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**Does contrarian trading by directors provide a signal to
outside investors for future abnormal returns in South Africa**

Tebogo Mokale

26452007

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Abstract

Directors of listed companies earn abnormal returns by trading in a contrarian manner. This research report investigated whether outside investors can earn abnormal returns by following director contrarian trades.

The returns to directors and outsiders, following a director trade were analysed using the event study methodology. The event study methodology utilised director trading information from SENS announcements on the JSE Securities Exchange, daily share prices, betas and price to book values for the selected companies, and daily all share index prices. The focus of the analysis was the post trade Cumulative Average Abnormal Returns (CAAR), in the 20 days following the director trade.

The overall CAAR for all transactions was a statistically significant but economically insignificant 0.43%. When viewed from a transaction type perspective, the CAAR was 0.72% and 0.44% for purchases and sales transactions respectively. This study shows that while directors of listed South African companies do earn abnormal returns, they do not do so while consistently trading in a contrarian manner. In fact, transactions not deemed contrarian generated higher abnormal returns for directors. In addition, the study shows that outside investors do not earn abnormal returns by mimicking directors, and actually, their following of director trades generates the abnormal returns for directors.

Keywords: Contrarian trading; Director trading; Abnormal returns; JSE.

Declaration

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

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1 Chapter 1: Introduction to the research problem

1.1 Background

Listed company shares, commonly referred to as equities, represent the ownership of the productive assets in the economy. Equity owners are important members in any society as their investment decisions affect the overall level of investment in the economy and thus indirectly influence the rate at which the economy grows. The ownership of equity brings with it risks which the equity owners assume, and for this the owners expect a compensating return. Should the return on the equity not compensate the owners for the risk they are assuming, they may choose to invest their funds in other non-equity assets, which may have undesired consequences for the economy. In light of this, it is important that the return for equity owners in individual companies is maximised, and specifically that it exceeds the return they could earn by investing in the general equities market, which carries with it less risk.

Investors have at their disposal, a number of equity investment strategies, which they can use to increase their wealth. These strategies fall into two broad areas commonly referred to as index tracking and stock picking. Index tracking involves the mimicking of an equities index on a stock exchange whereby investors buy all listed companies or a sector of all listed companies. Stock picking on the other hand involves the selection of specific shares based on the investor's beliefs about future returns and associated risks.

The fundamental assumption behind index tracking is that, for a given level of risk, investors are better off following a diversification strategy where they buy all shares included in the index, in turn avoiding the fluctuations related to specific shares. In effect, this assumption says that in the long-term, a single investor cannot consistently outperform the market average. The assumption behind stock picking on the other hand implies that the individual investor can consistently outperform the market, and is therefore better off making individual choices rather than diversifying completely.

The debate on whether to follow an index tracking or stock picking strategy is largely dependent on where the investor lies in the efficient markets debate. This debate is primarily rooted in the efficient market hypothesis (EMH), coined by Fama (1965). According to the EMH, markets should be efficient in at least one of the three forms. The three forms can be summarised as follows:

- Strong form – in this form the hypothesis states that current share prices reflect all information, including private information that has not been made available to outsiders, and hence no excess returns can be consistently earned by anyone except through luck;
- Semi strong form – in this form, share prices adjust rapidly and in an unbiased fashion, to new information announced to the public. An investor who simultaneously receives this information with the rest of the market cannot employ strategies to earn excess returns, as all other investors would logically employ the same strategy; and

- Weak form – in this form, an investor cannot use an analysis of historical price data to predict future prices, and consistently earn excess returns.

The implication of the strong form of market efficiency is that excess / abnormal returns (used interchangeably in this study), are not available for investors, and they should in turn adopt an index tracking strategy. With the semi strong form, inside investors who receive future performance information prior to the rest of the market may potentially earn excess returns, however these excess returns are not available to outside investors. The weak form suggests that outsiders could potentially earn excess returns, however they cannot do so through a strategy of studying historical prices, as the excess returns materialise in a random fashion. An implication of efficient markets, irrespective of the form therefore suggests that stock picking is always an inappropriate strategy for outsiders. Outsiders would therefore be better off following an index tracking strategy.

If an outside investor is to base their trading strategy on the assumption of efficient markets, they should first understand what lies behind the EMH. Bird, He, Thosar and Woolley (2004) state the assumptions of market efficiency as follows:

- Information flows costlessly to the market;
- Market participant use this information in identifying temporary mispricing and trade in the market with the objective of maximising their wealth; and
- Market imperfections that prevent investors from exploiting the mispricing do not exist.

All three assumptions need to hold in order for investors to rely on the EMH and buy the entire market. There are other schools of thought however, that believe that the assumptions behind the EMH do not hold, and an investor can consistently earn excess returns by employing strategies that exploit market imperfections. One of the prominent schools is the value investment school that believes that markets often misprice the value of equities, creating opportunities for those who can identify this mispricing.

Similar to other assets, the interaction of demand and supply forces in the market determines the value of equities. For a share price to increase, there first needs to be a disequilibrium where there is more demand than supply (more buyers than sellers), and vice versa for a share price decline. Those who benefit from this disequilibrium are those in the minority, as the movement required to correct the disequilibrium will benefit them. Being in the minority necessarily implies that one has a different view to the dominant view of the market, in effect a contrarian. Seen from another angle, having a different view to the market implies that one sees value where the market does not see value or one does not see value where the market sees value. From this line of thought, it therefore follows that value investors are in effect contrarians.

In studies conducted outside South Africa, various authors have shown that directors of listed companies (insiders) invest in their own companies in a contrarian manner (Lakonishok & Lee, 2001; Jeng, Metrick & Zeckhauser, 2003; Jenter, 2005). For directors to be investing in a contrarian manner, they have to believe that they can make excess returns from their investments that they would not earn if they followed an index tracking

strategy. If directors do in fact make these excess returns, it would be worth investigating if outsiders could also earn excess returns by mimicking director trades.

1.2 Problem statement

A study by Nair (2008), using director trading information between 1 April 2002 and 31 March 2008 for companies listed on the JSE Securities Exchange, concluded that in the year following the trade, directors earn a statistically significant but economically insignificant excess return of 0.31%. From a transaction type perspective, the study shows that directors earn 0.33% and 0.29% from their purchases and sales transactions respectively. An obvious problem with the magnitude of these returns is that outsiders would not benefit from following directors' trades. However, it is worth bearing in mind that the study by Nair did not consider whether South African directors trade in a contrarian manner, and if so whether their application of the contrarian style results in larger excess returns.

The starting point for this study is to consider whether directors in South African companies do in fact trade in a contrarian manner as their international counterparts do. It would also be important to establish whether these directors earn excess returns that exceed those observed by Nair, and more importantly, whether outside investors could earn these excess returns by mimicking director contrarian trades.

1.3 Purpose of study

The purpose of this study is to establish whether contrarian trading by directors of South African companies provides a credible signal to outside investors for future abnormal returns. Specifically, the objectives of this study are to show that:

- Directors employ contrarian trading strategies;
- The market reacts to directors' trades;
- Directors earn abnormal returns on their trades; and
- Outsiders can benefit from mimicking directors' contrarian trading.

1.4 Scope of study

While there have been studies to establish whether director trading yields abnormal returns in South Africa (Mordant & Muller, 2003; Nair, 2008), they have not considered the impact of contrarian trading on those abnormal returns. The aim of this study is to replicate international studies such as those conducted by Lakonishok and Lee (2001), Jeng *et al.* (2003), and Jenter (2005), by investigating whether any observed abnormal returns are related to the way that directors trade. This study will therefore combine the study of abnormal returns as previously conducted in South Africa, with the study of contrarian trading by directors as conducted internationally.

The focus of this study will be on companies listed on the JSE Securities Exchange, for which there has been reported director trading activity. The shares to be included in the study are those that are part of the Top 40 index on the JSE Securities Exchange, which

includes the 40 largest companies by market capitalisation. The primary reason for limiting this study to the largest companies stems from the share liquidity concern, whereby the shares of smaller companies with low trading volume, may exhibit excess volatility following director trades. This excess volatility could potentially lead to invalid inferences, as it may not relate to the director trade.

1.5 Structure of the research report

The structure of the rest of this research report is as follows:

- Chapter 2 reviews the relevant literature on contrarian trading strategies, director trading, director signalling to outside investors, and the possibilities for abnormal returns for outsiders;
- Chapter 3 will articulate the research hypotheses to be tested, which are based on the reviewed literature;
- Chapter 4 describes and justifies the research methodology adopted to test the various hypotheses;
- Chapter 5 presents the results of the study;
- Chapter 6 provides a discussion and interpretation the results observed in chapter 5; and
- Chapter 7 provides a summary of the major findings and provides recommendations. It will also offer ideas on areas for possible future research.

