positively to repurchase announcements. Interestingly, from

the above graph, it is apparent that a fair deal of information is leaked to the market before the announcement takes place, which may suggest some degree of insider trading on the repurchase information.

In light of the above, examining the cumulative average abnormal returns (CAARs) provides a more accurate account of the behaviour of returns around the announcement, as it caters for expected returns over the event window. The results of the three methods of estimating expected returns, to test for abnormal returns, illustrates a fairly consistent pattern of CAARs during the event window, seen in the graph below.

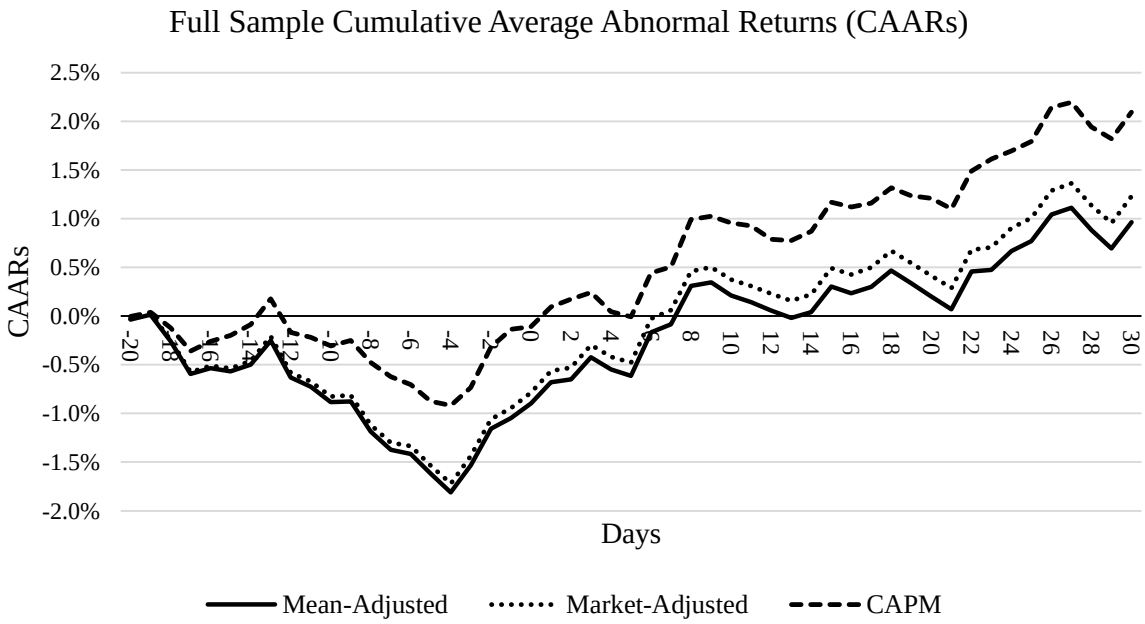


Figure 4: Full Sample Cumulative Average Abnormal Returns (CAARs)

Consistent with Figure 3, the above graph similarly exhibits an upward trend from day -3, for all three methods of estimating expected returns, once again suggesting the likelihood of insider trading on repurchase information. This upward trend in CAARs further supports the notion of the market reacting positively to repurchase announcements, consistent with the vast literature on share repurchases. Furthermore, this continued upward trend supports the assertions of Bhana (2007) that the market tends to underreact to the repurchase announcement initially. A noticeable difference between Figure 3 and the above graph, is the largely negative movement of CAARs in the period leading up to the repurchase announcement. This appears to support the notion of market timing as a motive behind a repurchase announcement. Given that the market reacts positively to the repurchase announcement, waiting for the market to reach its lowest valuation before making the announcement would yield the highest return. Table 3

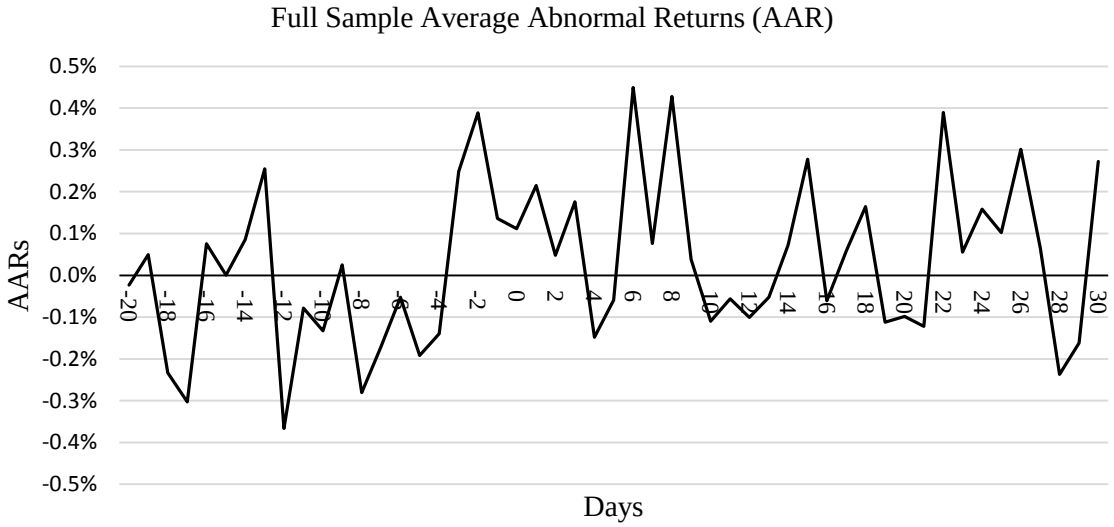
below highlights the days within the event window which exhibit significant average abnormal returns (AARs). The table is truncated, and the full table is available in the Appendix.

T-Test for AARs in the Event Window for the Full Sample

Days	Mean-Adjusted AARs	Mean-Adjusted T-stat	Market-Adjusted AARs	Market-Adjusted T-stat	CAPM AARs	CAPM T-stat
-17	-0.34%**	-2.38	-0.33%**	-2.35	-0.24%*	-1.88
-12	-0.38%**	-2.52	-0.37%**	-2.48	-0.35%*	-2.45
-8	-0.31%**	-2.03	-0.31%**	-2.00	-0.23%**	-1.79
-2	0.37%**	2.11	0.38%**	2.13	0.41%**	2.48
6	0.45%**	2.01	0.45%**	2.03	0.45%**	2.07
8	0.39%	1.65	0.40%*	1.66	0.49%**	2.10
22	0.39%*	1.70	0.39%*	1.73	0.39%*	1.74
30	0.27%*	1.80	0.27%*	1.83	0.27%**	2.08

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 3: Full Sample T-Test for AARs



* The AARs illustrated above represents an average of AARs across the three methodologies of estimating expected returns.

Figure 5: Full Sample Average abnormal returns (AARs)

The results from Table 3, and Figure 5, above illustrate the prevalence of significantly negative AARs in the period leading up to the announcement, which further supports the notion of market timing. This trend, however, reverses from day -2 which shows a significantly positive AAR. This, combined with the CAARs, and AARs, graphs, shows that information about the repurchase appears to leak to the market on day-3, but the market only appears to react significantly on day -2. Interestingly, the market does not react significantly on the announcement day. This observation, as well as the positive trend after the announcement,

highlights two potential issues. First, there may be a lack of market efficiency on the JSE as the market does not assimilate accurately, and immediately, to new information. Second, in line with previous studies, the market may simply be underreacting to the announcement.

In examining the full sample window, seen in the Appendix, it is apparent that, from day -3, there are 7 consecutive days of positive average abnormal returns, further supporting the positive market reaction to the announcement. Furthermore, from day -3 to the end of the event window, 22 of the 34 days exhibit positive AARs, showing that the market is still reacting positively after the announcement. Conversely, in terms of negative AARs, the longest trend is 5 negative consecutive days and, from day -20 to -4, 11 of the 17 AARs are negative, seemingly providing further support for the market timing theory.

The examination of the price behaviour around the announcement is extended further by testing the significance of the CAARs for the various sub-windows within the event window. The results are shown in Table 4 below.

T-Test for the Full Sample

	Mean-Adjusted		Market-Adjusted		CAPM	
Window	**CAARs**	**T-stat**	**CAARs**	**T-stat**	**CAARs**	**T-stat**
-1,+1	0.48%	1.03	0.49%	1.08	0.42%	0.94
-2,+2	0.88%*	1.68	0.91%*	1.75	0.91%*	1.86
-5,-1	0.37%	0.58	0.39%	0.63	0.57%	0.98
+1,+5	0.28%	0.69	0.31%	0.74	0.10%	0.25
+3,+20	0.85%	1.24	0.94%	1.26	1.03%	1.47
-20,-4	-1.81%**	2.54	-1.72%**	2.41	-0.92%	1.33
-3,+30	2.77%***	3.13	2.95%***	3.13	3.01%***	3.45

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 4: T-Test for the Full Sample

There does not appear to be a significant reaction to the announcement in the immediate window around the announcement (-1, +1). However, when the time-frame is extended to the -2, +2 window, the positive CAAR does appear to be significantly positive at the 10% level, illustrating that there is some significant reaction by the market around the announcement. There are no significant CAARs over the -5,-1 sub-window, illustrating that, even though there may be instances of insider trading, it does not appear to be significant. The non-significant positive CAAR for the +3, +20 sub-window suggests that, although the trend is definitely upward after the announcement, it does not appear to be significant. This may raise some concerns about the notion of underreaction, although the window would need to be extended to confirm this assertion. Interestingly, however, when one examines the -3, +30 window, the

CAAR does appear to be highly significant. This suggests that a fair degree of the positive reaction takes place before day 0, and continues after day +20. The significantly negative CAAR over the -20, -4 sub-window provides further support for the market timing argument.

Wilcoxon Signed-Rank Test for the Full Sample

	Mean-Adjusted		Market-Adjusted		CAPM	
Window	**CAARs**	**P-Val**	**CAARs**	**P-Val**	**CAARs**	**P-Val**
-1,+1	0.48%	0.5784	0.49%	0.5216	0.42%	0.6854
-2,+2	0.88%	0.1321	0.91%*	0.0986	0.91%*	0.0823
-5,-1	0.37%	0.3315	0.44%	0.2933	0.76%	0.1071
+1,+5	0.63%	0.1718	0.70%	0.1272	0.87%**	0.0495
+3,+20	0.98%	0.1516	1.06%	0.1562	1.07%	0.1728
-20,-4	-1.81%***	0.0007	-1.72%***	0.0028	-0.92%*	0.0648
-3,+30	2.77%***	0.0008	2.95%***	0.0004	3.01%***	0.0000

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 5: Wilcoxon Signed-Rank Test for the Full Sample

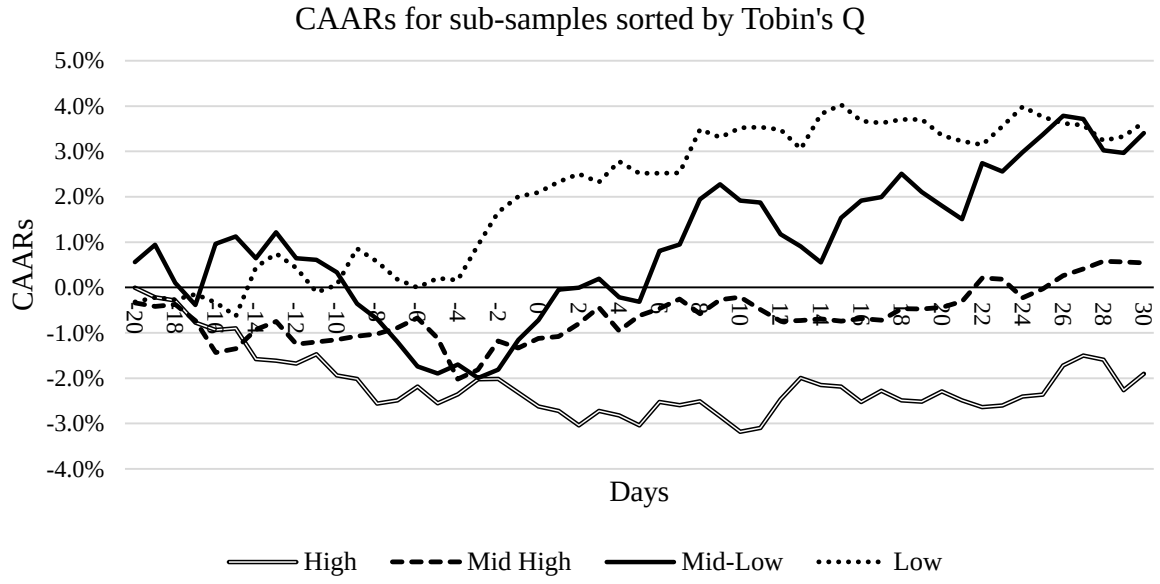
The non-parametric results further validate the findings that the market reacts positively to the repurchase announcement. Furthermore, the observed significantly negative CAAR leading up to the announcement is confirmed. The +3, +20 window is not significantly positive, consistent with the parametric results. The -2, +2 sub-window CAAR is seen to be significant at the 10% level for two of the three methods for estimating expected returns. This suggests that the market does react significantly around the announcement.

4.3 FREE CASH FLOW THEORY

When firms generate excess cash flow, they are faced with the choice of reinvesting the excess cash in the firm or paying it out to shareholders. In the absence of positive NPV projects, the firm should pay out all excess cash to shareholders (Hillier, Grinblatt, & Titman, 2012). If this is the case, and the firm does not pay out to shareholders, managers will misappropriate funds within the firm, acting in a way which is not value-maximizing for the firm's shareholders (Jensen, 1986).

To test this theory, this study examines the market reaction to the repurchase announcement across firms sorted by Tobin's Q. The Q-value is calculated as the ratio of the market value of the firm's assets to the replacement cost of the firm's assets. Firms with a low Tobin's Q are considered to be overinvesting firms, whereas firms with a relatively higher Q-value are seen

as underinvesting firms (Wang, Strong, Tung, & Lin, 2009). Considering this investing nature of firms, one would expect to observe a relatively more positive reaction by the market to the repurchase announcement for low Q-value firms. Since these are considered to be overinvesting firms, the market will perceive the repurchase as a reduction in agency costs, as the level of cash flow available for misappropriation will be reduced. This will, therefore, be perceived as a value-enhancing corporate action. On the converse, firms considered to be underinvesting firms should experience a relatively more negative market reaction to the announcement. If a firm is underinvesting, it would be logically to assume that positive NPV projects are available, but management is choosing to rather pay out excess cash. The results of the tests, based on this understanding, are presented below.



**The CAARs illustrated above represents an average across the three methodologies of estimating expected returns.*

Figure 6: CAARs for sub-samples sorted by Tobin's Q.

From the CAARs graph presented above, it seems as though the results, in a South African context, are consistent with the findings of Wang, Strong, Tung and Lin (2009). For overinvesting firms (low quartile), there is seen to be a positive reaction to the announcement illustrated be the upward trend in CAARs from day -3. Conversely, for underinvesting firms (high quartile), there is an apparent negative reaction to the announcement illustrated by a downward trend in CAARs from day -1. The above graph, therefore, seems to provide support for the free cash flow hypothesis as a result of the varying market reaction based on Q-values. The results of the significance tests for the free cash flow hypothesis are presented below.