2 Chapter 2: Literature review

2.1 Introduction

This chapter will review the relevant literature on contrarian trading strategies, director trading, director signalling to outside investors, and the possibilities for abnormal returns for outsiders.

The section on contrarian trading strategies will define what it means to be contrarian. It will identify measures commonly used to classify trades as contrarian and non-contrarian. The literature review will also assess the returns earned by contrarian traders as well as the potential causes of these returns.

The review of literature on director trading will follow next. This section will examine the returns that directors earn on their trades. The literature will also cover the potential reasons behind the returns that directors are able to generate from their trades.

The section on director signalling will focus on whether director trading sends credible information to outsiders. Importantly, this section will also review the relevant literature on whether outsiders actually use these signals.

The possibility for outsiders to earn abnormal returns by following director trades will be the focus of the next section. This section will consider whether post signal excess returns remain available for outsiders.

2.2 Contrarian trading strategies

2.2.1 Defining contrarian trading strategies

The background section in the introductory chapter of this study broadly defined a contrarian trader as one who holds a different view to the dominant view of the market. However, without first defining what a view is, one cannot empirically test whether an investor is a contrarian. Specific measures are therefore required that can make the identification of a contrarian a simpler exercise.

The first measure relevant for identifying contrarian trading is a ratio called the book to market value (B/M), (Rozeff & Zaman, 1998; Lakonishok & Lee, 2001). The book to market ratio compares the value of a company as per the financial statements and the value of a company as determined by the market. The value of a company according to the financial statements (book value) is the difference between assets and liabilities on the balance sheet. From a market value perspective, the value of a company is the product of the share price and the number of issued shares outstanding. Dividing the book value by the market value yields the book to market ratio.

A large ratio implies a smaller divergence between the value of the company as per the financial statements and the value of the company as perceived by the market, and vice versa for a smaller ratio. Value shares are those companies with large book to market ratios, and those with small book to market ratios represent growth shares. According to Rozeff and Zaman (1998), in a contrarian trade, investors buy those shares with high book

to market ratios (cheap) and sell those with low book to market ratios (expensive). The assumption behind this strategy is that at some point in the future, the market value will revert to the fundamental value, which is closer to the book value. With this reversion, previously cheap shares will increase in value and previously expensive shares will decrease in value. A contrarian trader will therefore benefit as they would have bought shares before they increase in value and would have sold shares before their value declined.

The performance or growth of shares in the past can also be the basis for determining a contrarian trade. In this case, investors buy those shares that have performed poorly in the recent past, and sell those that have performed well (Lakonishok & Lee, 2001). This is however encapsulated by the book to market ratio as shares that have performed well in the past will have a market value that has grown faster than the book value and hence a low book to market ratio, and conversely for shares that have performed poorly in the past.

According to Rozeff and Zaman (1998), another ratio relevant for identifying a contrarian trade is the cash flow to price ratio (CF/P). This ratio compares the amount of cash flow per share against the share price. Contrarian traders would buy shares with a high CF/P and sell shares with a low CF/P. The rationale for this is that companies with relatively high levels of cash can grow without substantially increasing debt, which increases the risk of failure. Therefore, for the same expected return, an investor is better off choosing the company that has a better relative cash position.

A key implication flowing from the EMH is that abnormal returns cannot be generated using information that is available to all market participants. Given that the measures identified above all rely on publicly available information, the hypothesis would then predict that contrarian strategies based on these measures are not abnormal return generating. A review of literature concerning the returns to contrarian traders follows next.

2.2.2 Returns for contrarian traders

Various authors have shown that companies considered previous losers or those with high B/M ratios outperform previous winners (De Bondt & Thaler, 1985; Fama & French, 1996). De Bondt and Thaler show that in the 36 months following the identification of loser and winner stocks, losers earn 25% more than winners do. This suggests that contrarian trading strategies can consistently yield excess returns, in violation of the assumptions of efficient markets.

On the other hand, many investors implicitly believe in the efficiency of markets as indicated by their preference for buying index funds rather than actively choosing shares. The preference of investors for buying an index may however have more to do with the fact that active fund managers fail to outperform the market rather than the efficiency of markets (Saville, 2009). In a study using data from 2003 to 2008, Saville, found that most actively managed funds in the USA underperformed the market over various investment horizons. Researchers and investors may therefore incorrectly classify markets as efficient

when the real reason for active fund underperformance is the ability of the fund manager to pick the right shares.

In a study conducted in 2000 by Piotroski (Cited in Bird, Lorenzo & Casavecchia, 2007), he finds that less than 43% of value shares in the USA outperformed the market over a 12 month period. A similar study in 2007 by Bird and Casavecchia (Cited in Bird *et al.* 2007) shows that less than 42% of value shares in Europe outperformed the market. Bird *et al.* (2007) conclude that this lack of outperformance relates to the timing and process of identifying value shares.

While measures such as book to market help identify companies that are candidates for contrarian investing, they do not tell the contrarian investor when the reversion to fundamental values will take place. A problem identified with contrarian investing is that the prices of value shares can remain depressed for long periods. De Bondt (2008) shows that share prices can diverge from the fundamental values for as long as four years. This lengthy divergence from fundamental values can result in the contrarian investor investing too early. According to Bird *et al.* (2007), earning excess returns using contrarian investing may become a matter of patience, with no guarantee that the reversion to fundamental values will ever occur.

Patience is only half the problem however. The other problem is that after identifying shares for contrarian investing using measures such as B/M, the prices of those shares may exhibit a momentum pattern before reversing (Jegadeesh & Titman, 2001). A

momentum pattern results when previous winners remain winners and previous losers remain losers. While a contrarian strategy consists of buying previously underperforming shares and selling previously outperforming shares, a momentum portfolio is long on shares that have outperformed and short on shares that have underperformed.

The study by Jegadeesh and Titman (2001) shows that a momentum portfolio long (short) on New York Stock Exchange (NYSE) shares that have outperformed (underperformed) in the past three to 12 months continues to outperform the market over the next 12 months. This momentum portfolio then reverses from month 13 to month 60, with previous winners becoming losers and previous losers becoming winners. A similar study by Jegadeesh and Titman (1993) shows that between 1965 and 1989 a portfolio long on previous winners and short on previous losers realises annualised excess returns of 12.01%. A logical action for a contrarian investor would be to wait for 12 months before constructing the contrarian portfolio, as measures such as B/M will be even more favourable. However, this strategy would only yield excess returns if other market participants were acting irrationally by not deploying the same strategy.

While the domicile of the companies used in the studies by Jegadeesh and Titman (1993; 2001) is the developed world, Bildik and Gulay (2007) perform a similar study using companies listed on the Istanbul Stock Exchange in Turkey, which is a developing market and come to different conclusions. Constructing a contrarian portfolio long on previous losers and short on previous winners, they show that this strategy generates excess returns of up to 15% from the point of formation. Even though the extent of the excess

returns starts to reverse after 15 months, as the return on previous losers slows down, these loser shares still outperform the winners up to 36 months. Bildik and Gulay (2007) also note that the duration for which the contrarian strategy outperforms, varies from one month to 36 months implying that timing the exit of the portfolio would be very difficult. With Bildik and Gulay, observing the reverse of what Jegadeesh and Titman observed using NYSE data, there is reason to believe that the occurrence and timing of the excess returns for contrarian strategies is market dependent. An understanding of the potential causes of contrarian and momentum profits may assist in the identification of markets where these strategies may be applied.

2.2.3 Potential causes of contrarian and momentum profits

Basu (1977) and Figelman (2007) propose the existence of investor under-reaction whereby the slow dissemination or slow interpretation of news and the frictions in the price adjustment process may cause intermediate term momentum profits. Should this be the case, it would violate the assumptions of the efficient market hypothesis as stated earlier. Figelman argues that the slow dissemination of news would lead share prices only gradually reflecting all available information. The slow interpretation of news would mean that investors are not acting on the information as would be rationally expected. A scenario could therefore arise whereby investors' buying and selling decisions are contrary to what the information suggests they should be doing, resulting in the current share price exhibiting momentum when a reversal is due, in effect moving the price further away from the fundamental value. Forner and Marhuenda (2003) propose that where an

investor accepts the under-reaction hypothesis, they should follow a momentum strategy of buying winners and selling losers. This scenario would be similar to what Jegadeesh and Titman (1993; 2001) observe in terms of short term momentum profits which later reverse and lead to longer term contrarian profits.

Figelman (2007) observes that investors learn more slowly about poor business performance and earnings manipulation as compared to good business performance, and this enhances the momentum observed in prices. The mere fact of this slow learning implies that when investors do finally learn of this performance, a reversal is inevitable which enhances the contrarian effect.