CAARs for sub-samples sorted by Tobin's Q - T-Test

Window	Mean Adjusted CAARs	Mean Adjusted T-Stat	Market Adjusted CAARs	Market Adjusted T-Stat	CAPM CAARs	CAPM T-Stat
High (n=36)						
-1,+1	-0.85%	-1.26	-0.78%	-1.17	-0.48%	-0.75
-2,+2	-1.22%	-1.60	-1.12%	-1.49	-0.71%	-1.00
-5,-1	-0.20%	-0.32	-0.09%	-0.16	-0.10%	-0.18
+1,+5	-0.42%	-0.49	-0.32%	-0.37	-0.51%	-0.68
+3,+20	0.46%	0.53	0.82%	0.94	0.97%	1.48
-20,-4	-2.77%***	-2.79	-2.43%**	-2.42	-1.86%*	-2.01
-3,+30	-0.16%	-0.09	0.53%	0.32	1.00%	0.67
Mid-High (n=37)						
-1,+1	0.14%	0.28	0.18%	0.34	-0.03%	-0.09
-2,+2	1.02%	1.53	1.08%	1.59	0.94%*	1.74
-5,-1	-0.77%	-0.51	-0.72%	-0.48	-0.51%	-0.37
+1,+5	0.50%	0.65	0.56%	0.70	0.44%	0.60
+3,+20	0.18%	0.16	0.37%	0.31	0.53%	0.51
-20,-4	-2.35%	-1.53	-2.16%	-1.45	-1.55%	-1.03
-3,+30	2.19%	1.43	2.55%	1.53	2.93%**	2.24
Mid-Low (n=37)						
-1,+1	1.79%	1.15	1.80%	1.17	1.70%	1.12
-2,+2	2.00%	1.18	2.03%	1.21	1.94%	1.21
-5,-1	0.45%	0.26	0.48%	0.28	0.83%	0.52
+1,+5	0.40%	0.38	0.44%	0.40	0.37%	0.35
+3,+20	1.73%	0.81	1.84%	0.77	1.85%	0.77
-20,-4	-1.90%	-1.03	-1.80%	-0.92	-1.38%	-0.72
-3,+30	5.02%**	2.22	5.22%**	2.05	5.06%*	1.95
Low (n=36)						
-1,+1	0.80%*	1.87	0.75%*	1.81	0.46%	1.12
-2,+2	1.69%***	2.92	1.61%***	2.83	1.43%**	2.59
-5,-1	2.01%**	2.52	1.93%**	2.39	2.07%***	2.78
+1,+5	0.64%	1.19	0.55%	1.00	0.09%	0.15
+3,+20	1.03%	1.03	0.73%	0.72	0.78%	0.90
-20,-4	-0.20%	-0.18	-0.48%	-0.47	1.15%	1.35
-3,+30	4.01%***	3.22	3.44%**	2.45	3.00%**	2.62

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 6: CAARs for sub-samples sorted by Tobin's Q - T-Test

The parametric test results presented above appear to support the assertions of the free cash flow hypothesis. The positive reaction for the low quartile over the -1, +1 window is seen to be significant at the 10% level, and the reaction over the -2, +2 window is seen to be significant at the 1% level, both illustrating that there is a considerable positive reaction around the announcement date. This suggests that the market perceives the repurchase to be value-enhancing for overinvesting firms. Consistent with expectations, the returns for the high quartile are negative, but are not significant. The negative returns over the -20, -4 sub-window does not appear to be significant for the low quartile but is significant for the high quartile. For overinvesting firms (low quartile), it appears that a large degree of the information about the

repurchase is leaked to the market before the announcement, evidenced by the significantly positive CAAR for the -5, -1 quartile.

CAARs for sub-samples sorted by Tobin's Q – Wilcoxon-Signed Rank Test

	Mean Adjusted		Market Adjusted		CAPM	
Window	**CAARs**	**P-val**	**CAARs**	**P-val**	**CAARs**	**P-val**
High (n=36)						
-1,+1	-0.85%**	0.0434	-0.78%*	0.0586	-0.48%	0.1432
-2,+2	-1.22%*	0.0874	-1.12%	0.1010	-0.71%	0.1828
-5,-1	-0.20%	0.3733	-0.09%	0.4871	-0.10%	0.4614
+1,+5	-0.42%	0.3551	-0.32%	0.4168	-0.51%	0.2914
+3,+20	0.46%	0.3795	0.82%	0.2287	0.97%*	0.0567
-20,-4	-2.77%***	0.0054	-2.43%**	0.0201	-1.86%**	0.0226
-3,+30	-0.16%	0.4678	0.53%	0.2697	1.00%	0.2239
Mid-High (n=37)						
-1,+1	0.14%	0.3293	0.18%	0.3753	-0.03%	0.3636
-2,+2	1.02%*	0.0900	1.08%*	0.0674	0.94%**	0.0463
-5,-1	-0.77%	0.3578	-0.72%	0.3237	-0.51%	0.2169
+1,+5	0.50%	0.3991	0.56%	0.4293	0.44%	0.4537
+3,+20	0.18%	0.3753	0.37%	0.4354	0.53%	0.2753
-20,-4	-2.35%	0.1407	-2.16%	0.1339	-1.55%	0.4907
-3,+30	2.19%**	0.0367	2.55%**	0.0216	2.93%***	0.0017
Mid-Low (n=37)						
-1,+1	1.79%	0.4784	1.80%	0.4599	1.70%	0.4660
-2,+2	2.00%	0.3931	2.03%	0.3812	1.94%	0.4722
-5,-1	0.45%	0.1906	0.48%	0.2035	0.83%	0.2452
+1,+5	0.40%	0.3237	0.44%	0.3350	0.37%	0.4232
+3,+20	1.73%	0.4293	1.84%	0.4232	1.85%	0.4722
-20,-4	-1.90%**	0.0116	-1.80%**	0.0208	-1.38%**	0.0172
-3,+30	5.02%**	0.0320	5.22%**	0.0216	5.06%*	0.0526
Low (n=36)						
-1,+1	0.80%**	0.0253	0.75%**	0.0263	0.46%	0.2050
-2,+2	1.69%***	0.0061	1.61%**	0.0100	1.43%**	0.0100
-5,-1	2.01%***	0.0067	1.93%***	0.0061	2.07%***	0.0040
+1,+5	0.64%	0.1098	0.55%	0.1192	0.09%	0.3856
+3,+20	1.03%	0.1786	0.73%	0.2750	0.78%	0.2096
-20,-4	-0.20%	0.2914	-0.48%	0.3372	1.15%*	0.0927
-3,+30	4.01%***	0.0013	3.44%***	0.0051	3.00%***	0.0022

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 7: CAARs for sub-samples sorted by Tobin's Q – Wilcoxon-Signed Rank Test

The non-parametric results presented above support those of the parametric test. Noticeably different, however, is the significance of the negative reaction for underinvesting firms (high quartile) over the -1, +1 and -2, +2 sub-windows, respectively. This provides evidence to suggest that the market is punishing the firm for making a decision which is not the best use of company funds, as it would be more beneficial to reinvest within the firm. The highly significant CAAR for -1, -5 window for overinvesting firms further suggests the possible existence of insider trading on repurchase information.

To further test the significance of the CAARs over the various sub-windows, sorted by Tobin's Q, a two-sample t-test is performed to test whether the positive reaction for the low quartile is significantly greater than the reaction of the high quartile. The results are displayed below.

Two-sample T-Test test for sub-samples sorted by Tobin's Q

	Mean-Adjusted			Market-Adjusted			CAPM		
Window	**CAARs (H)**	**CAARs (L)**	**T-stat**	**CAARs (H)**	**CAARs (L)**	**T-stat**	**CAARs (H)**	**CAARs (L)**	**T-stat**
-1,+1	-0.85%	0.80%	2.06**	-0.78%	0.75%	1.95**	-0.48%	0.46%	1.23
-2,+2	-1.22%	1.69%	3.04***	-1.12%	1.61%	2.89***	-0.71%	1.43%	2.38**
-5,-1	-0.20%	2.01%	2.16**	-0.09%	1.93%	1.98**	-0.10%	2.07%	2.31**
+1,+5	-0.42%	0.64%	1.05	-0.32%	0.55%	0.85	-0.51%	0.09%	0.63
+3,+20	0.46%	1.03%	0.43	0.82%	0.73%	0.07	0.97%	0.78%	0.18
-20,-4	-2.77%	-0.20%	1.72**	-2.43%	-0.48%	1.37*	-1.86%	1.15%	2.39**
-3,+30	-0.16%	4.01%	1.91**	0.53%	3.44%	1.35*	1.00%	3.00%	1.07

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 8: Two-sample T-Test test for sub-samples sorted by Tobin's Q

The two-sample t-test results presented in the table above provide further support for the free cash flow theory. The reaction to the announcement can be seen before the actual announcement is made, as the CAARs of the low quartile is significantly greater than that of the high quartile for the -5, -1 sub-window. The market reacts significantly more positively around the announcement for the low quartile, seen by the significant difference in CAARs over the -1, +1 window and -2, +2 sub-windows, respectively. The difference between the two quartiles over the +3, +20 sub-window is not seen to be significant, but when one includes the initial reaction, as seen in the -3, +30 window, the difference does become significant. From this evidence, it seems as though the initial reaction is significantly different between over- and underinvesting firms. The long-term reaction appears to be fairly similar, although an extension of the event window would be needed to confirm this result.

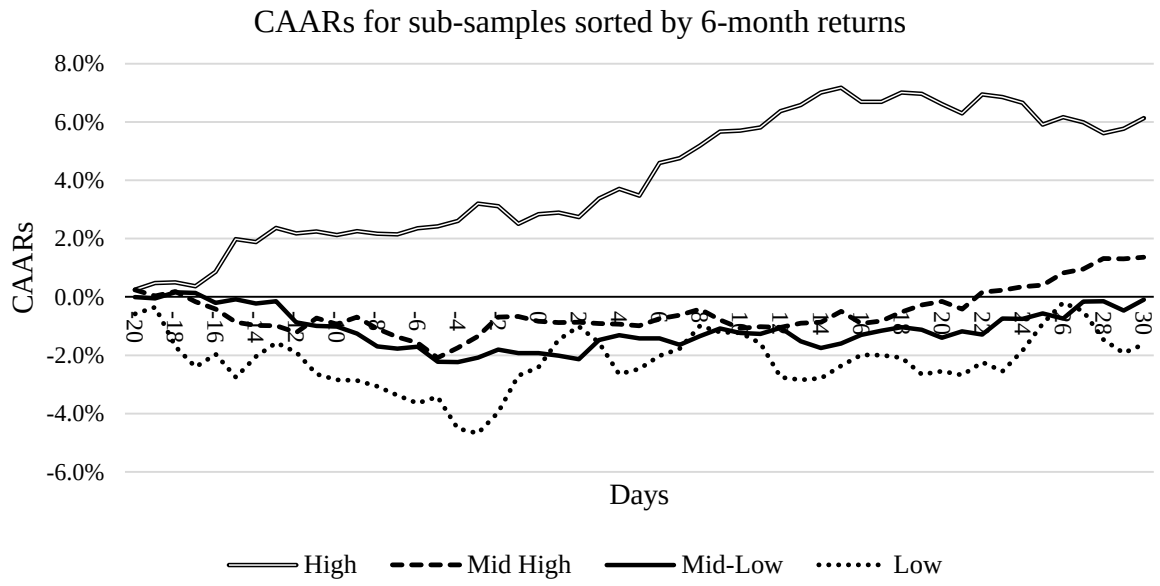
4.4 SIGNALLING HYPOTHESIS AND MARKET TIMING

4.4.1 6-Month Prior Return (Undervaluation and Market Timing)

One of the proxies for undervaluation chosen in this study is the 6-month return leading up to the start of the event window. This follows the logic that a firm is more likely to be undervalued

if it has experienced poor returns over the previous 6-month period. Furthermore, the reaction of the market will provide insights into the market timing ability of management. Stephens and Weisbach (1998) found a negative relationship between prior returns and the reaction of the market. As such, it is hypothesized that the low quartile (firms with the worst prior performance) will have a significantly more positive reaction to the announcement than the high quartile (firm with the best performance).

The examination of this variable's effect on the market's reaction to the announcement is presented below.



* The CAARs illustrated above represents an average across the three methodologies of estimating expected returns.

Figure 7: CAARs for sub-samples sorted by 6-month prior returns.

The high quartile appears to exhibit a large degree of momentum from prior returns, seen by a positive trend for the entirety of the event window. The two mid quartiles follow a fairly flat trend, while the low quartile exhibits a negative trend leading up to the announcement, and then a noticeable positive reaction at the time of the announcement. These observations appear to be in line with expectations. The significance of these observations is examined below.

CAARs for sub-samples sorted by 6-month prior returns - T-Test

Window	Mean Adjusted CAARs	Mean Adjusted T-Stat	Market Adjusted CAARs	Market Adjusted T-Stat	CAPM CAARs	CAPM T-Stat
High (n=36)						
-1,+1	-0.39%	-0.64	-0.18%	-0.30	-0.09%	-0.17
-2,+2	-0.82%	-1.07	-0.47%	-0.60	-0.07%	-0.11
-5,-1	-0.23%	-0.26	0.12%	0.14	0.57%	0.73
+1,+5	0.43%	0.50	0.77%	0.86	0.72%	0.82
+3,+20	2.89%	1.44	4.13%*	1.85	4.60%**	2.09
-20,-4	1.73%	1.08	2.90%*	1.84	3.18%**	2.03
-3,+30	1.52%	0.62	3.87%	1.35	5.18%*	1.87
Mid-High (n=37)						
-1,+1	-0.27%	-0.46	-0.19%	-0.33	-0.10%	-0.17
-2,+2	0.40%	0.54	0.53%	0.70	0.54%	0.75
-5,-1	0.97%*	2.02	1.09%**	2.27	0.63%	1.49
+1,+5	-0.23%	-0.37	-0.11%	-0.17	-0.15%	-0.26
+3,+20	0.42%	0.49	0.87%	1.02	0.85%	1.12
-20,-4	-2.25%**	-2.61	-1.83%**	-2.16	-1.17%	-1.41
-3,+30	2.66%*	1.92	3.52%**	2.66	3.16%***	2.76
Mid-Low (n=37)						
-1,+1	-0.09%	-0.18	-0.14%	-0.28	-0.39%	-1.09
-2,+2	0.02%	0.03	-0.07%	-0.11	-0.14%	-0.29
-5,-1	-0.34%	-0.46	-0.43%	-0.57	0.09%	0.16
+1,+5	0.76%	1.26	0.68%	1.12	0.09%	0.17
+3,+20	1.16%	1.56	0.85%	1.08	0.19%	0.26
-20,-4	-2.54%***	-3.03	-2.83%***	-3.53	-1.35%*	-1.88
-3,+30	2.86%**	2.42	2.28%*	1.82	1.30%	1.39
Low (n=36)						
-1,+1	2.70%*	1.74	2.53%	1.64	2.27%	1.49
-2,+2	3.96%**	2.44	3.68%**	2.30	3.34%**	2.13
-5,-1	1.06%	0.49	0.78%	0.36	0.99%	0.48
+1,+5	0.18%	0.16	-0.10%	-0.09	-0.26%	-0.23
+3,+20	-1.06%	-0.72	-2.07%	-1.38	-1.47%	-1.13
-20,-4	-4.13%**	-2.10	-5.09%**	-2.67	-4.32%**	-2.33
-3,+30	4.05%**	2.20	2.14%	1.25	2.46%	1.56

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 9: CAARs for sub-samples sorted by 6-month prior returns - T-Test

Consistent with the observations from Figure 7, the short term reaction of the market is significant for firms that have performed poorly over the previous 6-months. This is evidenced by the significant CAAR over the -2, +2 sub-window for the low quartile. Over the same sub-window, for the high quartile, the CAAR is seen to be negative, but not significantly so. This may suggest that the market views the repurchase as value destroying because the price paid for the repurchase is too high, consistent with the assertions of Woods and Brigham (1966). If one follows the logic of Chowdhry & Nanda (1994), if a firm is overvalued, it would make

sense for the firm to either pay out in the form of dividends, or save the cash until a point where the company is considered to be undervalued.

The notion of momentum is confirmed by observing the returns for the high, and low, quartiles over the -20, -4 sub-window. The CAAR for the high quartile is seen to be significantly positive, whereas the low quartile is significantly negative. Furthermore, momentum can be seen for the high quartile over the +3, +20 sub-window, as the CAAR is significantly positive even though the repurchase appeared to be 'bad' news judging by the negative initial reaction. Similarly for the low quartile, even though the repurchase was perceived as 'good' news, the CAAR for the +3, +20 sub-window was seen to be negative, although not significantly so.

CAARs for sub-samples sorted by 6-month prior returns – Wilcoxon-Signed Rank Test

	Mean Adjusted		**Market Adjusted**		**CAPM**	
Window	**CAARs**	**P-val**	**CAARs**	**P-val**	**CAARs**	**P-val**
High (n=36)						
-1,+1	-0.39%*	0.0531	-0.18%	0.1098	-0.09%	0.1360
-2,+2	-0.82%*	0.0849	-0.47%	0.2050	-0.07%	0.2804
-5,-1	-0.23%	0.3140	0.12%	0.4807	0.57%	0.2487
+1,+5	0.43%	0.4550	0.77%	0.3197	0.72%	0.4105
+3,+20	2.89%	0.1786	4.13%**	0.0465	4.60%**	0.0124
-20,-4	1.73%	0.2804	2.90%**	0.0352	3.18%**	0.0140
-3,+30	1.52%	0.4105	3.87%*	0.0954	5.18%**	0.0244
Mid-High (n=37)						
-1,+1	-0.27%	0.4232	-0.19%	0.3350	-0.10%	0.3072
-2,+2	0.40%	0.2079	0.53%	0.1306	0.54%*	0.0634
-5,-1	0.97%**	0.0179	1.09%***	0.0056	0.63%*	0.0694
+1,+5	-0.23%	0.4537	-0.11%	0.3127	-0.15%	0.3636
+3,+20	0.42%	0.4232	0.87%	0.1823	0.85%	0.0803
-20,-4	-2.25%**	0.0107	-1.83%**	0.0448	-1.17%	0.1906
-3,+30	2.66%**	0.0200	3.52%***	0.0039	3.16%***	0.0012
Mid-Low (n=37)						
-1,+1	-0.09%	0.2600	-0.14%	0.2079	-0.39%	0.1005
-2,+2	0.02%	0.3931	-0.07%	0.3406	-0.14%	0.2702
-5,-1	-0.34%	0.3872	-0.43%	0.3127	0.09%	0.4722
+1,+5	0.76%	0.1119	0.68%	0.1625	0.09%	0.4845
+3,+20	1.16%	0.1119	0.85%	0.2753	0.19%	0.4293
-20,-4	-2.54%***	0.0027	-2.83%***	0.0008	-1.35%**	0.0250
-3,+30	2.86%**	0.0216	2.28%*	0.0851	1.30%	0.2124
Low (n=36)						
-1,+1	2.70%*	0.0514	2.53%*	0.0874	2.27%	0.1786
-2,+2	3.96%***	0.0017	3.68%***	0.0049	3.34%**	0.0114
-5,-1	1.06%	0.2970	0.78%	0.3672	0.99%	0.2697
+1,+5	0.18%	0.4295	-0.10%	0.4871	-0.26%	0.4486
+3,+20	-1.06%	0.2591	-2.07%*	0.0927	-1.47%	0.1506
-20,-4	-4.13%	0.0263**	-5.09%***	0.0088	-4.32%**	0.0158
-3,+30	4.05%	0.0165**	2.14%	0.1098	2.46%**	0.0352

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 10: CAARs for sub-samples sorted by 6-month prior returns – Wilcoxon-Signed Rank Test

The observations from the parametric results are supported by the results of the non-parametric test. Most noticeable is the significantly negative (10% level) CAAR for the low quartile for the +3, +20 sub-window, confirming the effects of momentum, and the significantly negative (10% level) CAAR for the high quartile over the -1, +1 and -2, +2 sub-windows, respectively. This seems to support the notion that, although the market will react either positively or negatively to the news contained in the announcement, the long term movement of CAARs appears to be more a function of the momentum of past returns.

To further test the significance of the CAARs over the various sub-windows, sorted by the six-month prior return, a two-sample t-test is performed to test whether the positive reaction for the low quartile is significantly greater than that of the high quartile. The results are displayed below.

Two-sample T-Test test for sub-samples sorted by 6-month prior returns

	Mean-Adjusted			**Market-Adjusted**			**CAPM**		
Window	**CAARs (L)**	**CAARs (H)**	**T-stat**	**CAARs (L)**	**CAARs (H)**	**T-stat**	**CAARs (L)**	**CAARs (H)**	**T-stat**
-1,+1	2.70%	-0.39%	1.85**	2.53%	-0.18%	1.64*	2.27%	-0.09%	1.46*
-2,+2	3.96%	-0.82%	2.67***	3.68%	-0.47%	2.32**	3.34%	-0.07%	1.99**
-5,-1	1.06%	-0.23%	0.54	0.78%	0.12%	0.28	0.99%	0.57%	0.19
+1,+5	0.18%	0.43%	-0.17	-0.10%	0.77%	-0.60	-0.26%	0.72%	-0.69
+3,+20	-1.06%	2.89%	-1.58*	-2.07%	4.13%	-2.30**	-1.47%	4.60%	-2.37**
-20,-4	-4.13%	1.73%	-2.31**	-5.09%	2.90%	-3.23***	-4.32%	3.18%	-3.09***
-3,+30	4.05%	1.52%	0.82	2.14%	3.87%	-0.52	2.46%	5.18%	-0.85

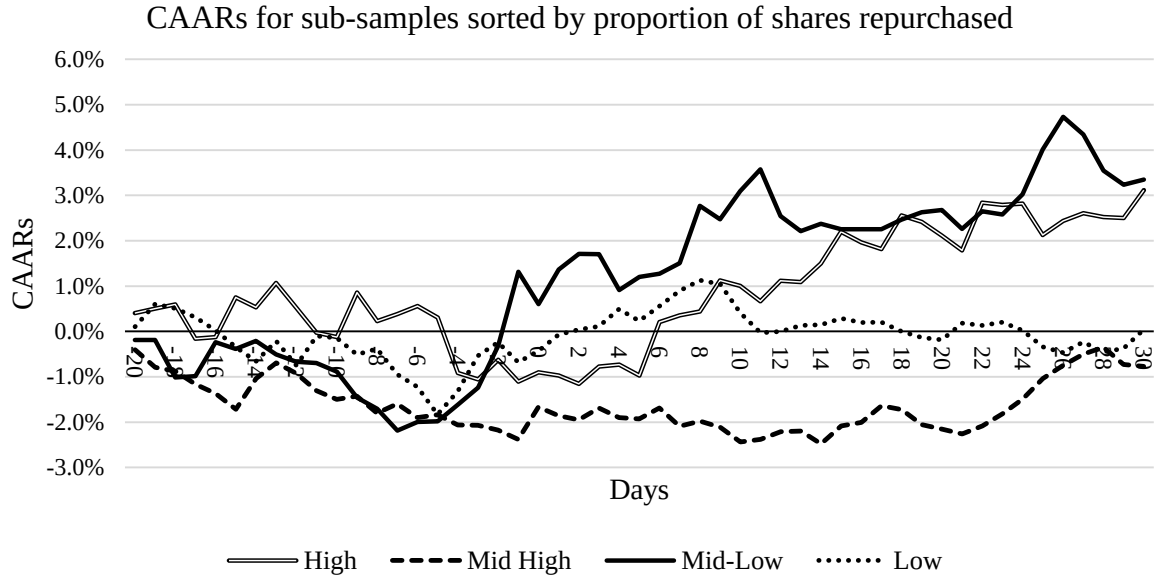
*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 11: Two-sample T-Test test for sub-samples sorted by 6-month prior returns

The results of Table 11 above confirm the observations from the t-test and Wilcoxon Signed-Rank test. First, the initial reaction of the market is seen to be significantly more positive for the low quartile, suggesting that the market views the repurchase as being significantly better news for the low-quartile. Second, although this is true of the initial reaction, the significantly more positive CAARs over the -20, -4 and +3, +20 sub-windows, respectively, for the high quartile, suggests that the information from the repurchase is not enough to shift the long-term momentum of returns. These results therefore, suggest support for the market timing and information signalling hypotheses.

4.4.2 Proportion of Shares Repurchased (Signalling)

McNally (1997) documents a positive relationship between the proportion of shares repurchased and the reaction of the market to the repurchase announcement. The reason for this is based on risk and signalling. The larger the repurchase, the more concentrated ownership will become for non-tendering shareholders. This will increase the level of idiosyncratic risk exposure for these shareholders, sending a credible signal to the market that they are confident about the future prospects of the firm. Based on this understanding, it is hypothesized that firms that make relatively large repurchases (high quartile) will experience a more positive reaction to the announcement than firms that make relatively smaller repurchases (low quartile).The results, based on this understanding, are presented below.



* The CAARs illustrated above represents an average across the three methodologies of estimating expected returns.

Figure 8: CAARs for sub-samples sorted by proportion of shares repurchased.

From the above graph, it seems apparent that the mid-low quartile has the strongest reaction to the repurchase announcement. This upward trend of this quartile appears to begin from day -6 and continues until the end of the event window. The low quartile has an upward movement in CAARs from day -4 to day +8 and then tapers off for the remainder of the event window. The CAAR movement for the mid-high quartile is fairly flat for the event window, and does not appear to exhibit a reaction to the announcement. Although the high quartile does exhibit a noticeable reaction to the announcement, the reaction appears to be delayed, with the upward

trend in CAARs only starting from day +6. In light of the above observations, it does not appear that there is a relationship between the reaction of the market and the proportion of shares repurchased.

T-test for the sub-samples sorted by proportion of shares repurchased

Window	CAARs	T-Stat	CAARs	T-Stat	CAARs	T-Stat
High (n=36)						
-1,+1	-0.38%	-0.57	-0.25%	-0.37	-0.42%	-0.81
-2,+2	-0.23%	-0.26	-0.02%	-0.02	-0.04%	-0.05
-5,-1	-1.81%	-1.18	-1.59%	-1.04	-1.60%	-1.17
+1,+5	-0.06%	-0.07	0.15%	0.16	-0.31%	-0.34
+3,+20	2.84%	1.34	3.61%	1.54	3.35%	1.45
-20,-4	-1.84%	-0.89	-1.12%	-0.54	0.21%	0.10
-3,+30	3.31%	1.35	4.77%	1.65	4.02%	1.44
Mid-High (n=37)						
-1,+1	0.42%	0.61	0.35%	0.51	0.17%	0.24
-2,+2	0.19%	0.22	0.07%	0.09	0.11%	0.13
-5,-1	-0.57%	-0.89	-0.69%	-1.05	-0.17%	-0.29
+1,+5	-0.18%	-0.20	-0.30%	-0.35	-0.31%	-0.37
+3,+20	-0.07%	-0.08	-0.51%	-0.53	-0.04%	-0.05
-20,-4	-2.27%	-1.68	-2.68%*	-2.02	-1.23%	-1.09
-3,+30	1.70%	1.18	0.88%	0.62	1.29%	1.00
Mid-Low (n=37)						
-1,+1	1.67%	1.12	1.70%	1.15	1.67%	1.15
-2,+2	2.91%*	1.91	2.97%*	2.00	2.96%**	2.05
-5,-1	3.28%*	1.96	3.34%**	2.03	3.31%**	2.05
+1,+5	0.67%	0.72	0.73%	0.78	0.40%	0.44
+3,+20	0.85%	0.88	1.07%	1.02	0.99%	0.97
-20,-4	-1.77%	-1.57	-1.57%	-1.31	-1.50%	-1.24
-3,+30	4.72%***	3.02	5.12%***	3.55	5.04%***	4.12
Low (n=36)						
-1,+1	0.17%	0.37	0.14%	0.31	0.22%	0.57
-2,+2	0.61%	0.95	0.57%	0.89	0.56%	1.03
-5,-1	0.50%	0.71	0.45%	0.67	0.68%	1.22
+1,+5	0.71%	1.27	0.66%	1.16	0.62%	1.20
+3,+20	-0.19%	-0.17	-0.35%	-0.31	-0.14%	-0.15
-20,-4	-1.34%	-1.43	-1.49%	-1.65	-1.13%	-1.23
-3,+30	1.34%	0.94	1.04%	0.80	1.69%	1.52

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 12: T-test for the sub-samples sorted by proportion of shares repurchased

The t-test results from the table above provide further validation for the notion that there seems to be no consistent relationship between the proportion of shares repurchased and the reaction of the market to the announcement.

Wilcoxon Signed-Rank Test for sub-samples sorted by proportion of shares repurchased

Window	Mean Adjusted CAARs	Mean Adjusted P-val	Market Adjusted CAARs	Market Adjusted P-val	CAPM CAARs	CAPM P-val
High (n=36)						
-1,+1	-0.38%	0.1291	-0.25%	0.2143	-0.42%	0.1506
-2,+2	-0.23%	0.1622	-0.02%	0.2644	-0.04%	0.3255
-5,-1	-1.81%	0.2386	-1.59%	0.3795	-1.60%	0.1360
+1,+5	-0.06%	0.3432	0.15%	0.3918	-0.31%	0.1257
+3,+20	2.84%	0.1224	3.61%	0.0824*	3.35%	0.1506
-20,-4	-1.84%**	0.0273	-1.12%	0.0824*	0.21%	0.3918
-3,+30	3.31%	0.1224	4.77%	0.0449**	4.02%	0.0849*
Mid-High (n=37)						
-1,+1	0.42%	0.3237	0.35%	0.3578	0.17%	0.3872
-2,+2	0.19%	0.4969	0.07%	0.4415	0.11%	0.4111
-5,-1	-0.57%	0.1663	-0.69%	0.1702	-0.17%	0.4415
+1,+5	-0.18%	0.4537	-0.30%	0.4599	-0.31%	0.4111
+3,+20	-0.07%	0.2550	-0.51%	0.1306	-0.04%	0.4660
-20,-4	-2.27%*	0.0674	-2.68%**	0.0448	-1.23%	0.1550
-3,+30	1.70%*	0.0925	0.88%	0.1742	1.29%	0.1061
Mid-Low (n=37)						
-1,+1	1.67%	0.2308	1.70%	0.1782	1.67%	0.2452
-2,+2	2.91%***	0.0025	2.97%***	0.0013	2.96%***	0.0016
-5,-1	3.28%**	0.0288	3.34%**	0.0185	3.31%***	0.0098
+1,+5	0.67%	0.1906	0.73%	0.1339	0.40%	0.1991
+3,+20	0.85%	0.2308	1.07%*	0.0875	0.99%*	0.0526
-20,-4	-1.77%**	0.0420	-1.57%	0.1089	-1.50%	0.1179
-3,+30	4.72%***	0.0012	5.12%***	0.0005	5.04%***	0.0001
Low (n=36)						
-1,+1	0.17%	0.3372	0.14%	0.2970	0.22%	0.4043
-2,+2	0.61%	0.3197	0.57%	0.3856	0.56%	0.2914
-5,-1	0.50%	0.1662	0.45%	0.1786	0.68%*	0.0800
+1,+5	0.71%*	0.0927	0.66%*	0.0981	0.62%	0.1325
+3,+20	-0.19%	0.4936	-0.35%	0.4807	-0.14%	0.4550
-20,-4	-1.34%*	0.0708	-1.49%*	0.0686	-1.13%	0.2644
-3,+30	1.34%	0.2191	1.04%	0.3140	1.69%*	0.0981

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 13: Wilcoxon Signed-Rank Test for sub-samples sorted by proportion of shares repurchased

The non-parametric results above appear to confirm the notion that there is no consistent relationship between the proportion of shares repurchased and the reaction of the market to the announcement.

To further test the significance of the CAARs over the various sub-windows, sorted by the proportion of outstanding stock repurchased, a two-sample t-test is performed to test whether the positive reaction for the high quartile is significantly greater than that of the low quartile. The results are displayed below.

Two-sample T-Test test for sub-samples sorted by proportion repurchased

Window	Mean-Adjusted CAARs (H)	Mean-Adjusted CAARs (L)	Mean-Adjusted T-stat	Market-Adjusted CAARs (H)	Market-Adjusted CAARs (L)	Market-Adjusted T-stat	CAPM CAARs (H)	CAPM CAARs (L)	CAPM T-stat
-1,+1	-0.38%	0.17%	-0.68	-0.25%	0.14%	-0.48	-0.42%	0.22%	-0.99
-2,+2	-0.23%	0.61%	-0.78	-0.02%	0.57%	-0.53	-0.04%	0.56%	-0.64
-5,-1	-1.81%	0.50%	-1.36*	-1.59%	0.45%	-1.22	-1.60%	0.68%	-1.54*
+1,+5	-0.06%	0.71%	-0.71	0.15%	0.66%	-0.46	-0.31%	0.62%	-0.90
+3,+20	2.84%	-0.19%	1.26	3.61%	-0.35%	1.52*	3.35%	-0.14%	1.40*
-20,-4	-1.84%	-1.34%	-0.22	-1.12%	-1.49%	0.17	0.21%	-1.13%	0.60
-3,+30	3.31%	1.34%	0.69	4.77%	1.04%	1.18	4.02%	1.69%	0.77

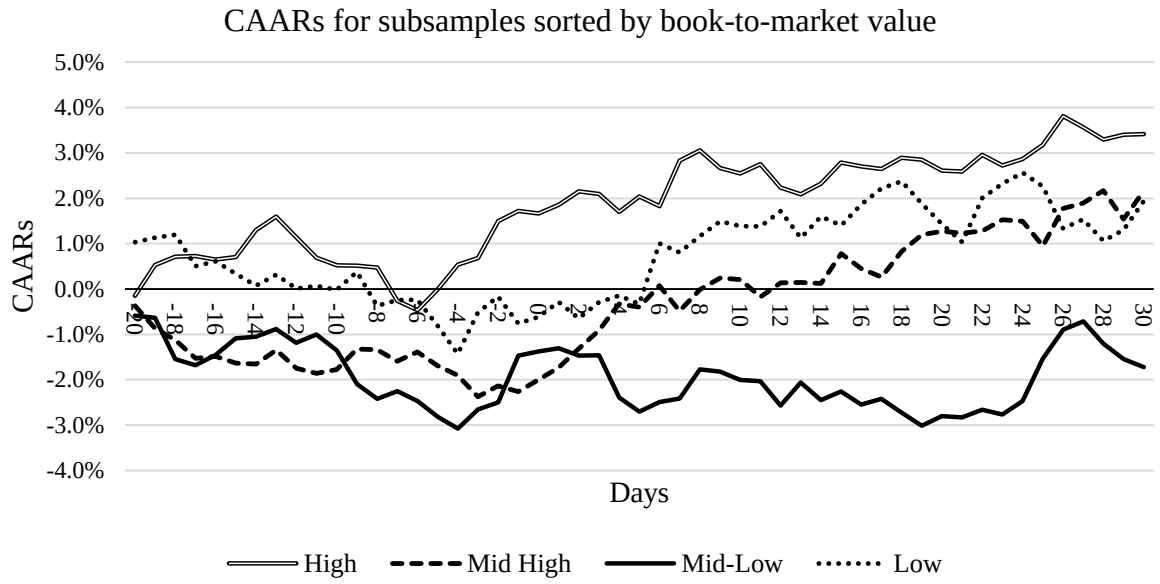
*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 14: Two-sample T-Test test for sub-samples sorted by proportion repurchased

From the results above, it appears that the reaction of the high quartile is not significantly greater than that of the low quartile over the -1, +1 and -2, +2 sub-windows. . There are two interesting observations, however. First, it appears that the reaction is significantly more positive in the short window before the announcement. However, the low quartile is significantly greater which does not make intuitive sense. Second, although the initial reaction is not significant, the +3, +20 window does illustrate that the reaction of the high quartile is significantly greater than that of the low quartile at the 10% level. This may indicate that the reaction to the announcement is somewhat delayed, consistent with the assertions of Bhana (2007).