Jegadeesh and Titman (1993) explain the movement from fundamental values as, a result of short-term under-reaction and long-term over-reaction. According to Jegadeesh and Titman, companies provide short-term forecasts that are ambiguous while investors rely on longer-term information to value firms. As a result, investors pay less attention or under-react to these short-term forecasts, in effect not incorporating information that is fundamental to the value of the company. On the other hand, De Bondt and Thaler (1987) hold the opposite view and say that investors actually overreact in the short term. Their argument is that investors place too much reliance on recent information, or overreact to this information, leading to the movement of share prices from their fundamental values. A reversal of this overreaction would materialise as time passes and the prospects for the company become clearer. Hence, this view is consistent with short-term momentum and long-term contrarian profits.

2.3 Director trading

The Insider Trading Act of 1998 allows for listed company directors, or insiders, to legally buy and sell shares of the companies that employ them. The act describes an insider as follows:

- An individual who has inside information –
 - a) through –
 - i. being a director, employee or shareholder of an issuer of securities or financial instruments to which the inside information relates; or
 - ii. having access to such information by virtue of his or her employment, office or profession; or
 - b) where such an individual knows that the direct or indirect source of the information was a person contemplated in paragraph (a); (ii).

This study uses the terms director and insider interchangeably.

For directors to legally trade on information, the act requires that such information should have been made public preceding the trade. The act states that the information shall be regarded as having been made public when –

- a) it is published in accordance with the rules of the relevant regulated market for the purpose of informing investors and their professional advisers; or
- b) it is contained in records maintained by the relevant statutory regulator which by virtue of any enactment are open to inspection by the public; or

- c) it can be readily acquired by those likely to deal in any securities or financial instruments –
 - i. to which the information relates; or
 - ii. of an issuer to which the information relates; or
- d) it is derived from information which has been made public.

While the focus of this study is on legal insider trading, there exists the possibility that directors may trade on information that is not in the public domain. It was not the aim of this study to determine whether directors trade in a legal manner.

2.3.1 Returns from director trades

Should the first assumption of the efficient market hypothesis hold, the implication would be that all information is shared efficiently, and no investor, including directors would be able to make excess returns from their trades. However, the available evidence suggests that directors do in fact earn excess returns (Jeng *et al.* (2003). Lakonishok and Lee (2001) also go on to show that companies where there has been extensive director share purchasing in the previous six months, outperform those where there has been extensive selling, for the next two years. This implies that director share portfolios tend to outperform. Bettis, Vickrey and Vickrey (1997) concur with this observation and add that not only do directors earn excess returns, but also that these returns appear to persist for long periods. Two possible reasons seem to be responsible for the occurrence of these excess returns, namely:

- Directors employ contrarian trading strategies; and
- Directors have more information about the state and prospects of the company.

A review of these reasons follows next.

2.3.2 Contrarian trading by directors

The distribution of director trading activity across companies is not random (Jenter, 2005). Instead, directors have a propensity to buy small companies, value companies, and those companies that have recently underperformed, and tend to sell those companies seen as growth companies or have recently outperformed (Lakonishok & Lee, 2001; Jeng *et al.* 2003; Jenter, 2005). According to Jenter (2005), the reason for the contrarian trading behaviour is rooted in directors' beliefs that the market is mispricing the value of their companies. They therefore buy when they believe that the true value of the company exceeds what the current prices reflect, and sell when the true value of the company is less than that reflected by the market.

The trading by directors on a personal account is not divorced from what they do as company officials either. Jenter shows that perceptions about the deviation of market prices from the true value of the company influence the timing of initial public offerings, share repurchases, and mergers and acquisitions (Jenter, 2005). In these cases, company directors take actions that are similar to selling shares when they perceive company overvaluation and buy shares when they perceive undervaluation. This shows that the actions of directors are consistent irrespective of who the beneficiary is.

2.3.3 Informed trading by directors

The information required to derive the measures that directors use to identify contrarian trading opportunities are not unavailable to outsiders. Outsiders can therefore employ the very same strategies using B/M and CF/P ratios. One would therefore expect that directors should not earn excess returns over and above those flowing from contrarian trading strategies. Gangopadhyay, Yook and Sarwar (2009) show that directors do in fact earn these excess returns. They show in their study based on director transactions and returns in the USA between 1999 and 2002, that shares bought by directors outperformed those sold by directors by 22.5% in the year following the transaction. When adjusted for the impact of the contrarian trade, the difference is still an economically significant 13.9%. They conclude that the superior information that directors possess about their companies generates this additional excess return, and that this excess return is accentuated during volatile markets, such as those experienced in the period studied in this report.

Given the excess returns that directors are able to earn even after controlling for the contrarian effect, many may argue that directors possess an unfair advantage and should not be able to profit from it. Bris (2005) notes an increase in the incidence and profitability of insider trading following the enforcement of insider trading rules. On the other hand, proponents of insider trading argue that it provides a mechanism for the communication of superior information that directors possess to outside investors and should thus be encouraged (Fidrmuc, Goergen & Renneboog, 2006).

It is still important to understand the activities that directors engage in to profit from the superior information. According to Cheng and Lo (2006), there seems to be a positive correlation between the frequency of bad news released by the company and the extent of director purchasing of shares. This suggests that directors accelerate the release of information that should decrease, or at least slow down the rate of growth in shares prior to purchasing those shares. However, Cheng and Lo do not find directors accelerating the release of good news prior to selling. They attribute this to the potentially higher litigation risk that directors would face in this scenario, as this action would lead regulators to perceive it as market manipulation.

Looking at this behaviour from a different angle, Rogers (2008) finds that prior to director purchases, the quality of managerial disclosures is lower than that observed in the absence of trading. In other words, the disclosures are such that outside investors are not encouraged to buy. Prior to selling however, Rogers finds that the quality of disclosures exceeds that seen during periods of no trading, suggesting that the higher scrutiny associated with sales transactions forces managers to be more careful with the release of information. The implication of the asymmetry in frequency of disclosures (Cheng & Lo, 2006) and quality of disclosures (Rogers, 2008) is that purchases by directors provide a credible signal of future excess returns, whereas sales do not provide such a strong signal, as directors do not outwardly seek to gain from the possession of such information.

2.3.4 The motivation of directors' trades

Given the two reasons proposed for the excess returns that directors earn, it would be of value to outsiders to understand which constitutes the stronger motivator for director trading. Piotroski and Roulstone (2004) propose that perceptions about the market's mispricing of shares are the primary motivator for directors' trading. According to this view, directors primarily trade in a contrarian manner. This is however inconsistent with the findings of Gangopadhyay *et al.* (2009), that show that directors still earn excess returns even after controlling for the contrarian effect. On the other hand, Jiang and Zaman (2010), suggest that for larger firms, director trading is more of an indicator of superior information about future cash flows than it is about contrarian views.

From an outsider's perspective, contrarian motivations for directors should not offer any additional benefits, as the outsider can also employ contrarian strategies without having to wait for the director to trade first. Logically, an outsider who already follows a contrarian strategy should gain more from those director trades that are motivated by superior information. A necessary condition however is that the outsider should consider the signals sent by the directors to be credible.

2.4 Director signalling

Given the problems related to timing the formation of contrarian portfolios, and the fact that directors earn excess returns even after controlling for their contrarian trading, it would make sense for contrarian investors to supplement their identification of shares that qualify as value shares, with the timing of purchases and sales based on director signals. Given that when directors trade, they are putting their own money on the line which affects their personal wealth, director trading should therefore present a credible signal to outside investors (Jenter, 2005).

Seyhun (1992) shows that not only is there a relation between director trades and future excess performance, but that there is a positive relation between director trading and future real activity as well as after tax profits. In other words, director trading does not only indicate deviations from fundamental values, but also provides a signal on company plans going forward which should be valuable information for outsiders. A review of how investors react to director signals follows.

Various studies in this area have produced conflicting results. Lakonishok and Lee (2001) observe that while the media covers director trading activities extensively, the market tends to ignore this information. Lakonishok and Lee attribute this to the under-reaction hypothesis discussed above. On the other hand, Fidrmuc *et al.* (2006) show that in the USA and UK, director purchases and sales result in immediate market movements of 3.12% and -0.37% respectively. They also show that this reaction is stronger when several

directors trade on the same day. Their results suggest that the market finds director purchases to be more informational than sales, as illustrated by the stronger market reaction subsequent to the trade.

Hillier and Marshall (2002) agree with this observation, and go on to say that the stronger abnormal returns following a purchase are related to the increase in the holdings of a director, and the confidence this generates in the market. Another study conducted on shares listed on the London Stock Exchange shows that purchase transactions generate stronger abnormal returns around the days of the trade (Friederich, Gregory, Matatko & Tonks, 2002).