4.4.3 Book-To-Market (Undervaluation)

The reason for including the B/M variable as a proxy for undervaluation stems from the assertions of Ikenberry, Lakonishok and Vermaelen (1995). The paper mentions that low B/M firms, or glamour stocks, are likely to repurchase shares for reasons other than undervaluation, whereas high B/M firms, or value stocks, are likely to have undervaluation as the primary motive for a repurchase. As such, a repurchase from a high B/M firm should signal undervaluation to the market, manifesting in a relatively larger positive reaction to the repurchase announcement. This relationship is examined by Bhana (2007), in a South African context, but notes that the B/M ratio has no impact on the short-term market reaction to share repurchases. The relationship between market reaction and B/M is tested to examine if the findings of Bhana (2007) are consistent with a more recent sample in SA. The results are presented below.



* The CAARs illustrated above represents an average across the three methodologies of estimating expected returns.

Figure 9: CAARs for sub-samples sorted by book-to-market value

From the graph above, it appears that all quartiles, with the exception of the mid-low quartile, exhibit an upward trend in CAARs as a result of the announcement. Although the high quartile does appear to react more positively to the announcement than the low quartile, the significance of this observation needs to be examined before one can make valuable inferences. The results of the t-test are presented below.

T-Test for Sub-samples sorted by book-to-market

Window	Mean Adjusted CAARs	Mean Adjusted T-Stat	Market Adjusted CAARs	Market Adjusted T-Stat	CAPM CAARs	CAPM T-Stat
High (n=36)						
-1,+1	0.32%	0.51	0.34%	0.55	0.42%	0.70
-2,+2	1.38%*	1.85	1.42%*	1.98	1.60%**	2.32
-5,-1	2.10%**	2.35	2.14%**	2.41	2.31%**	2.71
+1,+5	0.37%	0.45	0.41%	0.50	0.34%	0.41
+3,+20	0.38%	0.43	0.52%	0.57	0.48%	0.53
-20,-4	0.42%	0.39	0.55%	0.55	0.64%	0.60
-3,+30	2.67%**	2.16	2.94%**	2.15	3.02%**	2.53
Mid-High (n=37)						
-1,+1	0.39%	0.72	0.53%	0.98	0.28%	0.60
-2,+2	0.93%	1.20	1.18%	1.47	1.08%	1.51
-5,-1	-0.99%	-1.32	-0.75%	-1.04	-0.89%	-1.42
+1,+5	1.53%**	2.14	1.77%**	2.36	1.52%**	2.09
+3,+20	2.04%	1.15	2.92%	1.42	2.79%	1.35
-20,-4	-2.59%***	-3.19	-1.77%*	-1.97	-1.36%	-1.43
-3,+30	2.95%	1.35	4.60%*	1.80	4.64%*	1.83
Mid-Low (n=37)						
-1,+1	1.20%	0.79	1.12%	0.75	1.26%	0.84
-2,+2	1.28%	0.81	1.14%	0.74	1.12%	0.74
-5,-1	1.00%	0.61	0.86%	0.53	1.14%	0.75
+1,+5	-1.24%	-1.29	-1.38%	-1.42	-1.36%	-1.52
+3,+20	-1.22%	-1.16	-1.72%	-1.58	-1.05%	-0.99
-20,-4	-3.15%**	-2.48	-3.62%**	-2.71	-2.46%**	-2.07
-3,+30	1.65%	0.94	0.71%	0.46	1.71%	1.13
Low (n=36)						
-1,+1	-0.01%	-0.02	-0.04%	-0.06	-0.32%	-0.65
-2,+2	-0.08%	-0.09	-0.12%	-0.14	-0.18%	-0.27
-5,-1	-0.62%	-0.42	-0.66%	-0.45	-0.27%	-0.20
+1,+5	0.49%	0.66	0.45%	0.60	-0.09%	-0.12
+3,+20	2.23%	1.44	2.08%	1.33	1.92%	1.52
-20,-4	-1.85%	-0.85	-1.99%	-0.94	-0.44%	-0.22
-3,+30	3.85%**	2.14	3.57%*	1.99	2.67%*	1.91

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 15: T-Test for Sub-samples sorted by book-to-market

From the above table, the high quartile appears to exhibit a significantly positive CAAR for the -2, +2 at both the 10% and 5% levels, depending on the methodology used for estimating expected returns. Furthermore, if one considers the potential presence of insider trading, the significantly positive CAAR for the high quartile over the -5,-1 window may suggest that high B/M firms react significantly positively to the information contained within the announcement, where lower B/M firms do not. This seems to be consistent with expectations as high B/M firms are more likely to have undervaluation as their main motivation for repurchasing.

Wilcoxon Signed-Rank test for sub-samples sorted by book-to-market

Window	Mean Adjusted CAARs	P-val	Market Adjusted CAARs	P-val	CAPM CAARs	P-val
High (n=36)						
-1,+1	0.32%	0.3197	0.34%	0.3083	0.42%	0.4168
-2,+2	1.38%	0.1583	1.42%	0.1360	1.60%**	0.0305
-5,-1	2.10%**	0.0100	2.14%***	0.0042	2.31%***	0.0016
+1,+5	0.37%	0.3491	0.41%	0.3980	0.34%	0.3733
+3,+20	0.38%	0.2697	0.52%	0.3733	0.48%	0.4614
-20,-4	0.42%	0.4936	0.55%	0.2336	0.64%	0.1038
-3,+30	2.67%*	0.0605	2.94%**	0.0104	3.02%***	0.0030
Mid-High (n=37)						
-1,+1	0.39%	0.2651	0.53%	0.1442	0.28%	0.3463
-2,+2	0.93%	0.1587	1.18%*	0.0758	1.08%	0.1241
-5,-1	-0.99%	0.1477	-0.75%	0.2355	-0.89%	0.1241
+1,+5	1.53%**	0.0159	1.77%***	0.0070	1.52%**	0.0224
+3,+20	2.04%	0.2355	2.92%	0.1061	2.79%	0.1273
-20,-4	-2.59%***	0.0016	-1.77%**	0.0126	-1.36%**	0.0406
-3,+30	2.95%	0.1339	4.60%**	0.0355	4.64%**	0.0355
Mid-Low (n=37)						
-1,+1	1.20%	0.3753	1.12%	0.3127	1.26%	0.4784
-2,+2	1.28%	0.3463	1.14%	0.4537	1.12%	0.4537
-5,-1	1.00%	0.4845	0.86%	0.4111	1.14%	0.3931
+1,+5	-1.24%	0.1148	-1.38%*	0.0674	-1.36%*	0.0736
+3,+20	-1.22%*	0.0978	-1.72%*	0.0715	-1.05%	0.3406
-20,-4	-3.15%**	0.0172	-3.62%***	0.0070	-2.46%**	0.0208
-3,+30	1.65%	0.1210	0.71%	0.2858	1.71%	0.1089
Low (n=36)						
-1,+1	-0.01%	0.3672	-0.04%	0.4105	-0.32%	0.1432
-2,+2	-0.08%	0.4550	-0.12%	0.4232	-0.18%	0.3672
-5,-1	-0.62%	0.3551	-0.66%	0.3672	-0.27%	0.1583
+1,+5	0.49%	0.2386	0.45%	0.1960	-0.09%	0.4168
+3,+20	2.23%**	0.0465	2.08%**	0.0449	1.92%*	0.0605
-20,-4	-1.85%*	0.0549	-1.99%**	0.0405	-0.44%	0.3083
-3,+30	3.85%**	0.0109	3.57%***	0.0096	2.67%**	0.0119

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 16: Wilcoxon Signed-Rank test for sub-samples sorted by book-to-market

The results from the non-parametric test above seem fairly consistent with the observations from the parametric t-test. The CAAR over the -2, +2 window is significant, at the 5% level, for the high quartile using the CAPM estimation approach. The same cannot be observed for the low and mid-low quartiles. Furthermore, the CAAR over the -5, -1 sub-window is significant at the 1% level for the high quartile which seems to provide support for the notion that the market responds more positively to share repurchases for high B/M firms. Interestingly, the low quartile exhibits a significantly positive CAAR for the +3, +20 sub-window which is contrary to expectations.

To further test the significance of the CAARs over the various sub-windows, sorted by B/M, a two-sample t-test is performed to test whether the positive reaction for the high quartile is significantly greater than that of the low quartile. The results are displayed below.

Two-sample T-Test test for sub-samples sorted by book-to-market

Window	Mean-Adjusted CAARs (H)	Mean-Adjusted CAARs (L)	Mean-Adjusted T-stat	Market-Adjusted CAARs (H)	Market-Adjusted CAARs (L)	Market-Adjusted T-stat	CAPM CAARs (H)	CAPM CAARs (L)	CAPM T-stat
-1,+1	0.32%	-0.01%	0.36	0.34%	-0.04%	0.42	0.42%	-0.32%	0.96
-2,+2	1.38%	-0.08%	1.29	1.42%	-0.12%	1.38*	1.60%	-0.18%	1.83**
-5,-1	2.10%	-0.62%	1.55*	2.14%	-0.66%	1.61*	2.31%	-0.27%	1.59*
+1,+5	0.37%	0.49%	-0.11	0.41%	0.45%	-0.04	0.34%	-0.09%	0.39
+3,+20	0.38%	2.23%	-1.03	0.52%	2.08%	-0.85	0.48%	1.92%	-0.92
-20,-4	0.42%	-1.85%	0.94	0.55%	-1.99%	1.08	0.64%	-0.44%	0.47
-3,+30	2.67%	3.85%	-0.54	2.94%	3.57%	-0.28	3.02%	2.67%	0.19

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

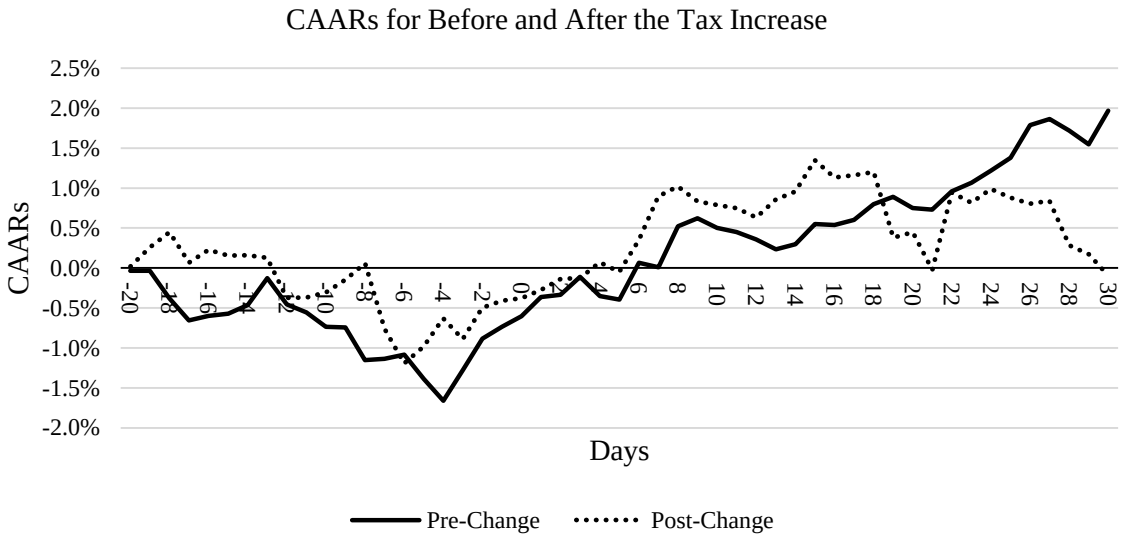
Table 17: Two-sample T-Test test for sub-samples sorted by book-to-market

The results above indicate that the positive CAARs of the high quartile are significantly greater than that of the low quartile for the -2, +2 and -5, -1 sub-windows, respectively. This appears to support the assertions of Ikenberry et al. (1995) that high B/M firms are more likely to have undervaluation as the primary motivation for repurchasing shares, and provides support for the signalling hypothesis. These findings appear to contradict, to a certain extent, the findings of Bhana (2007) in that the B/M ratio does appear to have an effect on the short-term reaction of the market to the announcement.

4.5 TAXATION THEORY

Moser (2007) mentions that firms are more likely to distribute cash in the form of a repurchase when it is relatively more beneficial to do so, given the tax rates on capital gains and dividend income. Further, Rau and Vermaelen (2002) note that in an environment which is less favourable to repurchases, the market reaction to the announcement will be less positive. Similarly, in the U.S., Grullon and Michaely (2002) note that the positive reaction to repurchase announcements was seen to decrease after the Tax Reform Act (TRA) of 1986, as the relative tax advantage of repurchases, over dividends, was seen to decrease.

In light of this understanding, this study investigates whether the reaction of the market is more positive with a lower CGT rate. CGT rates were increased in South Africa from 1 March 2012. The following results illustrate the reaction of the market before (pre-change) and after (post-change) the increase in CGT rates.



* The CAARs illustrated above represents an average across the three methodologies of estimating expected returns.

Figure 10: CAARs representing the reaction of the market under two different CGT rates

CAARs to test the Clientele Effect – T-Test Results

Window	Mean-Adjusted CAARs	Mean-Adjusted T-stat	Market-Adjusted CAARs	Market-Adjusted T-stat	CAPM CAARs	CAPM T-stat
Pre-Change (n=103)						
-1,+1	0.60%	0.95	0.64%	1.02	0.44%	0.73
-2,+2	0.94%	1.33	1.01%	1.44	0.93%	1.42
-5,-1	0.21%	0.26	0.28%	0.34	0.40%	0.52
+1,+5	0.24%	0.45	0.30%	0.57	0.04%	0.07
+3,+20	0.87%	0.95	1.12%	1.11	1.28%	1.36
-20,-4	-2.34%**	-2.56	-2.11%**	-2.26	-1.06%	-1.17
-3,+30	3.60%***	3.09	4.06%***	3.29	4.05%***	3.57
Post-Change (n=43)						
-1,+1	0.18%	0.49	0.14%	0.37	0.36%	1.06
-2,+2	0.74%	1.42	0.67%	1.31	0.85%*	1.72
-5,-1	0.73%	0.98	0.65%	0.90	0.97%	1.44
+1,+5	0.40%	0.64	0.32%	0.52	0.25%	0.41
+3,+20	0.79%	1.11	0.53%	0.71	0.43%	0.58
-20,-4	-0.53%	-0.55	-0.78%	-0.88	-0.58%	-0.66
-3,+30	0.79%	0.77	0.29%	0.27	0.51%	0.50

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 18: CAARs to test the Clientele Effect – T-Test Results

From the parametric test results above, it appears that the differing CGT rate does not have a significant effect on the reaction of the market to the repurchase announcement. The level of undervaluation before the announcement appears to be larger for the lower tax rate over the -20, -4 sub-window. Mild support can be found for this relationship if one examines the reaction over the -3, +30 sub-window as the CAAR for the lower tax rate is seen to be significantly

greater than zero, which is not the case for the higher tax rate. Surprisingly, the reaction for the higher tax rate (post-change) is significant, at the 10% level, for the -2, +2 sub-window for CAPM expected returns. This result seems counterintuitive, as one would expect this to be the case for the lower tax rate.

Wilcoxon Signed-Rank Test for sub-samples sorted by CGT rate

	Mean-Adjusted		Market-Adjusted		CAPM	
Window	**CAARs**	**P-Value**	**CAARs**	**P-Value**	**CAARs**	**P-Value**
Pre-Change (n=103)						
-1,+1	0.60%	0.4682	0.64%	0.3636	0.44%	0.7127
-2,+2	0.94%	0.2175	1.01%	0.1424	0.93%	0.1531
-5,-1	0.21%	0.4353	0.28%	0.3390	0.40%	0.3197
+1,+5	0.24%	0.2050	0.30%	0.1719	0.04%	0.4393
+3,+20	0.87%	0.2907	1.12%	0.2041	1.28%*	0.0920
-20,-4	-2.34%***	0.0005	-2.11%***	0.0037	-1.06%	0.1046
-3,+30	3.60%***	0.0007	4.06%***	0.0002	4.05%***	0.0000
Post-Change (n=43)						
-1,+1	0.18%	0.4288	0.14%	0.3991	0.36%	0.4947
-2,+2	0.74%	0.4158	0.67%	0.4236	0.85%	0.3888
-5,-1	0.73%	0.3724	0.65%	0.3686	0.97%	0.3221
+1,+5	0.40%	0.4907	0.32%	0.4854	0.25%	0.4748
+3,+20	0.79%	0.4485	0.53%	0.4801	0.43%	0.4960
-20,-4	-0.53%	0.4119	-0.78%	0.4042	-0.58%	0.4184
-3,+30	0.79%	0.4511	0.29%	0.4775	0.51%	0.4458

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 19: Wilcoxon Signed-Rank Test for sub-samples sorted by CGT rate

The results of the non-parametric test above appear to be consistent with that of the parametric t-test. The only noticeable difference is the significantly positive (10% level) reaction for the lower tax rate over the +3, +20 sub-window for CAPM expected returns. This may suggest that, although the reaction around the announcement is not significant, the longer term reaction may be more positive for the lower CGT rate.

To further test the significance of the CAARs over the various sub-windows, for the two different tax rates, a two-sample t-test is performed to test whether the positive reaction for the lower CGT is significantly greater than that of the higher CGT rate. The results are displayed below.

Two-sample T-Test for sub-samples sorted by CGT rate

	Mean-Adjusted			Market-Adjusted			CAPM		
Window	**CAARs (Pre)**	**CAARs (Post)**	**T-stat**	**CAARs (Pre)**	**CAARs (Post)**	**T-stat**	**CAARs (Pre)**	**CAARs (Post)**	**T-stat**
-1,+1	0.60%	0.18%	0.57	0.64%	0.14%	0.69	0.44%	0.36%	0.12
-2,+2	0.94%	0.74%	0.22	1.01%	0.67%	0.39	0.93%	0.85%	0.10
-5,-1	0.21%	0.73%	-0.46	0.28%	0.65%	-0.34	0.40%	0.97%	-0.56
+1,+5	0.24%	0.40%	-0.20	0.30%	0.32%	-0.02	0.04%	0.25%	-0.27
+3,+20	0.87%	0.79%	0.07	1.12%	0.53%	0.46	1.28%	0.43%	0.70
-20,-4	-2.34%	-0.53%	-1.35*	-2.11%	-0.78%	-1.03	-1.06%	-0.58%	-0.37
-3,+30	3.60%	0.79%	1.80**	4.06%	0.29%	2.29**	4.05%	0.51%	2.28**

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 20: Two-sample T-Test for sub-samples sorted by tax rate

The results from the two-sample t-test illustrate that there is no statistical difference in the reaction of the market, except for the -3, +30 sub-window, to the repurchase announcement for the two different CGT rates. The significantly more positive reaction to the lower tax rate over the -3, +30 window may provide some support for the notion that the CGT rate affects the nature of the reaction to the announcement. If one considers the potential of market underreaction to repurchase announcements on the JSE, as documented by Bhana (2007), then this result may have some validity, despite the lack of significant results over the other sub-windows. Interestingly, in the lead up to the announcement, the CAARs over the -20, -4 sub-window are seen to be significantly greater for the higher tax rate. The consequences of which, however, are uncertain.

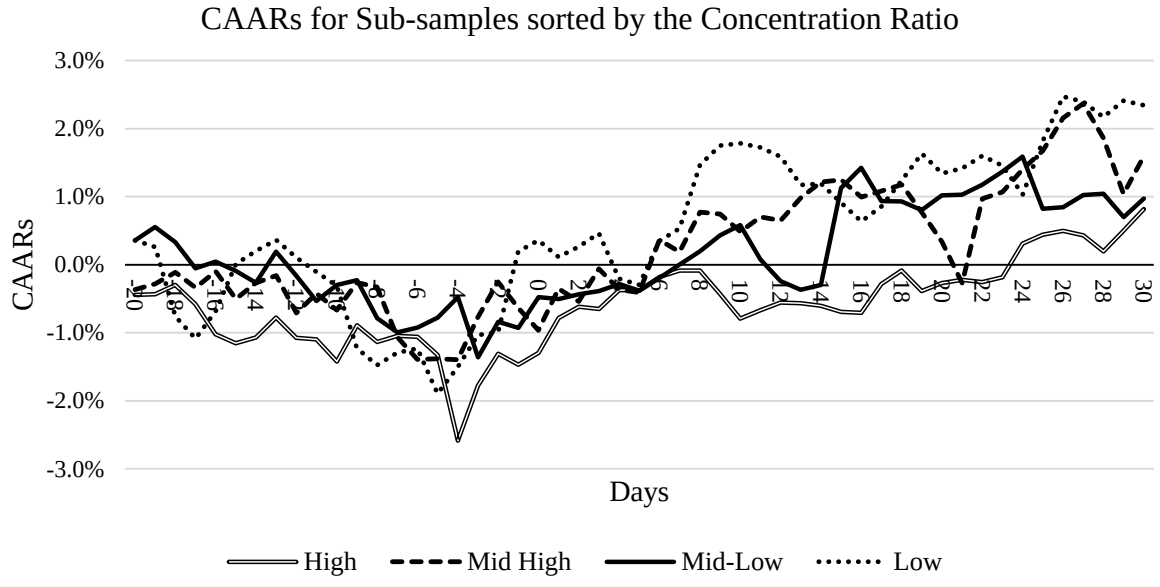
If the reaction is delayed as suggested above, this may draw some parallels to the results of Rau and Vermaelen (2002) in terms of the market reacting less positively to repurchases when the environment is less favourable. Given that this evidence is not entirely conclusive, it would be necessary to perform further tests on this relationship, particularly over a longer time period to fully account for the apparent underreaction.

4.6 OWNERSHIP CONCENTRATION (AGENCY CONFLICTS)

Ownership concentration is examined in this study to document the effects of both agency conflicts and corporate governance, with a specific focus on shareholder protection, on the market reaction to repurchase announcements.

If one follows the assertions of Jensen and Meckling (1976), the valuation of a firm will be higher when the degree of separation of ownership and control is lower. The logic behind this is that, when ownership becomes fractional, owner managers will not necessarily act in a way which is value-maximising for all shareholders, as they will seek to maximise their own utility. As such, one can assume that managers will make better decisions on behalf of shareholders when their level of ownership is more concentrated. In light of this, one would expect the market to be more receptive to a repurchase announcement when ownership concentration is higher. This relationship is examined by Zakaria, Zulkafli and Muhammad (2013) in a Malaysian context but the authors do not find the relationship to be significant. Ownership concentration was measured in two different ways in this study. First, using the Concentration Ratio, calculated as the largest shareholding divided by the sum of the five largest shareholdings. Second, using the Herfindahl Index, calculated as the sum of the squares of the five largest shareholdings.

In light of the above, this study hypothesizes that the reaction of the market to the repurchase announcement will be more positive for firms with a more highly concentrated ownership structure (high quartile), measured using the Concentration Ratio and the Herfindahl Index. The results are presented below.



* The CAARs illustrated above represents an average across the three methodologies of estimating expected returns.

Figure 11: CAARs for Sub-samples sorted by the Concentration Ratio.

Graphically, using the Concentration Ratio, it appears that all quartiles exhibit an upward trend in CAARs from just before the announcement date until the end of the event window, as well as a downward trend from the start of the event window until the information first hits the market, consistent with the full sample results. One cannot infer, however, if the reactions in the respective quartiles are significant and if a relationship exists between ownership concentration and the significance of the abnormal returns. The results of the significance tests are displayed below.

CAARs for sub-samples ordered by the Concentration Ratio - T-Test

	Mean Adjusted		Market Adjusted		CAPM	
Window	**CAARs**	**T-Stat**	**CAARs**	**T-Stat**	**CAARs**	**T-Stat**
High (n=36)						
-1,+1	0.61%	1.40	0.61%	1.35	0.36%	1.09
-2,+2	1.22%**	2.13	1.21%**	2.07	1.05%**	2.21
-5,-1	-0.44%	-0.28	-0.45%	-0.29	-0.34%	-0.23
+1,+5	0.98%	1.29	0.98%	1.24	0.80%	1.08
+3,+20	0.38%	0.31	0.36%	0.28	0.30%	0.27
-20,-4	-2.89%*	-1.78	-2.90%*	-1.81	-1.97%	-1.27
-3,+30	3.52%**	2.44	3.49%**	2.44	3.20%**	2.63
Mid-High (n=37)						
-1,+1	-0.06%	-0.11	-0.05%	-0.10	-0.19%	-0.41
-2,+2	0.27%	0.39	0.28%	0.40	0.15%	0.23
-5,-1	0.59%	0.68	0.60%	0.69	1.09%	1.44
+1,+5	0.66%	0.79	0.67%	0.80	0.35%	0.43
+3,+20	0.81%	0.81	0.85%	0.84	0.97%	1.15
-20,-4	-1.71%*	-1.84	-1.68%*	-1.75	-0.79%	-0.93
-3,+30	2.97%**	2.40	3.05%**	2.48	2.94%***	2.73
Mid-Low (n=37)						
-1,+1	0.33%	0.53	0.35%	0.59	0.33%	0.65
-2,+2	0.93%	1.11	0.97%	1.16	0.89%	1.23
-5,-1	0.04%	0.06	0.09%	0.12	-0.14%	-0.22
+1,+5	0.18%	0.29	0.22%	0.34	-0.12%	-0.18
+3,+20	1.29%	0.70	1.45%	0.69	1.62%	0.79
-20,-4	-0.78%	-0.66	-0.63%	-0.54	-0.01%	-0.01
-3,+30	1.17%	0.52	1.48%	0.55	1.70%	0.66
Low (n=36)						
-1,+1	1.05%	0.64	1.09%	0.67	1.18%	0.73
-2,+2	1.13%	0.65	1.19%	0.70	1.56%	0.95
-5,-1	1.27%	0.78	1.33%	0.83	1.68%	1.11
+1,+5	-0.69%	-0.66	-0.63%	-0.60	-0.63%	-0.63
+3,+20	0.92%	0.67	1.11%	0.78	1.22%	0.90
-20,-4	-1.88%	-1.02	-1.70%	-0.92	-0.92%	-0.50
-3,+30	3.46%*	1.76	3.83%*	2.03	4.26%**	2.51

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 21: CAARs for sub-samples ordered by the Concentration Ratio - T-Test

Most noticeable, from the results above, is the significantly positive reaction, over the -2, +2 window, for the high quartile. Although the magnitude of the CAAR is similar to that of the low quartile, the low quartile positive CAAR is not seen to be significantly different from zero. This result may provide some support for the assertion that, when ownership is more

concentrated, the repurchase is seen to be more credible, evidenced by the significantly positive reaction of the market.

CAARs for sub-samples ordered by the Concentration Ratio – Wilcoxon-Signed Rank Test

Window	Mean Adjusted CAARs	P-val	Market Adjusted CAARs	P-val	CAPM CAARs	P-val
High (n=36)						
-1,+1	0.61%	0.1622	0.61%	0.1544	0.36%	0.2336
-2,+2	1.22%**	0.0434	1.21%**	0.0305	1.05%**	0.0420
-5,-1	-0.44%	0.4105	-0.45%	0.4168	-0.34%	0.2644
+1,+5	0.98%*	0.0874	0.98%*	0.0849	0.80%	0.1786
-3,+20	0.38%	0.4871	0.36%	0.4742	0.30%	0.4678
-20,-4	-2.89%*	0.0567	-2.90%	0.1098	-1.97%	0.3856
-3,+30	3.52%**	0.0114	3.49%**	0.0114	3.20%***	0.0037
Mid-High (n=37)						
-1,+1	-0.06%	0.2501	-0.05%	0.2403	-0.19%*	0.0674
-2,+2	0.27%	0.3127	0.28%	0.3182	0.15%	0.3127
-5,-1	0.59%	0.4660	0.60%	0.4784	1.09%	0.2651
+1,+5	0.66%	0.3872	0.67%	0.3872	0.35%	0.4599
-3,+20	0.81%	0.2124	0.85%	0.1513	0.97%	0.1148
-20,-4	-1.71%**	0.0434	-1.68%*	0.0736	-0.79%	0.1273
-3,+30	2.97%**	0.0185	3.05%**	0.0141	2.94%**	0.0185
Mid-Low (n=37)						
-1,+1	0.33%	0.4907	0.35%	0.4784	0.33%	0.4722
-2,+2	0.93%	0.2355	0.97%	0.2124	0.89%	0.2215
-5,-1	0.04%	0.2261	0.09%	0.1948	-0.14%	0.2355
+1,+5	0.18%	0.4845	0.22%	0.4171	-0.12%	0.3350
-3,+20	1.29%	0.4784	1.45%	0.4722	1.62%	0.4415
-20,-4	-0.78%	0.1948	-0.63%	0.2169	-0.01%	0.4111
-3,+30	1.17%	0.3991	1.48%	0.4293	1.70%	0.4599
Low (n=36)						
-1,+1	1.05%	0.3672	1.09%	0.4105	1.18%	0.4422
-2,+2	1.13%	0.4043	1.19%	0.3491	1.56%	0.1396
-5,-1	1.27%	0.4232	1.33%	0.3432	1.68%	0.3255
+1,+5	-0.69%	0.4168	-0.63%	0.4295	-0.63%	0.3612
-3,+20	0.92%	0.2804	1.11%	0.2437	1.22%	0.1396
-20,-4	-1.88%***	0.0067	-1.70%**	0.0253	-0.92%	0.1068
-3,+30	3.46%***	0.0067	3.83%***	0.0030	4.26%***	0.0024

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 22: CAARs for sub-samples ordered by the Concentration Ratio – Wilcoxon-Signed Rank Test

From the above results, there does not appear to be much of a difference between the quartiles with regards to the significance of CAARs over the longer sub-windows. The results appear to be fairly consistent with the parametric results in terms of the observations made about the -2, +2 sub-window. The notion of a consistent relationship between ownership concentration and the reaction of the market seems questionable given the significantly negative (10% level)

reaction for the mid-high quartile for over the -1, +1 quartile. Another noticeable result is the significantly positive (10% level) reaction over the +1, +5 sub-window for the high quartile.

To further test the significance of the CAARs over the various sub-windows, sorted by the concentration ratio, a two-sample t-test is performed to test whether the positive reaction for the high quartile is significantly greater than that of the low quartile. The results are displayed below.