An interesting contrast is the study performed in the period between October 2000 and March 2002 on the JSE Securities Exchange (Mordant & Muller, 2003). This study shows that abnormal returns following director trades were stronger for sales transactions than for purchase transactions. This could suggest that South African investors react in a manner contrary to international observations, by finding sales transactions by directors to be more informative.

The length of time that directors have to report their trades also plays an important role in how the market reacts to this information. Shorter durations lead to a higher impact on the market (Fidrmuc *et al.* 2006). This suggests that director trading information is more valuable in markets where the stock exchange does not allow for lengthy delays in reporting, which enables outside investors to use this information for their own trading

decisions. Fildmuc *et al.* (2006) observe that director trades are still informative even when preceded by other news, but notice a reduction in the informational content of trades when preceded by news on mergers and acquisitions, and CEO replacement.

The informational content of director trades is very important, and Piotroski and Roulstone (2004) conclude that director trades help to disseminate information that is more firm specific. They contrast this with the informational content of analysts' recommendations using a measure they refer to as stock return synchronicity. This measure shows the extent to which market and industry returns explain the variation in firm level returns. The share price of a firm exhibiting high stock return synchronicity tends to move in line with the market as a whole as well as its peers. A firm with low stock return synchronicity moves more independently, and tends to have higher levels of insider activity, implying that the signalling of director trades is more effective. In effect, Piotroski and Roulstone show that shares studied and influenced more by analysts are more likely to yield average returns as compared to those influenced by director trading activity.

2.5 Possibilities for abnormal returns for outsiders

Various authors show that directors earn excess returns from their trades (Bettis *et al.* 1997; Lakonishok & Lee, 2001; Jeng *et al.* 2003; Gangopadhyay *et al.* 2009). This does not necessarily imply that an outsider can also earn excess returns as the returns to directors could very well be due to outsiders pushing prices up following the director trade. Hillier and Marshall (2002) observe that on average directors outperform the market and seem

to time their trade perfectly, which suggests that their outperformance may be rooted in the reaction of outsiders.

According to Atallah and El-Amrani (2005), loss aversion may explain the reaction of outsiders to director trades. In this case, outsiders find it easier to handle a loss if they traded in the same manner as directors, in effect creating the herd behaviour. Asgharian and Hansson (2009) concur with this finding and add that profits from long-term contrarian investing by directors is a compensation for risk assumed, whereas the profits from short-term contrarian investing are non-risk based and are driven by investor irrationality. This herding behaviour may be responsible for the momentum effect observed in prices following a director trade (Xiang, He & Cao, 2002).

While the literature reviewed so far suggests that outsiders following the director trade create the returns to directors, Stotz (2006) holds a different view. In a review of director trades on German companies executed between July 2002 and July 2003, he finds that outsiders that mimic directors on the day following the director trade achieve nearly the same abnormal returns. He also shows that for large market capitalisation stocks, the abnormal returns to outsiders are even greater than those that directors earn.

Bettis *et al.* (1997), show in their study that outside investors who mimic director trades can make statistically and economically significant excess returns. Jeng *et al.* (2003) make an important observation that has relevance for outside investors. They observe that 25% and 50% of the excess returns for directors accrue in the first week and first month

respectively. Seen from an outsiders' perspective, this means at least 75% of the excess return is available to an outsider who trades in the first week following a director's trade, and that at least 50% is available for trades concluded within the first month.

2.6 Literature summary

The literature review started by defining what a contrarian trader is, and showed that contrarian traders earn abnormal returns. The review shows that these abnormal returns relate to the under-reaction and over-reaction hypotheses. The following section reviewed literature on director trading and concluded that directors earn abnormal returns, and do so through contrarian trading and the use of superior information. The section on director signalling showed that outsiders do consider director signals to be credible, but more so for director purchases. The last section concluded that while there were instances where outsiders could earn abnormal returns by following directors, outsiders could also be generating the abnormal earnings for directors. This movement in share prices resulting from outsider activity may be due to the herding behaviour, which does not generate abnormal returns for outsiders.

3 Chapter 3: Research hypotheses

3.1 Introduction

The purpose of this study is to establish whether contrarian trading by directors provides a credible signal to outside investors for future abnormal returns. Specifically, the study will test whether:

- Directors employ contrarian trading strategies;
- The market reacts to directors' trades;
- Directors earn abnormal returns on their trades; and
- Outsiders can benefit from mimicking directors' contrarian trading.

3.2 Hypothesis 1

Two methods will test the first hypothesis, which aims to determine whether South African directors trade in a contrarian manner. The first method, encapsulated by hypothesis 1 (a), will test whether directors buy their company shares when the share price has exhibited recent underperformance, and sell when the share price has recently outperformed relative to the market. The second method, encapsulated by hypothesis 1 (b) will test whether directors buy when the price to book ratio is relatively low and sell when the price to book ratio is relatively high.

3.2.1 Hypothesis 1 (a)

The null hypothesis states that the cumulative average abnormal return (CAAR) in the period preceding the director trade is not significantly different from zero. The alternative hypothesis states that the cumulative average abnormal return (CAAR) in the period preceding the director trade is significantly less than zero. To standardise all transactions, the CAAR for sale transactions is multiplied by -1 . In this way, a negative return represents recent underperformance for purchase transactions and recent outperformance for sale transactions.

$$H_0: CAAR_t = 0$$

$$H_A: CAAR_t < 0$$

Where:

$CAAR_t$ is the cumulative average abnormal return in the period preceding the director trade.

3.2.2 Hypothesis 1 (b)

This study will use the price to book ratio (P/B) instead of the book to market ratio. With a contrarian trading strategy, the expectation is that directors will buy when the price to book is low and sell when the price to book is high. The null hypothesis states that the P/B for buy transactions is not significantly different from the P/B for sell transactions. The

alternative hypothesis states that the P/B for purchase transactions is significantly less than the P/B for sale transactions.

$$H_0: P/B_{\text{purchase}} = P/B_{\text{sale}} \text{ OR } P/B_{\text{purchase}} - P/B_{\text{sale}} = 0$$

$$H_A: P/B_{\text{purchase}} < P/B_{\text{sale}} \text{ OR } P/B_{\text{purchase}} - P/B_{\text{sale}} < 0$$

3.3 Hypothesis 2

The second hypothesis aims to determine whether the market reacts to directors' trades, or alternatively if the market considers signals provided by directors to be credible. The null hypothesis states that the pure cumulative return (PCR) from a share following a trade is not significantly different from zero. The alternative hypothesis states that the pure cumulative return (PCR) from a share following a trade is significantly different from zero.

$$H_0: PCR_t = 0$$

$$H_A: PCR_t \neq 0$$

Where:

PCR_t is the pure cumulative return on the share in the period following the director trade.

3.4 Hypothesis 3

The third hypothesis will test whether directors earn abnormal returns on their trades.

The null hypothesis states that cumulative average abnormal return (CAAR) following a director's trade is not significantly different from zero. The alternative hypothesis states that the cumulative average abnormal return (CAAR) following a director's trade is significantly greater than zero. To standardise all transactions, the CAAR for sale transactions is multiplied by -1 .

$$H_0: CAAR_t = 0$$

$$H_A: CAAR_t > 0$$

Where:

$CAAR_t$ is the cumulative average abnormal return in the period following the director trade.

3.5 Hypothesis 4

The fourth hypothesis will test whether outsiders can earn abnormal returns on their trades by following directors' contrarian trades. This test uses a comparison between the CAAR after the fifth day and the CAAR at day 20. The assumption made is that five days is enough time for outsiders to assimilate the director trading information. The null hypothesis states that the CAAR on day five is not statistically significantly different from the CAR on day 20. The alternative hypothesis states that the difference between the CAAR at day 20 and the CAAR on day five is greater than zero.