Two-sample T-Test test for sub-samples sorted by the Concentration Ratio

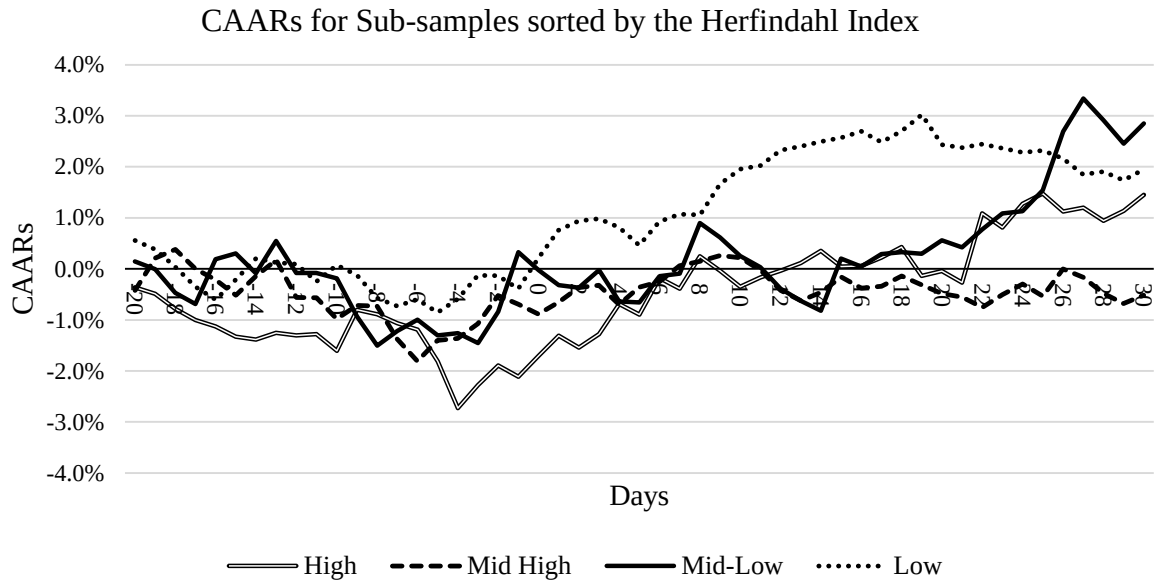
	Mean-Adjusted			Market-Adjusted			CAPM		
Window	**CAARs (H)**	**CAARs (L)**	**T-stat**	**CAARs (H)**	**CAARs (L)**	**T-stat**	**CAARs (H)**	**CAARs (L)**	**T-stat**
-1,+1	0.61%	1.05%	-0.26	0.61%	1.09%	-0.28	0.36%	1.18%	-0.50
-2,+2	1.22%	1.13%	0.04	1.21%	1.19%	0.01	1.05%	1.56%	-0.30
-5,-1	-0.44%	1.27%	-0.75	-0.45%	1.33%	-0.79	-0.34%	1.68%	-0.95
+1,+5	0.98%	-0.69%	1.28	0.98%	-0.63%	1.22	0.80%	-0.63%	1.14
+3,+20	0.38%	0.92%	-0.29	0.36%	1.11%	-0.39	0.30%	1.22%	-0.51
-20,-4	-2.89%	-1.88%	-0.41	-2.90%	-1.70%	-0.49	-1.97%	-0.92%	-0.44
-3,+30	3.52%	3.46%	0.02	3.49%	3.83%	-0.14	3.20%	4.26%	-0.51

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 23: Two-sample T-Test test for sub-samples sorted by the Concentration Ratio

Although the size of the difference in CAARs for the +1, +5 sub-window does appear to be large, it is not seen to be significant. Furthermore, even though the reaction for the high quartile was seen to be significantly different from zero over the -2, +2 sub-window, it is not significantly greater than the low quartile. This evidence, therefore, seems to suggest that a relationship between ownership concentration and the market reaction to repurchase announcements is weak, if not non-existent.

This relationship is further tested by sorting the quartiles according to the Herfindahl Index.



* The CAARs illustrated above represents an average across the three methodologies of estimating expected returns.

Figure 12: CAARs for Sub-samples sorted by the Herfindahl Index.

From the above graph, as in the case using the Concentration Ratio, an upward trend in CAARs is observed after the information about the repurchase first reaches the market. The same is true regarding a downward movement before the information reaches the market, and is more pronounced for the high quartile.

CAARs for sub-samples ordered by the Herfindahl Index - T-Test

Window	Mean Adjusted CAARs	Mean Adjusted T-Stat	Market Adjusted CAARs	Market Adjusted T-Stat	CAPM CAARs	CAPM T-Stat
High (n=36)						
-1,+1	0.58%	1.59	0.58%	1.52	0.60%	1.61
-2,+2	0.71%	1.61	0.71%	1.57	0.78%*	1.78
-5,-1	-0.96%	-0.66	-0.95%	-0.66	-0.87%	-0.63
+1,+5	0.84%	1.10	0.84%	1.05	0.75%	0.96
+3,+20	1.39%	1.46	1.39%	1.29	1.73%*	1.89
-20,-4	-2.70%*	-1.73	-2.70%*	-1.72	-2.78%*	-1.88
-3,+30	4.00%**	2.60	4.02%**	2.70	4.52%***	3.32
Mid-High (n=37)						
-1,+1	-0.09%	-0.20	-0.05%	-0.13	-0.25%	-0.67
-2,+2	0.71%	1.01	0.77%	1.13	0.64%	1.01
-5,-1	0.99%	1.06	1.05%	1.13	1.32%	1.54
+1,+5	0.61%	0.74	0.67%	0.82	0.30%	0.36
+3,+20	-0.23%	-0.23	-0.02%	-0.02	-0.10%	-0.11
-20,-4	-2.05%*	-1.73	-1.85%	-1.66	-0.19%	-0.18
-3,+30	0.69%	0.48	1.08%	0.75	0.76%	0.65
Mid-Low (n=37)						
-1,+1	0.45%	0.29	0.49%	0.31	0.62%	0.41
-2,+2	1.01%	0.61	1.07%	0.65	1.19%	0.74
-5,-1	1.29%	0.79	1.35%	0.84	1.33%	0.86
+1,+5	-0.58%	-0.61	-0.53%	-0.54	-0.79%	-0.85
+3,+20	0.80%	0.39	1.00%	0.44	0.98%	0.44
-20,-4	-1.40%	-1.24	-1.21%	-0.98	-1.17%	-0.95
-3,+30	3.91%	1.64	4.30%	1.60	4.12%	1.54
Low (n=36)						
-1,+1	0.99%	1.25	0.98%	1.23	0.71%	1.06
-2,+2	1.09%	1.12	1.08%	1.10	1.02%	1.28
-5,-1	0.09%	0.11	0.08%	0.09	0.45%	0.71
+1,+5	0.29%	0.38	0.28%	0.37	0.17%	0.27
+3,+20	1.48%	1.20	1.43%	1.12	1.56%	1.35
-20,-4	-1.09%	-0.61	-1.14%	-0.65	0.46%	0.27
-3,+30	2.52%	1.65	2.43%	1.52	2.68%**	2.14

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 24: CAARs for sub-samples ordered by the Herfindahl Index - T-Test

The results from the Herfindahl Index appear to be fairly similar to that of the Concentration Ratio. The positive reaction over the -2, +2 sub-window for the high quartile does not appear to be as significant, although still significant at the 10% level for CAPM expected returns. Different to the Concentration Ratio results, the +3, +20 positive CAAR for the high quartile is seen to be significant (10% level) for CAPM expected returns.

CAARs for sub-samples ordered by the Herfindahl Index – Wilcoxon-Signed Rank Test

Window	Mean Adjusted CAARs	P-val	Market Adjusted CAARs	P-val	CAPM CAARs	P-val
High (n=36)						
-1,+1	0.58%	0.2191	0.58%	0.1872	0.60%	0.1257
-2,+2	0.71%	0.1224	0.71%	0.1129	0.78%	0.1010
-5,-1	-0.96%	0.3795	-0.95%	0.4295	-0.87%	0.4550
+1,+5	0.84%	0.3672	0.84%	0.3795	0.75%	0.3612
+3,+20	1.39%	0.1583	1.39%	0.1915	1.73%**	0.0449
-20,-4	-2.70%*	0.0605	-2.70%	0.1192	-2.78%	0.1325
-3,+30	4.00%***	0.0064	4.02%***	0.0032	4.52%***	0.0003
Mid-High (n=37)						
-1,+1	-0.09%	0.3182	-0.05%	0.3636	-0.25%	0.0578
-2,+2	0.71%	0.2550	0.77%	0.2079	0.64%	0.3018
-5,-1	0.99%	0.1948	1.05%	0.1089	1.32%*	0.0526
+1,+5	0.61%	0.1148	0.67%*	0.0875	0.30%	0.3695
+3,+20	-0.23%	0.4660	-0.02%	0.3636	-0.10%	0.4722
-20,-4	-2.05%**	0.0232	-1.85%*	0.0597	-0.19%	0.3872
-3,+30	0.69%	0.1864	1.08%	0.1241	0.76%	0.1061
Mid-Low (n=37)						
-1,+1	0.45%	0.1477	0.49%	0.1663	0.62%	0.1625
-2,+2	1.01%	0.4476	1.07%	0.4415	1.19%	0.4845
-5,-1	1.29%	0.4969	1.35%	0.4171	1.33%	0.4537
+1,+5	-0.58%	0.4293	-0.53%	0.4476	-0.79%	0.2753
+3,+20	0.80%	0.3293	1.00%	0.3521	0.98%	0.3695
-20,-4	-1.40%	0.1339	-1.21%	0.1864	-1.17%	0.1477
-3,+30	3.91%	0.1061	4.30%	0.1179	4.12%	0.1442
Low (n=36)						
-1,+1	0.99%	0.3083	0.98%	0.2859	0.71%	0.2697
-2,+2	1.09%	0.2287	1.08%	0.2005	1.02%	0.1038
-5,-1	0.09%	0.2750	0.08%	0.2804	0.45%*	0.0954
+1,+5	0.29%	0.4486	0.28%	0.4614	0.17%	0.3980
+3,+20	1.48%	0.1544	1.43%	0.1703	1.56%	0.1068
-20,-4	-1.09%**	0.0405	-1.14%**	0.0305	0.46%	0.2644
-3,+30	2.52%**	0.0263	2.43%**	0.0226	2.68%***	0.0054

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 25: CAARs for sub-samples ordered by the Herfindahl Index – Wilcoxon-Signed Rank Test

The non-parametric results above appear to be fairly consistent with the parametric t-test results, although the CAAR for the high quartile over the -2, +2 sub-window does not appear to be significant. The results from both sets of tests seem fairly consistent with that of the Concentration Ratio with regards to there being a lack of a relationship between ownership concentration and the reaction of the market.

To further test the significance of the CAARs over the various sub-windows, sorted by the Herfindahl Index, a two-sample t-test is performed to test whether the positive reaction for the high quartile is significantly greater than that of the low quartile. The results are displayed below.

Two-sample T-Test test for sub-samples sorted by the Herfindahl Index

Window	Mean-Adjusted CAARs (H)	Mean-Adjusted CAARs (L)	Mean-Adjusted T-stat	Market-Adjusted CAARs (H)	Market-Adjusted CAARs (L)	Market-Adjusted T-stat	CAPM CAARs (H)	CAPM CAARs (L)	CAPM T-stat
-1,+1	0.58%	0.99%	-0.47	0.58%	0.98%	-0.45	0.60%	0.71%	-0.14
-2,+2	0.71%	1.09%	-0.36	0.71%	1.08%	-0.34	0.78%	1.02%	-0.27
-5,-1	-0.96%	0.09%	-0.62	-0.95%	0.08%	-0.61	-0.87%	0.45%	-0.87
+1,+5	0.84%	0.29%	0.50	0.84%	0.28%	0.51	0.75%	0.17%	0.56
+3,+20	1.39%	1.48%	-0.06	1.39%	1.43%	-0.02	1.73%	1.56%	0.11
-20,-4	-2.70%	-1.09%	-0.68	-2.70%	-1.14%	-0.66	-2.78%	0.46%	-1.44*
-3,+30	4.00%	2.52%	0.68	4.02%	2.43%	0.73	4.52%	2.68%	0.99

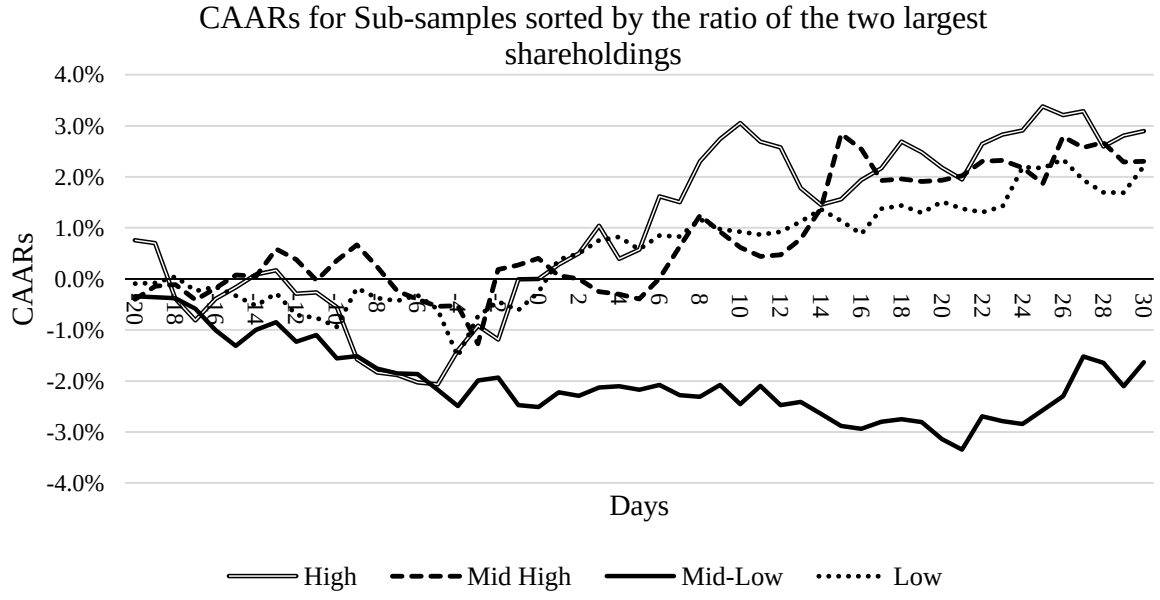
*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 26: Two-sample T-Test test for sub-samples sorted by the Herfindahl Index

The results of the two sample t-test above appear to support the findings of the concentration ratio. There is only one instance of a significant result in the above table and it relates to the sub-window before the announcement. Overall, the results of the three tests, as well as the results from the Concentration Ratio, seem to suggest that a relationship between ownership concentration and the market reaction does not exist.

4.7 CORPORATE GOVERNANCE (SHAREHOLDER PROTECTION)

To test the effect of shareholder protection and corporate governance on the reaction of the market, subsamples are formed according to the ratio of the second highest shareholding to the highest shareholding. This is premised on the notion that the market will view an announcement as being more favourable if an appreciable level of investor protection is present, as this is likely to add credibility to the announcement. Ginlinger & L'Her (2002) note the importance of a second, large controlling shareholder to discipline the behaviour of the controlling shareholder to protect minority shareholders. Therefore, with this understanding, one would expect the reaction of the market to have a positive relationship with the level of shareholder protection.



* The CAARs illustrated above represents an average across the three methodologies of estimating expected returns.

Figure 13: CAARs for Sub-samples sorted by the ratio of two largest shareholdings.

Graphically speaking, it appears that the high quartile has the largest positive reaction to the repurchase announcement, consistent with expectations. All quartiles, with the exception of the mid-low quartile, exhibit a positive reaction to the announcement. The observed movement of the mid-low quartile appears to be spurious.

CAARs for sub-samples ordered by the ratio of two largest shareholdings - T-Test

Window	Mean Adjusted CAARs	Mean Adjusted T-Stat	Market Adjusted CAARs	Market Adjusted T-Stat	CAPM CAARs	CAPM T-Stat
High (n=36)						
-1,+1	1.44%	0.90	1.43%	0.91	1.54%	0.99
-2,+2	1.30%	0.77	1.29%	0.78	1.67%	1.05
-5,-1	1.96%	1.19	1.96%	1.21	2.14%	1.41
+1,+5	0.62%	0.60	0.61%	0.59	0.49%	0.49
+3,+20	1.82%	1.41	1.81%	1.33	1.41%	1.03
-20,-4	-1.54%	-0.83	-1.55%	-0.83	-1.11%	-0.59
-3,+30	4.25%**	2.36	4.23%**	2.60	4.41%***	3.03
Mid-High (n=37)						
-1,+1	-0.10%	-0.16	-0.06%	-0.10	-0.18%	-0.30
-2,+2	1.26%	1.50	1.33%	1.60	1.23%	1.56
-5,-1	0.64%	0.67	0.71%	0.76	0.67%	0.78
+1,+5	-0.84%	-0.99	-0.77%	-0.89	-0.79%	-0.95
+3,+20	1.60%	0.88	1.85%	0.88	2.36%	1.16
-20,-4	-0.89%	-0.80	-0.66%	-0.59	-0.02%	-0.02
-3,+30	2.44%	1.04	2.90%	1.05	3.16%	1.17
Mid-Low (n=37)						
-1,+1	-0.26%	-0.53	-0.26%	-0.52	-0.33%	-0.75
-2,+2	-0.23%	-0.33	-0.23%	-0.33	-0.44%	-0.74
-5,-1	-0.74%	-1.09	-0.74%	-1.08	-0.35%	-0.59
+1,+5	0.52%	0.75	0.52%	0.75	-0.02%	-0.04
+3,+20	-0.96%	-0.80	-0.96%	-0.81	-0.60%	-0.62
-20,-4	-2.80%***	-2.79	-2.79%***	-2.83	-1.88%**	-2.28
-3,+30	0.86%	0.64	0.87%	0.67	0.85%	0.80
Low (n=36)						
-1,+1	0.88%*	1.70	0.90%*	1.70	0.67%	1.56
-2,+2	1.22%*	1.93	1.26%*	1.94	1.20%**	2.19
-5,-1	-0.38%	-0.25	-0.34%	-0.23	-0.17%	-0.12
+1,+5	0.86%	1.29	0.90%	1.29	0.75%	1.14
+3,+20	0.97%	0.94	1.11%	0.97	0.97%	0.97
-20,-4	-2.01%	-1.25	-1.88%	-1.17	-0.65%	-0.43
-3,+30	3.60%**	2.57	3.86%**	2.72	3.69%***	3.00

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 27: CAARs for sub-samples ordered by the ratio of the two largest shareholdings – T-Test

Although the size of the positive CAARs for the high quartile, over the -1, +1 and -2, +2 sub-windows, are greater than the low quartile, the CAARs for the low quartile are seen to be significant. The significance of these results is in apparent contradiction of expectations, as one would expect the high quartile to exhibit a significantly positive result. Furthermore, in terms of the hypothesized relationship between shareholder protection and the market reaction, there does not appear to be a consistent pattern throughout the quartiles, suggesting a lack of support for this relationship.