H₀: $CAAR_{Day20} = CAAR_{Day5}$ Or $CAAR_{Day20} - CAAR_{Day5} = 0$

H_A: $CAAR_{Day20} > CAAR_{Day5}$ Or $CAAR_{Day20} - CAAR_{Day5} > 0$

4 Chapter 4: Research methodology

4.1 Introduction

This chapter elaborates on the research methodology used in this study. The various sub sections that follow address the following aspects:

- The methodology that is most appropriate for this type of study;
- A description of the selected methodology;
- The methodology as used in this study; and
- The limitations of the research

4.2 Appropriate methodology

The purpose of this study was is to establish whether contrarian trading by directors provides a credible signal to outside investors for future abnormal returns. The appropriate methodology therefore needed to examine whether directors in listed South African companies did in fact trade in a contrarian manner as various studies conducted in other markets have shown (Lakonishok & Lee, 2001; Jeng *et al.* 2003; Jenter, 2005). Secondly, the methodology needed to examine whether outside investors consider trading by directors to be a credible signal for future company performance as Jenter (2005) has postulated. Thirdly, the methodology needed to be able to determine whether South African directors earned abnormal returns following their trades as studies in other markets have shown (Bettis *et al.* 1997; Lakonishok and Lee, 2001; Jeng *et al.* 2003;

Gangopadhyay *et al.* 2009). Lastly, the methodology needed to examine whether outsiders could profit from following the trading activity of directors, as suggested by Jeng *et al.* (2003). The thread that links the various aspects is the director's trade, which will form the starting point of the research methodology.

The director's trade constitutes an event. The ex-ante and ex-post movement in the share price is the explanation for, and the result of the occurrence of the event respectively. According to MacKinlay (1997), the event study is a suitable methodology when the researcher is seeking to measure the impact of specific events on the value of the firm. The event study methodology is suitable for this study as it enables the examination of what value of the firm leads directors to trade. Additionally, the event study methodology is suitable as it can determine if the value of the firm changes following the director's trade.

4.3 Event study methodology

MacKinlay (1997) suggests that while the event study methodology does not follow one unique structure, there is a general flow of analysis. MacKinlay's structure of analysis can be summarised as follows:

- Define the event of interest and the event window;
- Determine the selection criteria and select the set of cases to be included in the study;
- Measure the event's impact by calculating the abnormal return over the event window. The abnormal return is the difference between the actual return and the

normal return, where the normal return is the expected value in the absence of the event; and

- Analyse the returns.

4.4 The event study methodology as used in this report

4.4.1 Defining the event of interest

The event of interest for this study was the trading of shares by directors in listed South African companies. The selected event window was twofold. First, the event window encompassed the period leading up to the director trade, and secondly, the period that followed the director trade. MacKinlay (1997) observed that extending the event window to include the period preceding the event enables a study to measure the pre-event returns, and may assist in examining the possibility of market participants obtaining company information before it was officially in the public domain. The pre-event window selected was the 20 trading days, or one month preceding the director trade and the post-event window was the 20 trading days following the director trade. The basis of selecting a twenty-day event window is the assumption that it was long enough to measure the impact of the event, but also minimises the possibility that other intervening events may cloud the observed results.

4.4.2 Selection criteria

The selection criteria were concerned with which cases to include in the study. The various aspects that are covered under this sub-section include, the unit of analysis, the relevant population, the sampling method and sample size, the data collection process, and the data preparation and exclusion rules.

4.4.2.1 Unit of analysis

Daily share price returns for companies listed on the JSE Securities Exchange (JSE) constituted the unit of analysis for this study. The relevant returns were those within the event window.

4.4.2.2 The relevant population

Director trades publicly announced on the Stock Exchange News Service (SENS) constitute the overall population.

According to the Fama-French three-factor model (Fama & French, 1996), the expected return on a portfolio of shares in excess of the risk-free rate $[E(R_i) - R_f]$ is explained by the sensitivity to three factors:

- i. The excess return on a broad market portfolio ($R_M - R_f$);
- ii. The difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks (SMB, small minus big);
- iii. The difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks (HML, high minus low).

While point (iii) postulates that the returns from shares is related to the value or contrarian effect and is therefore relevant for this study, point (ii) is also relevant in that it says that returns on shares could be influenced by the size of the company, with smaller companies expected to yield higher returns. This study was concerned with abnormal returns that are due to the contrarian effect and not the size effect. To reduce the impact of size on the observed returns, the study needed to look at similar sized companies. At the same time, the selected companies needed to have enough director transactions to enable the use of statistical tests. For this reasons only director trades for large capitalisation shares were included. The added benefit of selecting large capitalisation shares was that they tend to exhibit greater trading liquidity, reducing the potential volatility that related to smaller companies. The modified population therefore only included director trades for companies that were in the top 40 index as at 30 June 2010.

4.4.2.3 Sampling method and size

The chosen sampling method was the census method. As the census method considers all events in the population, it reduces the possibility of data snooping that may lead to biased results. The resulting sample consisted of 6,221 director trades.

4.4.2.4 Data collection process

This study only utilised secondary data available on public platforms. The source of the director trading information was the Standard Bank Online Share Trading platform, which obtains the information directly from the JSE SENS announcements. A sample of the director trading data is included in Appendix 1. To carry out the analysis, various other

data elements were required in addition to the director trading information. These data elements included:

- Daily closing share prices for the event window corresponding to the director trades in the sample. The source of the share price information was the McGregor BFANet research database. A sample of the share prices data is included in Appendix 2;
- Beta ratios for companies included in the sample. The beta ratios obtained corresponded to annual betas calculated from 01 January to 31 December of each year. The source of the beta ratios was the McGregor BFANet research database. A sample of the beta ratios data is included in Appendix 3;
- Yearly price to book ratios for companies included in the sample. The source of the price to book ratios was the McGregor BFANet research database. A sample of the price to book ratios is included in Appendix 4;
- Daily index closing values for the All Share Index (JSE code J203) in the event window corresponding to the director trades in the sample. The source of the All Share Index information was the McGregor BFANet research database. A sample of the All Share Index data is included in Appendix 5;

4.4.2.5 Data preparation and exclusion rules

The exclusions that apply to this study are as follows:

- The nature of the event study methodology requires that the selected event window be consistent across all events. In this case director trades for which there was not at least 20 daily share price data points before and after the event were excluded;
- This study excludes derivative type transactions, such as the exercise of options, which do not inform outsiders about what directors think about the prospects of the firm. The director dealings data obtained did not indicate if a transaction was related to the exercise of options, and therefore had to be approximated by removing all transactions where the director's transaction price was not within ten percent of the closing share price on the day;
- Director trades corresponding to dates where the beta values were not available were excluded;
- Director trades corresponding to dates where the price-to-book ratios were not available were excluded; and
- The study excludes director trades involving purchases and sales on the same day by the same director where the net trade was zero.

After the abovementioned exclusions, the remaining sample contained 1,909 transactions.

The event study methodology requires that the event be isolatable. With the possibility of directors within the same company taking opposite positions, perhaps by trading with each other, the net effect may be zero, reducing the usability of the inferences from the

observed results. A further refinement was necessary to net-off the purchases and sales for each company for each day, and determine the net trading direction for the day. The study excludes transactions where the net trading direction was neutral. The final sample consisted of 1,123 summary transactions including 431 net purchase days, and 692 net sale days.

4.4.3 Calculation of returns

Two types of returns were calculated. The first type involved calculating the return from the share from the event date throughout the relevant event window, without considering the overall market movement, referred to in this study as the pure cumulative return (PCR). The purpose of this measure was to determine if there is a reaction to directors' trades, corresponding to hypothesis two. The second type of return, referred to in this study as the cumulative average abnormal return (CAAR), involved calculating the return from the share during the event window, and taking into account the overall market movement. The purpose of this measure was to determine if there are abnormal returns associated with director's trade, both before and after the trade. Hypotheses 1, 3 and 4 use this measure.

4.4.3.1 Pure cumulative return

The first step in calculating the pure cumulative return is the calculation of the actual daily return. The calculation for the actual daily return divides the closing share price for the current day by the closing share price for the previous trading day, and takes the natural logarithm of the result.

Equation 1: Calculation of pure return

$$R_{it} = \text{LN} (S_t / S_{t-1})$$

where:

R_{it} is the actual daily return for company i on the event date t ;

LN is the natural logarithm of a number;

S_t is the closing share price on the event date t ; and

S_{t-1} is the closing share price from the previous trading day.

The calculation of the pure cumulative return is the sum of the daily returns over the event window.

Equation 2: Calculation of pure cumulative return

where:

PCR is the pure cumulative return during the event window;

R_{it} is the actual daily return calculated in equation 1; and

t is the event window.

4.4.3.2 Cumulative average abnormal return

The first step in calculating the abnormal return involved calculating the actual daily return. This calculation is the same as in equation 1. The second step involved calculating the daily market return of the All Share index. The calculation is as follows:

Equation 3: Calculation of market return

$$R_{mt} = \text{LN} (M_t / M_{t-1})$$

where:

R_{mt} is the actual daily return for the All Share index on the event date t ;

LN is the natural logarithm of a number;

M_t is the closing price of the All Share index on the event date t ; and

M_{t-1} is the closing price of the All Share index from the previous trading day.

The third step involved calculating the daily abnormal return. The calculation of the daily abnormal return involves subtracting the product of the daily market return (as per equation 3) and the Beta value from the actual daily return per share (as per equation 1).