CAARs for sub-samples ordered by the ratio of two largest shareholdings – Wilcoxon Signed -Rank Test

Window	Mean Adjusted CAARs	P-val	Market Adjusted CAARs	P-val	CAPM CAARs	P-val
High (n=36)						
-1,+1	1.44%	0.4550	1.43%	0.4807	1.54%	0.4105
-2,+2	1.30%	0.4295	1.29%	0.4043	1.67%	0.2191
-5,-1	1.96%*	0.0874	1.96%*	0.0567	2.14%**	0.0449
+1,+5	0.62%	0.1129	0.61%	0.1291	0.49%	0.2050
-3,+20	1.82%*	0.0800	1.81%*	0.0849	1.41%*	0.0753
-20,-4	-1.54%**	0.0244	-1.55%**	0.032	-1.11%*	0.0874
-3,+30	4.25%***	0.0022	4.23%***	0.0022	4.41%***	0.0013
Mid-High (n=37)						
-1,+1	-0.10%	0.3931	-0.06%	0.3931	-0.18%	0.3406
-2,+2	1.26%*	0.0694	1.33%**	0.0463	1.23%**	0.0380
-5,-1	0.64%	0.3521	0.71%	0.3072	0.67%	0.3931
+1,+5	-0.84%**	0.0343	-0.77%**	0.0380	-0.79%**	0.0259
-3,+20	1.60%	0.3695	1.85%	0.4051	2.36%	0.2651
-20,-4	-0.89%	0.1407	-0.66%	0.2501	-0.02%	0.4171
-3,+30	2.44%	0.1823	2.90%	0.1513	3.16%*	0.0925
Mid-Low (n=37)						
-1,+1	-0.26%	0.1864	-0.26%	0.1864	-0.33%*	0.0803
-2,+2	-0.23%	0.1906	-0.23%	0.2215	-0.44%*	0.0758
-5,-1	-0.74%	0.2403	-0.74%	0.2501	-0.35%	0.3872
+1,+5	0.52%	0.2124	0.52%	0.1587	-0.02%	0.4232
-3,+20	-0.96%	0.2550	-0.96%	0.2452	-0.60%	0.4660
-20,-4	-2.80%***	0.0059	-2.79%***	0.0073	-1.88%**	0.0320
-3,+30	0.86%	0.2308	0.87%	0.2452	0.85%	0.2550
Low (n=36)						
-1,+1	0.88%	0.1224	0.90%*	0.0981	0.67%	0.1828
-2,+2	1.22%	0.1224	1.26%*	0.0776	1.20%**	0.0391
-5,-1	-0.38%	0.4358	-0.34%	0.4295	-0.17%	0.2191
+1,+5	0.86%	0.1662	0.90%	0.1703	0.75%	0.2804
-3,+20	0.97%	0.3491	1.11%	0.2804	0.97%	0.2437
-20,-4	-2.01%	0.1703	-1.88%	0.3491	-0.65%	0.2750
-3,+30	3.60%**	0.0119	3.86%***	0.0080	3.69%***	0.0020

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 28: CAARs for sub-samples ordered by the ratio of the two largest shareholders – Wilcoxon Signed-Rank Test

The findings of the non-parametric test appear to be fairly consistent with the result of the parametric t-test. This further suggests the lack of a relationship between shareholder protection and the reaction of the market to the repurchase announcement.

To further test the significance of the CAARs over the various sub-windows, sorted by the ratio of the two largest shareholdings, a two-sample t-test is performed to test whether the positive reaction for the high quartile is significantly greater than that of the low quartile. The results are displayed below.

Two-sample T-Test test for sub-samples sorted by the ratio of the two largest shareholdings

	Mean-Adjusted			Market-Adjusted			CAPM		
Window	CAARs (H)	CAARs (L)	T-stat	CAARs (H)	CAARs (L)	T-stat	CAARs (H)	CAARs (L)	T-stat
-1,+1	1.44%	0.88%	0.33	1.43%	0.90%	0.32	1.54%	0.67%	0.54
-2,+2	1.30%	1.22%	0.04	1.29%	1.26%	0.02	1.67%	1.20%	0.28
-5,-1	1.96%	-0.38%	1.05	1.96%	-0.34%	1.04	2.14%	-0.17%	1.11
+1,+5	0.62%	0.86%	-0.20	0.61%	0.90%	-0.23	0.49%	0.75%	-0.22
+3,+20	1.82%	0.97%	0.51	1.81%	1.11%	0.39	1.41%	0.97%	0.26
-20,-4	-1.54%	-2.01%	0.19	-1.55%	-1.88%	0.13	-1.11%	-0.65%	-0.19
-3,+30	4.25%	3.60%	0.28	4.23%	3.86%	0.17	4.41%	3.69%	0.38

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 29: Two-sample T-Test test for sub-samples sorted by the ratio of the two largest shareholdings

The absence of significant results from the table above seems to further indicate that there is no relationship between the ratio of the two largest shareholders, as a proxy for investor protection, and the reaction of the market to repurchase announcements.

4.8 DISCUSSION OF RESULTS

The full sample results present a number of interesting observations. First, there is a positive market reaction to the repurchase announcement. Moreover, it appears that this positive reaction occurs from day -3, illustrating that the news of the repurchase actually reaches the market before the announcement is made. This may highlight the presence of insider trading on repurchase information, on the JSE. Second, it appears that the reaction to the announcement is incomplete immediately following the announcement. This is illustrated by the upward trend in CAARs for the remainder of the event window. This may be due to a number of reasons, such as a lack of market efficiency, the market ignoring a large degree of the information and/or the market exhibiting an appreciable degree of scepticism towards the announcement. This observation is consistent with the findings of Bhana (2007) and the underreaction hypothesis put forward by Ikenberry et al. (1995). Last, it is apparent from the results that there is a fair degree of market timing in terms of making the announcement. This is illustrated by the significantly negative CAAR, over the -20, -4 sub-window, leading up to the initial reaction of the market, which is consistent with recent international studies such as Akyol & Foo (2013) in Australia.

To test the theories of repurchase motives, repurchase announcements were sorted into quartiles depending on certain proxy variables. Furthermore, it was examined if corporate

governance, shareholder protection and tax rates affected the nature of the market's reaction to the repurchase announcement.

According to prior literature, the main motivation behind a repurchase is the apparent undervaluation of the firm in the secondary market (Ikenberry et al., 1995). Managers may use repurchases to signal to the market that the stock is undervalued. This is seen as a positive signal, as a rational investor will only purchase shares when they are undervalued. Following this logic, this study tests this theory by examining the reaction of the market to the announcement. Undervaluation was measured using 6-month prior returns, B/M ratio and the proportion of outstanding shares repurchased.

The results of the tests appear to provide support for the signalling theory. A positive relationship is seen between B/M and the initial reaction of the market. This is consistent with Ikenberry et al. (1995)'s assertion that high B/M firms are more likely to have undervaluation as the primary motivation behind a repurchase. A negative relationship is seen between the 6-month prior returns and the market reaction, consistent with the assertions of Stephens and Weisbach (1998). This also suggests a fair degree of market timing on behalf of management. It should be noted, however, that this relationship is only apparent in the short sub-windows around the announcement. The longer periods before, and after, the announcement illustrate that, although the market reacts to the announcement, the reaction itself is not enough to significantly alter the momentum of past returns. The results pertaining to the relationship between the proportion of shares repurchased and the reaction of the market appear to be spurious, which appear to contradict the findings of McNally (1999).

Another suggested leading motive behind a repurchase is the free cash flow hypothesis premised on the free cash flow theory, and its associated agency problems, articulated by Jensen (1986). To test this hypothesis, the study sorted repurchases according to Tobin's Q, said to be a measure of over- and underinvestment (Wang, Strong, Tung, & Lin, 2009). The results seemingly illustrate that the reaction to the announcement is significantly more positive for overinvesting firms compared to underinvesting firms. This is consistent with expectations, as managers of overinvesting firms are more likely to misappropriate funds if excess cash is not paid out. On the converse, there is a negative reaction to the announcement for firms considered to be underinvesting firms. This, too, is consistent with expectations as these firms would be better off reinvesting funds in the company.

In the short-term investigated in this study, little to no support was seen for the market reacting differently to repurchase announcements as a result of an increase in CGT rates. Although this is the case, the reaction was seen to be significantly more positive for the lower tax rate over the -3, +30 window. For this observation to have true substance, this investigation would need to be extended beyond the thirty days after the announcement to see if this upward trend persists for the lower CGT rate. If so, this would be consistent with expectations based on the findings of Moser (2007) and Rau and Vermaelen (2002).

The study investigated the potential relationship between ownership concentration and the market reaction to the repurchase announcement, as hypothesized by Zakaria, Zulkafli and Muhammad (2013). This was tested using both the Concentration Ratio and the Herfindahl Index as proxies for ownership concentration. The results of both the parametric and non-parametric tests appeared to lack clear evidence to suggest that a relationship exists between the proxies for ownership concentration and the reaction to the announcement.

Ginlinger & L'Her (2002) note the importance of having a second large shareholder for protecting the rights of minority shareholders. This large shareholding will likely result in a contest for power, in which the two controlling shareholders will look to win over minority shareholders and, in so doing, create value for shareholders. The paper further notes that the reaction of the market is positively related to the level of shareholder protection and corporate governance. Contrary to expectations, the results of the tests conducted on the ratio of the second largest shareholding to the largest shareholding, in this study, do not appear to support the relationship put forward by Ginlinger & L'Her (2002).

CHAPTER 5

CONCLUSION

This study investigated the short-term market reaction on the JSE to repurchase announcements to gain a better understanding of the market's perception of this method of corporate pay-out. A number of noticeable findings were made, generally consistent with prior literature. First, the market reacts positively to repurchase announcements on the JSE. Second, although the market reacts positively around the announcement date, the reaction is not complete, evidenced by an upward trend in CAARs for the remainder on the event window. The long term reaction beyond the event window is outside the scope of this study. Third, the positive market reaction appears to begin before the announcement, suggesting the possibility of insider trading on the repurchase information.

Further, noticeable findings were made with respect to repurchase motivations and company characteristics. First, results appear to provide support for the signalling (undervaluation) and market timing hypotheses. This is evidenced by a significantly positive reaction for firms that had performed poorly over the 6-month period before the announcement. Further, using the proxy of 6-month prior returns, it was seen that, although the market reacts significantly to the announcement initially, it is not enough of a reaction to change the momentum of past returns. The initial reaction is also worth mentioning. For firms that have performed well over the past 6 months, the initial reaction was seen to be significantly negative. This makes intuitive sense, as the market is seemingly punishing the firm for paying too much for the shares. Conversely, a significantly positive initial reaction is seen for firms that have performed poorly. This, again, makes intuitive sense as the market is responding positively to the firm making a relatively good investment, assuming the price paid is below intrinsic value. Further support is provided for the signalling (undervaluation) hypothesis, seen be a significantly more positive initial reaction for high B/M firms.

Second, support was seen for the free cash flow hypothesis. For overinvesting firms, a significantly positive initial reaction was seen and, interestingly, a significantly negative initial reaction was seen for underinvesting firms. The market seemingly punishes underinvesting firms in this instance, as the firm would be better off reinvesting the funds within the firm, under the assumption of available positive NPV projects. The market is seen to reward

overinvesting firms, as the firm has disgorged cash which would have been misappropriated if left in the firm.

Third, in the short term, as investigated in this study, there does not seem to be a relationship between CGT rates and the reaction of the market to the announcement. Although this is the case, the results indicate that a relationship may exist over the long term. This, however, would need to be confirmed by extending this investigation over a longer post-event window which, unfortunately, is beyond the scope of this paper.

Fourth, little to no support was seen for ownership concentration and shareholder protection having a significant effect on the market reaction to the repurchase announcement. It may be worthwhile to investigate this relationship further using different proxies for ownership concentration and shareholder protection, as well as observing the relationship over a longer period.

The results of the study, therefore, provide support for a number of the findings from Bhana (2007). This illustrates the persistence of the positive reaction, underreaction and support for the signalling hypothesis, using a more recent, and larger, sample on the JSE. Observing the long-run reaction, as in Bhana (2007), unfortunately goes beyond the scope of this study. Support for the free cash flow is a new addition to the literature on repurchases in South Africa, and the long-run reaction should be investigated in further studies.

REFERENCES

Abuaf, N. (2012). Excess Cash and Shareholder Payout Strategies. *Journal of Applied Corporate Finance, 24*(3), 39-54.

Ahern, K. R. (2009). Sample Selection and Event Study Estimation. *Journal of Empirical Finance, 16*, 466-482.

Akyol, A. C., & Foo, C. C. (2013). Share Repurchase Reasons and the Market Reaction to Actual Share Repurchases: Evidence from Australia. *International Review of Finance, 13*(1), 1-37.

Allen, F., Bernardo, A. E., & Welch, I. (2000). A Theory of Dividends Based on Tax Clienteles. *The Journal of Finance, 55*(6), 2499-2536.

Asquith, P., & Mullins, D. W. (1986). Signalling with Dividends, Stock Repurchases, and Equity Issues. *Financial Management, 15*(3), 27-44.

Attig, N., El Ghoul, S., & Guedhami, O. (2009). Do Multiple Large Shareholders Play a Corporate Governance Role? Evidence from East Asia. *Journal of Financial Research, 32*(4), 395-422.

Babenko, I., Tserlukevich, Y., & Vedrashko, A. (2012). The Credibility of Open Market Share Repurchase Signalling. *Journal of Financial and Quantitative Analysis, 47*(5), 1059-1088.

Bagnoli, M., Gordon, R., & Lipman, B. L. (1989). Stock Repurchase as a Takeover Defense. *The Review of Financial Studies, 2*(3), 423-443.

Bagwell, L. S. (1991). Share Repurchase and Takeover Deterrence. *The RAND Journal of Economics, 22*(1), 72-88.

Bagwell, L. S., & Shoven, J. B. (1989). Cash Distributions to Shareholders. *Journal of Economic Perspectives, 3*(3), 129-140.

Baker, M., & Wurgler, J. (2002). Market Timing and Capital Structure. *The Journal of Finance, 57*(1), 1-32.

Banerjee, S., Gatchev, V. A., & Spindt, P. A. (2007). Stock Market Liquidity and Firm Dividend Policy. *The Journal of Financial and Quantitative Analysis, 42*(2), 369-397.

Bhana, N. (2007). The Market Reaction to Open Market Share Repurchases Announcements: The South African Experience. *Investment Analysts Journal, 65*, 25-36.

Bierman, H. J., & West, R. (1966). The Acquisition of Common Stock by the Corporate Issuer. *The Journal of Finance, 21*(4), 687-696.

Billett, M. T., & Xue, H. (2007). The Takeover Deterrent Effect of Open Market Share Repurchases. *The Journal of Finance, 62*(4), 1827-1850.

Binder, J. J. (1998). The Event Study Methodology Since 1969. *Review of Quantitative Finance and Accounting, 11*, 111-137.