The calculation is as follows:

Equation 4: Calculation of abnormal return

$$AR_{it} = R_{it} - \beta_i(R_{mt})$$

where:

AR_{it} is the daily abnormal return for company i on the event date t ;

R_{it} is the actual daily return for company i on the event date t ;

R_{mt} is the actual daily return for the All Share index on the event date t ; and

β_i is the beta of company i shares or its sensitivity to the market return.

Mordant and Muller (2003), observe that in studies of director trading, the returns from sales transactions should be multiplied by minus one as they are similar to short sales, with outperformance showing a negative return and underperformance, a positive return. Multiplying the abnormal returns from directors' sales standardised the results.

The fourth step involved calculating the average abnormal return for each day, with each transaction carrying equal weight. The calculation is as follows:

Equation 5: Calculation of average abnormal return

$$AAR_t = \frac{\quad}{n}$$

where:

AAR_t is the average abnormal return at period t ;

AR_{it} is the daily abnormal return for company i on the event date t as per equation 4;

and

n is the number of director trades in the sample.

The last step involves calculating the cumulative average abnormal return, which is the sum of the AARs over the event window. The calculation is as follows:

Equation 6: Calculation of cumulative average abnormal return

CAAR_t

where:

CAAR_t is the cumulative average abnormal return during the event window *t*;

AAR_t is the average abnormal return as per equation 5.

4.4.4 Analysis of returns

The returns were analysed using T-tests. The calculation of the test statistic, which is identical for both one-tailed and two-tailed tests, is as follows:

Equation 7: Calculation of T-test statistic

$$t_{n-1} = \frac{\bar{r} - \mu_0}{s / \sqrt{n}}$$

where:

t_{n-1} is the t-test statistic with *n-1* degrees of freedom;

\bar{r} is the observed value;

μ_0 is the expected value or null hypothesis value;

s is the standard deviation of the observed value; and

n is the number of observations.

In the context of pure cumulative returns, the equation becomes

Equation 8: T-test statistic for pure cumulative returns

$$t_{n-1} = \frac{\text{PCR} - \text{Hovalue}}{s/ \sqrt{n}}$$

In the context of cumulative average abnormal returns, the equation becomes

Equation 9: T-test statistic for cumulative average abnormal returns

$$t_{n-1} = \frac{\text{CAAR} - \text{Hovalue}}{s/ \sqrt{n}}$$

The tests were calculated with $n-1$ degrees of freedom, and tested at the 5% level of significance.

4.5 Research limitations

A number of limitations should be noted which apply for this study. These include:

- The study did not distinguish between the types of directors, such as executive and non-executive;
- The study only considered director trading in the 40 largest companies on the JSE and hence excluded a large portion of the overall market;
- The study did not consider the impact of director trading in derivatives;
- The study did not consider the volume traded by directors, nor the percentage of this volume to their holdings or the market volume;

- The study did not consider whether there were other newsworthy events flowing from the company around the time of the director trade; and
- The beta values and price to book values used were on an annual basis. These did not consider the potential impact that the volatility of the share may have during the year.

5 Chapter 5: Results

5.1 Hypothesis 1

The aim of the first hypothesis was to determine whether South African company directors trade in a contrarian manner. This study uses two test methods. The first method tested the short-term contrarian behaviour by considering whether the CAAR for the 20 days preceding the trade was negative. The second method tested the underlying contrarian behaviour by considering whether the price to book ratio for purchase transactions was less than the price to book ratio for sale transactions.

The generation of the results for hypothesis 1(a) uses all transactions in the sample. Table 1 provides the breakdown of the data used based on the direction of trade.

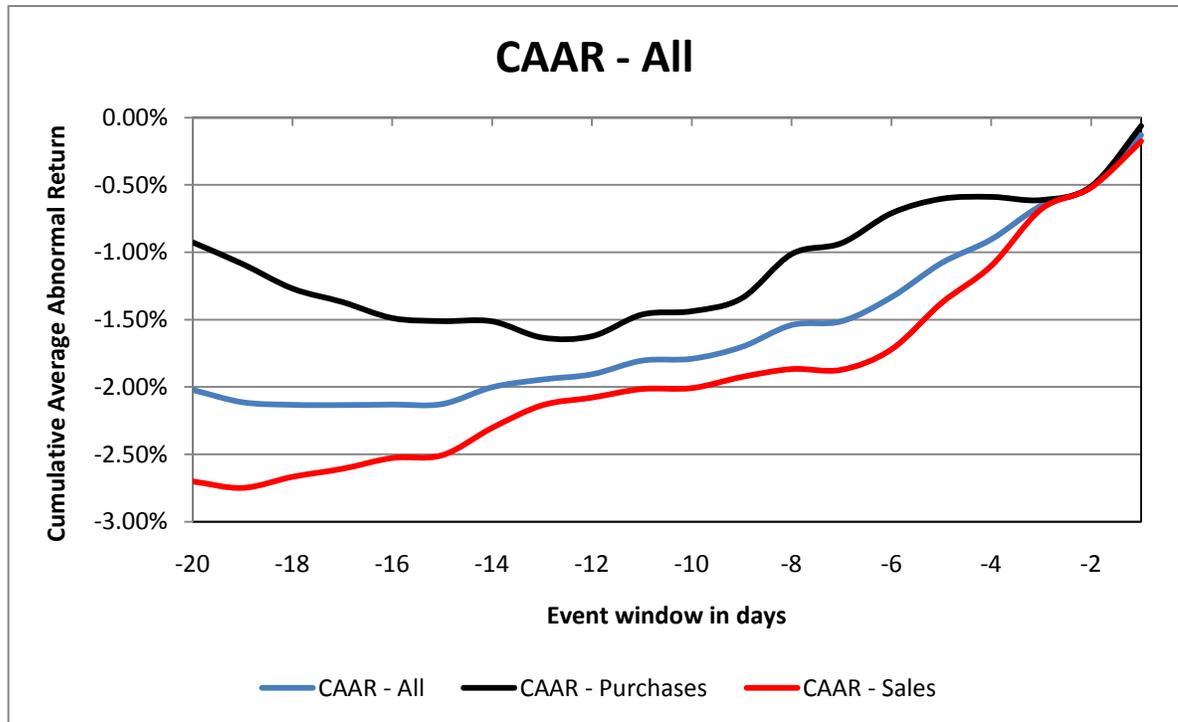
Table 1: Breakdown of sample based on direction of trade

Direction of trade	Observations	Percent of sample
Purchases	431	38%
Sales	692	62%
All	1,123	100%

5.1.1 Hypothesis 1 (a)

Figure 1 shows the CAARs for the 20 days preceding the director trade for all transactions, purchases transactions and sales transactions.

Figure 1: CAAR – Pre transaction



The pre-trade CAARs for all transactions, purchases transactions and sales transactions are negative. The negative pre-trade CAARs show that directors enter into purchase transactions when the share price has recently underperformed and enter into sales transactions when the share price has recently outperformed. The performance of T-tests on the daily CAARs determines if the observed pre-trade CAARs are statistically significant. Table 2 shows the summary of the hypothesis testing results performed using the T-test.

Table 2: Summary of T-test results for pre transaction CAARs

Accept /Reject null hypothesis	All		Purchases		Sales	
	Number of days	% of event window	Number of days	% of event window	Number of days	% of event window
Accept	0	0%	1	5%	0	0%
Reject	20	100%	19	95%	20	100%
All	20	100%	20	100%	20	100%

This study rejects the null hypothesis that the pre-trade CAAR is not significantly different from zero, for most of the days in the event window. Appendix 6 shows the detailed CAARs for each day preceding the trade. It also shows the daily results of the hypothesis testing performed using the T-test. The CAARs related to sales transactions are more negative than for purchase transactions throughout the event window period.

5.1.2 Hypothesis 1 (b)

Tables 3 and 4 show the descriptive statistics for the price to book ratio.

Table 3: Means and medians of the price to book ratio

Direction of trade	Count	Mean	Standard deviation	Median
Purchases	431	13.93675	50.24991	2.49
Sales	692	5.248613	15.82978	3.26

The expectation is that contrarian directors purchase shares when the price to book ratio is low, and sell shares when the price to book ratio is high. The observed means show that the price to book ratio is higher for purchase transactions than for sales transactions, which is contrary to expectations. The standard deviation of the price to book ratio for purchase transactions is however much greater than that observed for sales transactions. A comparison of the medians for purchases and sales sheds further light on this observation. The results are summarised in table 4 below.

Table 4: Quartiles of the price to book ratio

Direction of trade	10th percentile	25th percentile	50th percentile (Median)	75th percentile	90th percentile
Purchases	1.28	1.59	2.49	5.32	9.91
Sales	1.33	2.25	3.26	5.12	7.12

The medians of the price to book ratio for purchases and sales transactions exhibit the opposite of the observation using means, with the sales transactions median being the higher of the two. However, the quartile values indicate this relationship is not consistent across the entire price to book range. At lower levels of the price to book ratio, the relationship seen with the median holds, however at higher levels of the ratio, the relationship is the reverse, with purchases exhibiting higher price to book values, which is contrary to expectations.

Testing for the differences in means uses T-tests. However, in order for the T-tests to be relied upon the variances of the two samples should be equal. Table 5 below presents the tests of assumptions relating to the variance.

Table 5: Test of assumptions – equal variances

Test	Value	Probability	Accept / Reject equal variances
Variance-ratio equal-variance test	10.0768	0.000000	Reject equal variances
Modified-Levene equal-variance test	20.1711	0.000008	Reject equal variances

Table 5 shows that the use of T-tests would be inappropriate as the variances of the two samples are unequal. In this case, the use of the Aspin-Welch unequal-variance test is more appropriate. The test statistic for the Aspin-Welch unequal-variance test is the price to book for purchases less the price to book for sales. The null hypothesis stated that the difference is not statistically different from zero, and the alternative hypothesis stated that the difference is negative. Table 6 shows the results of the Aspin-Welch unequal-variance test.

Table 6: Results of Aspin-Welch unequal-variance test

Null hypothesis (H0)	Alternative Hypothesis	Probability	Reject H0 at 0.05
Difference = 0	Difference \neq 0	0.000540	Yes
Difference = 0	Difference < 0	0.999730	No
Difference = 0	Difference > 0	0.000270	Yes

While the results indicate that the null hypothesis should be rejected, this is due to the difference (Price to book for purchases less price to book for sales) being greater than zero, which is the opposite of the alternative hypothesis that was stated. The cause of this may be the outlier observations for purchase transactions that lead to the mean of the purchases being higher than the mean for sales. A test on the difference in medians confirms this observation. The difference in medians strips out the impact that outliers may have on the mean. The relevant test is the Mann-Whitney-U test for the difference in the medians. Table 7 below shows the results.

Table 7: Results of Mann-Whitney-U test for difference in medians

Null hypothesis (H0)	Alternative Hypothesis	Probability	Reject H0 at 0.05
Difference = 0	Difference \neq 0	0.000549	Yes
Difference = 0	Difference < 0	0.000275	Yes
Difference = 0	Difference > 0	0.999725	No

The result of the Mann-Whitney-U test for the difference in medians shows that the median for purchase transactions is lower than for sales transactions. This agrees with the stated alternative hypothesis, that director purchase shares when the price to book ratio is low and sell shares when the price to book ratio is high.

5.2 Hypothesis 2

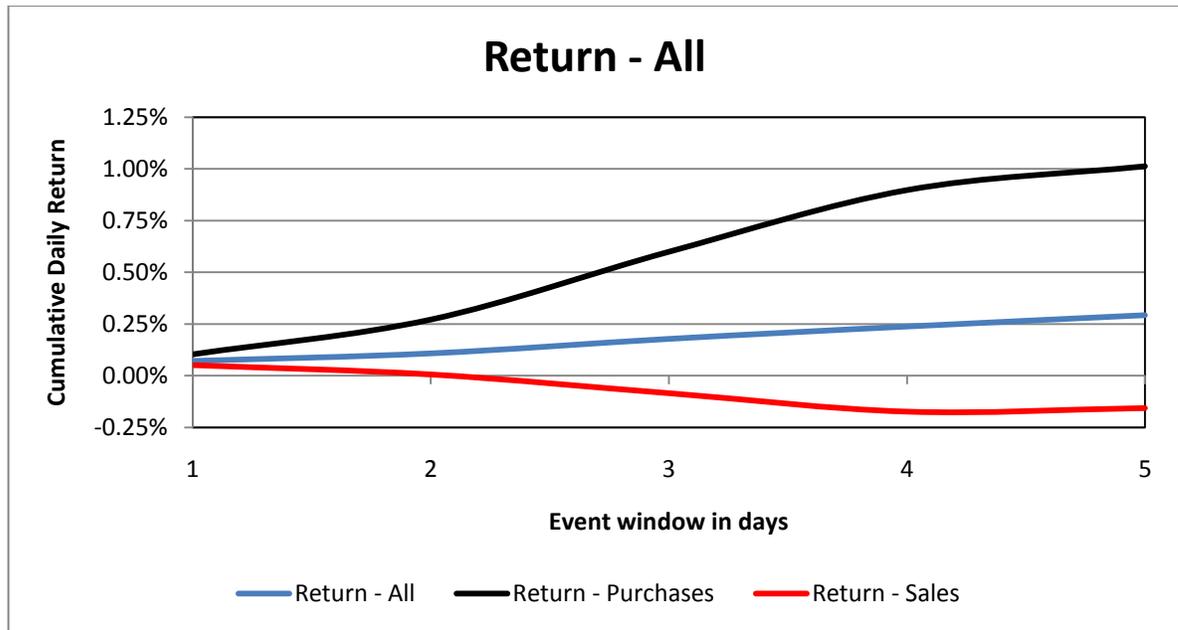
The aim of the second hypothesis was to determine whether the market reacts to directors' trades, or alternatively if the market follows the signals provided by directors. The test determines if the cumulative return in the five days following the trade is significantly different from zero. In this case, the cumulative return is the pure return, with no comparison to the market return. The reason for not considering the market movement and Beta was that the test was only concerned with the occurrence of a reaction to a director trade, not the quantum of the return. Hypothesis 2 uses all transactions in generating the results. Table 8 provides the breakdown of the data used based on the direction of trade.

Table 8: Breakdown of sample used for pure cumulative returns

Direction of trade	Observations	Percent of sample
Purchases	431	38%
Sales	692	62%
All	1,123	100%

Figure 2 shows the returns for the five days following the director trade for all transactions, purchases transactions and sales transactions.

Figure 2: Return – Post Transaction



While the result indicates that the market reacts to directors’ trades, this reaction is only valid for purchases. The reaction of the market to sales transactions does not seem to be significant. This study used T-tests to make a firm conclusion of this observation. Table 9 shows the summary of the hypothesis testing performed using the T-test.

Table 9: Summary of T-test results for pure cumulative returns

Accept /Reject null hypothesis	All		Purchases		Sales	
	Number of days	% of event window	Number of days	% of event window	Number of days	% of event window
Accept	3	60%	2	40%	5	100%
Reject	2	40%	3	60%	0	0%
All	5	100%	5	100%	5	100%

Appendix 7 shows the detailed returns for each day following the trade. It also shows the day-to-day results of the hypothesis testing performed using the T-test. The result of the T-tests shows that the cumulative return for purchases is statistically significant from day three onwards, whereas it is statistically insignificant for sales transactions throughout the event window. This confirms the earlier observation that the market reacts to directors' purchases but does not react to directors' sales.

5.3 Hypothesis 3

The aim of the third hypothesis was to determine if directors earn abnormal returns from their trades. The CAARs post the director trades indicate whether directors earn abnormal returns. Hypothesis 2 uses all transactions to generate the results. Table 10 provides the breakdown of the data used based on the direction of trade.

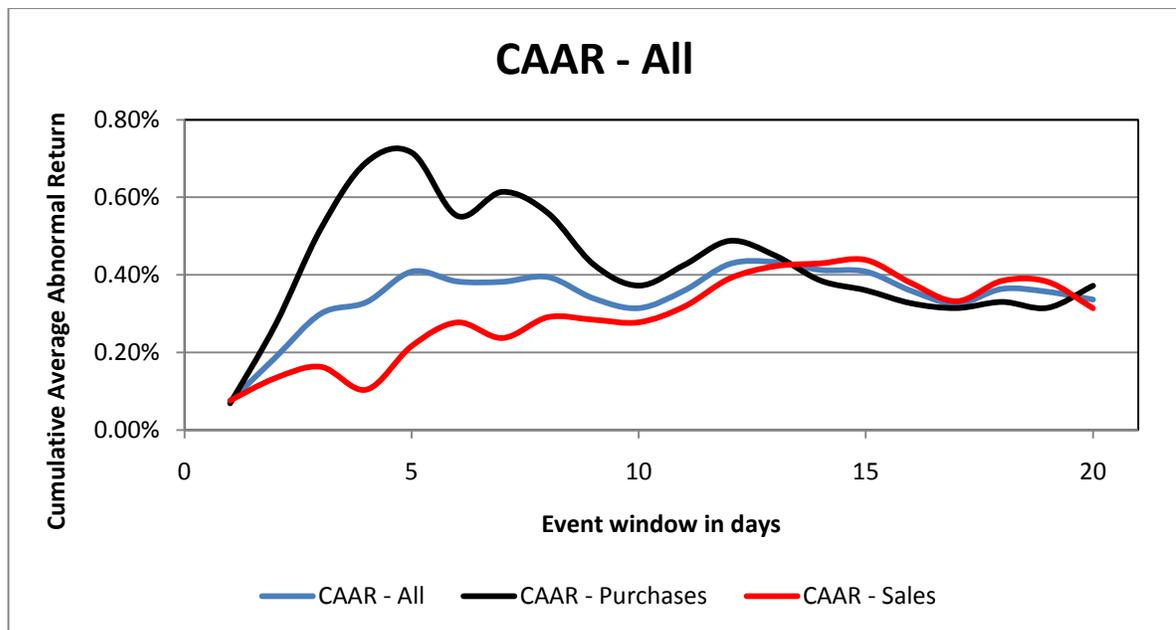
Table 10: Breakdown of sample used for post transaction CAARs