Bloch, F., & Hege, U. (2003). *Multiple Shareholders and Control Contests*. Unpublished Working Paper. HEC School of Management.

Boehmer, E., Musumeci, J., & Poulsen, A. B. (1991). Event-Study Methodology Under Conditions of Event-Induced Variance. *Journal of Financial Economics, 30*(2), 253-272.

Bonaimé, A. A. (2012). Repurchases, Reputation, and Returns. *Journal of Financial and Quantitative Analysis, 47*(2), 469-491.

Brav, A., Graham, J. R., Harvey, C. R., & Michaely, R. (2005). Payout Policy in the 21st Century. *Journal of Financial Economics, 77*(3), 483-527.

Brown, S. J., & Warner, J. B. (1980). Measuring Security Price Performance. *Journal of Financial Economics, 8,* 205-258.

Brown, S. J., & Warner, J. B. (1985). Using Daily Stocks Returns: The Case of Event Studies. *Journal of Financial Economics, 14*, 3-31.

Chan, K., Ikenberry, D., & Lee, I. (2004). Economic Sources of Gain in Stock Repurchases. *The Journal of Financial and Quantitative Analysis, 39*(3), 461-479.

Chhachhi, I. S., & Davidson, W. N. (1997). A Comparison of the Market Reaction to Specially Designated Dividends and Tender Offer Stock Repurchases. *Financial Management, 26*(3), 89-96.

Chowdhry, B., & Nanda, V. (1994). Repurchase Premia as a Reason for Dividends: A Dynamic Model of Corporate Payout Policies. *The Review of Financial Studies, 7*(2), 321-350.

Comment, R., & Jarrell, G. A. (1991). The Relative Signalling Power of Dutch-Auction and Fixed-Price Self-Tender Offers and Open-Market Share Repurchases. *The Journal of Finance, 46*(4), 1243-1271.

Cudd, M., Duggal, R., & Sarkar, S. (1996). Share Repurchases Motives and Stock Market Reaction. *Quarterly Journal of Business and Economics, 35*(2), 66-76.

Dann, L. Y. (1981). Common Stock Repurchases. *Journal of Financial Economics, 9*, 113-138.

Denis, D. J. (1990). Defensive Changes in Corporate Payout Policy: Share Repurchases and Special Dividends. *The Journal of Finance, 45*(5), 1433-1456.

Dittmar, A. K. (2000). Why Do Firms Repurchase Stock? *The Journal of Business, 73*(3), 331-355.

D'Mello, R., & Shroff, P. K. (2000). Equity Undervaluation and Decisions Related to Repurchase Tender Offers: An Empirical Investigation. *The Journal of Finance, 55*(5), 2399-2424.

Dyckman, T., Philbrick, D., & Stephan, J. (1984). A Comparison of Event Study Methodologies Using Daily Stock Returns: A Simulation Approach. *Journal of Accounting Research, 22*, 1-30.

Easterbrook, F. H. (1984). Two Agency-Cost Explanations of Dividends. *The American Economic Review, 74*(4), 650-659.

Elton, E., & Gruber, M. (1968). The Effect of Share Repurchase on the Value of the Firm. *The Journal of Finance, 23*(1), 135-149.

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance, 25*(2), 383-417.

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The Adjustment of Stock Prices to New Information. *International Economic Review, 10*(1), 1-21.

Gay, G. D., Kale, J. R., & Noe, T. H. (1991). Share Repurchase Mechanisms: A Comparative Analysis of Efficacy, Shareholder Wealth, and Corporate Control Effects. *Financial Management, 20*(1), 44-59.

Ginlinger, E., & L'Her, J.-F. (2002). *Ownership Structure and Open Market Stock Repurchases in France.* Paris: Université Paris XII.

Gomes, A., & Novaes, W. (1999). *Multiple Large Shareholders in Corporate Governance.* Unpublished Working Paper. The Wharton School.

Grinstein, Y., & Michaely, R. (2005). Institutional Holdings and Payout Policy. *The Journal of Finance, 60*(3), 1389-1426.

Grullon, G., & Michaely, R. (2002). Dividends, Share Repurchases, and the Substitution Hypothesis. *The Journal of Finance, 57*(4), 1649-1684.

Grullon, G., & Michaely, R. (2004). The Information Content of Share Repurchase Programs. *The Journal of Finance, 59*(2), 651-680.

Guthart, L. A. (1967). Why Companies Are Buying Back Their Own Stock. *Financial Analysts Journal, 23*(2), 105-110.

Hausch, D. B., & Seward, J. K. (1993). Signalling with Dividends and Share Repurchases: A Choice between Deterministic and Stochastic Cash Disbursements. *The Review of Financial Studies, 6*(1), 121-154.

Hillier, D., Grinblatt, M., & Titman, S. (2012). *Financial Markets and Corporate Strategy.* Berkshire: McGraw-Hill.

Hovakimian, A. (2004). The Role of Target Leverage in Security Issues and Repurchases. *The Journal of Business, 77*(4), 1041-1072.

Hovakimian, A., Opler, T., & Titman, S. (2001). The Debt-Equity Choice. *The Journal of Financial and Quantitative Analysis, 36*(1), 1-24.

Howe, K. M., He, J., & Wenchi Kao, G. (1992). One-Time Cash Flow Announcements and Free Cash-Flow Theory: Share Repurchases and Special Dividends. *The Journal of Finance, 47*(5), 1963-1975.

Hsieh, J., & Wang, Q. (2008). Insiders' Tax Preferences and Firms' Choices between Dividends and Share Repurchases. *The Journal of Financial and Quantitative Analysis, 43*(1), 213-244.

Huddart, S. (1993). The Effect of a Large Shareholder on Corporate Value. *Management Science, 39*(11), 1407-1421.

IBA Corporate and M&A Law Committee. (2014). *Treasury Shares Guide*. IBA Corporate and M&A Law Committee 2014.

Ikenberry, D., Lakonishok, J., & Vermaelen, T. (1995). Market Underreaction to Open Market Share Repurchases. *Journal of Financial Economics, 39*, 181-208.

Jain, R. (2007). Institutional and Individual Investor Preferences for Dividends and Share Repurchases. *Journal of Economics and Business, 59*, 406-429.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review, 76*(2), 323-329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure. *Journal of Financial Economics, 3*(4), 305-360.

Lakonishok, J., & Vermaelen, T. (1990). Anomalous Price Behavior Around Repurchase Tender Offers. *The Journal of Finance, 45*(2), 455-477.

Lie, E. (2005). Financial Flexibility, Performance, and the Corporate Payout Choice. *The Journal of Business, 78*(6), 2179-2202.

Lie, E., & Lie, H. J. (1999). The Role of Personal Taxes in Corporate Decisions: An Empirical Analysis of Share Repurchases and Dividends. *The Journal of Financial and Quantitative Analysis, 34*(4), 533-552.

Liu, C.-S., & Ziebart, D. A. (1997). Stock Returns and Open-Market Stock Repurchase Announcements. *The Financial Review, 32*(3), 709-728.

Lo, K.-H., Kehluh, W., & Yeh, C.-T. (2008). Stock Repurchase and Agency Problems: New Evidence in Taiwan's Stock Market. *Emerging Markets Finance & Trade, 44*(1), 84-94.

Maroun, W., Turner, M., & Coldwell, D. (2014). Capital Gains Tax in South Africa: Perceptions of Fairness? *South African Journal of Economic and Management Sciences, 17*(2), 124-139.

McNally, W. J. (1999). Open Market Stock Repurchase Signalling. *Financial Management, 28*(2), 55-67.

Medury, P. V., Bowyer, L. E., & Srinivasan, V. (1992). Stock Repurchases: A Multivariate Analysis of Repurchasing Firms. *Quarterly Journal of Business and Economics, 31*(1), 21-44.

Miller, M. H., & Modigliani, F. (1961). Dividend Policy, Growth, and the Valuation of Shares. *The Journal of Business, 34*(4), 411-433.

Modigliani, F., & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review, 48*(3), 261-297.

Moser, W. J. (2007). The Effect of Shareholder Taxes on Corporate Payout Choice. *The Journal of Financial and Quantitative Analysis, 42*(4), 991-1019.

Myers, S. C. (1993). Still Searching for Optimal Capital Structure. *Journal of Applied Corporate Finance, 6*(1), 4-14.

Nageswara Rao, S., & Sreejith, U. (2014). Event Study Methodology: A Critical Review. *The Macrotheme Review, 3*(1), 40-53.

Paulsen, N. (2012, February 23). *Increase in Capital Gains Tax Rates*. (Cliffe Dekker Hofmeyr) Retrieved from Polity Website: http://www.polity.org.za/article/increase-in-capital-gains-tax-rates-2012-02-23

Peterson, P. P. (1989). Event Studies: A Review of Issues and Methodology. *Quarterly Journal of Business and Economics, 28*(3), 36-66.

Peyer, U., & Vermaelen, T. (2009). The Nature and Persistence of Buyback Anomalies. *The Review of Financial Studies, 22*(4), 1693-1745.

Rau, P. R., & Vermaelen, T. (2002). Regulation, Taxes, and Share Repurchases in the United Kingdom. *The Journal of Business, 75*(2), 245-282.

Sanders, W. G., & Carpenter, M. A. (2003). Strategic Satisficing? A Behavioral-Agency Theory Perspective on Stock Repurchase Program Announcements. *The Academy of Management Journal, 46*(2), 160-178.

Shleifer, A., & Vishny, R. W. (1997). A Survey of Corporate Governance. *The Journal of Finance, 52*(2), 737-783.

Shoven, J. B. (1987). The Tax Consequences of Share Repurchases and Other Non-Dividend Cash Payments to Equity Owners. *Tax Policy and the Economy, 1*, 29-54.

Sinha, S. (1991). Share Repurchase as a Takeover Defense. *The Journal of Financial and Quantitative Analysis, 26*(2), 233-244.

South African Revenue Service. (2000). *Guide to Capital Gains Tax.* Pretoria: South African Revenue Service.

Stephens, C. P., & Weisbach, M. S. (1998). Actual Share Reaquisitions in Open-Market Repurchase Programs. *The Journal of Finance, 53*(1), 313-333.

Stewart, S. S. (1976). Should A Corporation Repurchase Its Own Stock? *The Journal of Finance, 31*(3), 911-921.

Vermaelen, T. (1981). Common Stock Repurchases and Market Signalling: An Empirical Study. *Journal of Financial Economics, 9*, 139-183.

Wang, C.-S., Strong, N., Tung, S., & Lin, S. (2009). Share Repurchases, the Clustering Problem, and the Free Cash Flow Hypothesis. *Financial Management, 38*(3), 487-505.

Wansley, J. W., Lane, W. R., & Sarkar, S. (1989). Managements' View on Share Repurchase and Tender Offer Premiums. *Financial Management, 18*(3), 97-110.

Woods, D. H., & Brigham, E. F. (1966). Stockholder Distribution Decisions: Share Repurchases or Dividends? *The Journal of Financial and Quantitative Analysis, 1*(1), 15-26.

Wu, R.-S. (2012). Does Corporate Governance Quality Lend Credibility to Open-Market Share Repurchase Announcements? *Corporate Governance: An International Review, 20*(5), 490-508.

Yook, K. C., & Gangopadhyay, P. (2010). Free Cash Flow and the Wealth Effects of Stock Repurchase Announcements. *Quarterly Journal of Finance and Accounting, 49*(3), 23-42.

Zakaria, Z., Zulkafli, A. H., & Muhammad, J. (2013). Ownership Concentration and Share Repurchase: Evidence from Malaysia. *International Journal of Advances in Management and Economics, 2*(6), 154-159.

Zeckhauser, R. J., & Pound, J. (1990). Are Large Shareholders Effective Monitors? An Investigation of Share Ownership and Corporate Performance. In R. G. Hubbard,

Asymmetric Information, Corporate Finance, and Investment (pp. 149-180). University of Chicago Press.

APPENDIX

T-Test for AARs for the Full Sample, Days -20 to -1

	Mean-Adjusted		Market-Adjusted		CAPM	
Days	**AARs**	**T-stat**	**AARs**	**T-stat**	**AARs**	**T-stat**
-20	-0.04%	-0.16	-0.03%	-0.14	-0.01%	-0.03
-19	0.05%	0.30	0.05%	0.34	0.04%	0.29
-18	-0.27%	-1.12	-0.27%	-1.09	-0.16%	-0.64
-17	-0.34%**	-2.38	-0.33%**	-2.35	-0.24%*	-1.88
-16	0.06%	0.23	0.07%	0.25	0.10%	0.39
-15	-0.03%	-0.17	-0.03%	-0.14	0.06%	0.35
-14	0.07%	0.36	0.07%	0.39	0.11%	0.66
-13	0.25%	1.23	0.25%	1.27	0.26%	1.54
-12	-0.38%**	-2.52	-0.37%**	-2.48	-0.35%*	-2.45
-11	-0.09%	-0.47	-0.09%	-0.44	-0.05%	-0.27
-10	-0.16%	-1.18	-0.15%	-1.14	-0.09%	-0.73
-9	0.01%	0.02	0.01%	0.04	0.06%	0.19
-8	-0.31%**	-2.03	-0.31%**	-2.00	-0.23%**	-1.79
-7	-0.19%	-0.96	-0.18%	-0.93	-0.15%	-0.78
-6	-0.04%	-0.26	-0.04%	-0.23	-0.08%	-0.59
-5	-0.20%	-1.24	-0.20%	-1.21	-0.17%	-1.14
-4	-0.19%	-0.60	-0.19%	-0.59	-0.04%	-0.14
-3	0.28%	1.19	0.28%	1.21	0.18%	0.84
-2	0.37%**	2.11	0.38%**	2.13	0.41%**	2.48
-1	0.11%	0.28	0.11%	0.29	0.19%	0.49

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 30: T-Test for AARs for the Full Sample, Days -20 to -1

T-Test for AARs for the Full Sample, Days 0 to +30

	Mean-Adjusted		Market-Adjusted		CAPM	
Days	**AARs**	**T-stat**	**AARs**	**T-stat**	**AARs**	**T-stat**
0	0.15%	0.74	0.16%	0.77	0.02%	0.14
1	0.22%	1.10	0.22%	1.13	0.20%	1.08
2	0.03%	0.21	0.03%	0.24	0.08%	0.56
3	0.23%	1.20	0.23%	1.22	0.07%	0.37
4	-0.13%	-0.54	-0.12%	-0.51	-0.20%	-0.87
5	-0.07%	-0.41	-0.06%	-0.38	-0.05%	-0.34
6	0.45%**	2.01	0.45%**	2.03	0.45%**	2.07
7	0.08%	0.46	0.09%	0.49	0.06%	0.37
8	0.39%	1.65	0.40%*	1.66	0.49%**	2.10
9	0.04%	0.21	0.04%	0.24	0.04%	0.22
10	-0.13%	-0.68	-0.13%	-0.66	-0.07%	-0.38
11	-0.07%	-0.37	-0.07%	-0.34	-0.03%	-0.18
12	-0.09%	-0.39	-0.08%	-0.37	-0.14%	-0.63
13	-0.08%	-0.35	-0.07%	-0.33	-0.01%	-0.07
14	0.06%	0.35	0.06%	0.38	0.09%	0.65
15	0.26%	0.84	0.27%	0.85	0.30%	0.96
16	-0.07%	-0.38	-0.06%	-0.35	-0.05%	-0.30
17	0.07%	0.48	0.07%	0.53	0.04%	0.31
18	0.17%	1.22	0.17%	1.25	0.16%	1.23
19	-0.13%	-0.79	-0.12%	-0.75	-0.08%	-0.50
20	-0.14%	-0.79	-0.13%	-0.76	-0.03%	-0.18
21	-0.13%	-0.81	-0.13%	-0.78	-0.11%	-0.69
22	0.39%*	1.70	0.39%*	1.73	0.39%*	1.74
23	0.02%	0.12	0.02%	0.16	0.12%	0.91
24	0.19%	1.15	0.20%	1.19	0.08%	0.52
25	0.10%	0.38	0.11%	0.40	0.10%	0.39
26	0.27%	1.03	0.28%	1.05	0.35%	1.36
27	0.07%	0.35	0.07%	0.38	0.05%	0.28
28	-0.23%	-1.08	-0.23%	-1.05	-0.25%	-1.20
29	-0.18%	-1.09	-0.18%	-1.06	-0.12%	-0.77
30	0.27%*	1.80	0.27%*	1.83	0.27%**	2.08

*** = Significant at the 1% level, ** = Significant at the 5% level, * = Significant at the 10% level

Table 31: T-Test for AARs for the Full Sample, Days 0 to +30