Direction of trade	Price to book quartile	Observations	Percent of sample
Purchases	Quartile 1	160	14%
	Quartile 2	90	8%
	Quartile 3	70	6%
	Quartile 4	111	10%
Sales	Quartile 1	123	11%
	Quartile 2	190	17%
	Quartile 3	222	20%
	Quartile 4	157	14%

Direction of trade	Price to book quartile	Observations	Percent of sample
All		1,123	100%

Figure 3 shows the CAARs for 20 days following the director trade for all transactions, purchases transactions and sales transactions.

Figure 3: CAAR All – Post Transaction



The CAARs for all transactions were positive post the trading event. This would imply that directors earn abnormal returns from their trades. However, the abnormal returns earned do not seem to be economically significant. Initially, the CAARs for purchases were greater than the CAARs for sales; however, this difference dissipates over the course of the event window. Performing T-tests enables the study to test whether the abnormal returns

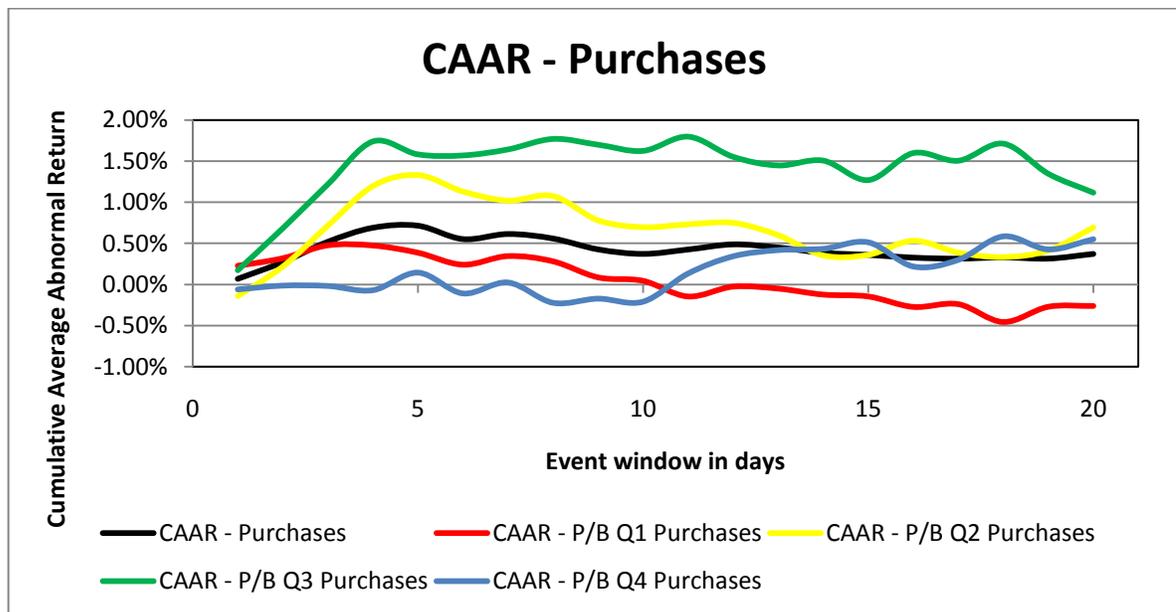
observed are statistically significant. Table 11 shows the summary of the hypothesis testing performed using the T-test.

Table 11: Summary of T-test results for post transaction CAARs

Accept /Reject null hypothesis	All		Purchases		Sales	
	Number of days	% of event window	Number of days	% of event window	Number of days	% of event window
Accept	1	5%	12	60%	16	80%
Reject	19	95%	8	40%	4	20%
All	20	100%	20	100%	20	100%

Appendix 8 shows the detailed CAARs for each day following the trade. It also shows the day-to-day results of the hypothesis testing performed using the T-test. Figure 4 shows the CAARs for 20 days following the director trade for purchases transactions.

Figure 4: CAAR Purchases – Post Transaction



The results show that purchase transactions where the price to book was in quartile two and quartile three have the highest CAARs post the transaction. Purchase transactions where the price to book is in the first quartile exhibit a negative CAAR after 10 days. Table 12 shows the summary of the hypothesis testing performed using the T-test.

Table 12: Summary of T-test results for purchases

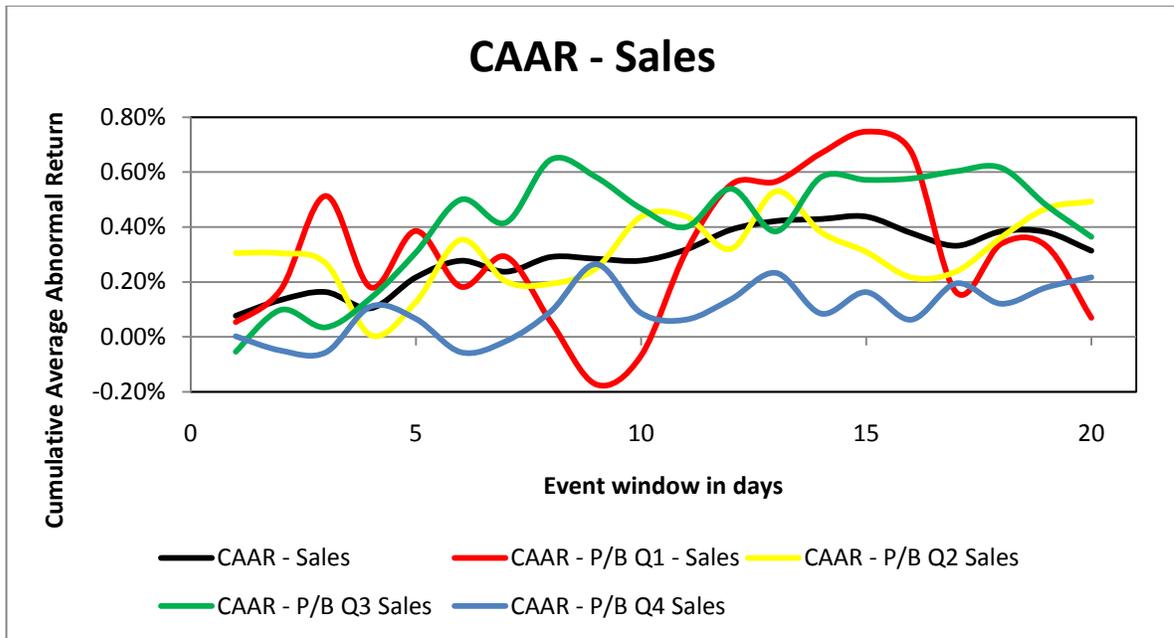
Accept /Reject null hypothesis	P/B Q1		P/B Q2		P/B Q3		P/B Q4	
	Number of days	% of event window	Number of days	% of event window	Number of days	% of event window	Number of days	% of event window
Accept	19	95%	14	70%	2	10%	20	100%
Reject	1	5%	6	30%	18	90%	0	0%
All	20	100%	20	100%	20	100%	20	100%

Appendix 9 shows the detailed CAARs for each day following the trade. It also shows the daily results of the hypothesis testing performed using the T-test.

The CAARs where the purchase transaction took place when the price to book ratio was in quartile three were statistically significant in 90% of the event window. The CAARs for quartile one, two and four were not statistically significant.

Figure 5 shows the CAARs for 20 days following the director trade for sales transactions.

Figure 5: CAAR Sales – Post Transaction



The post-transaction CAARs for sales do not exhibit any clear pattern. Table 13 shows the summary of the hypothesis testing performed using the T-test.

Table 13: Summary of T-test results for sales

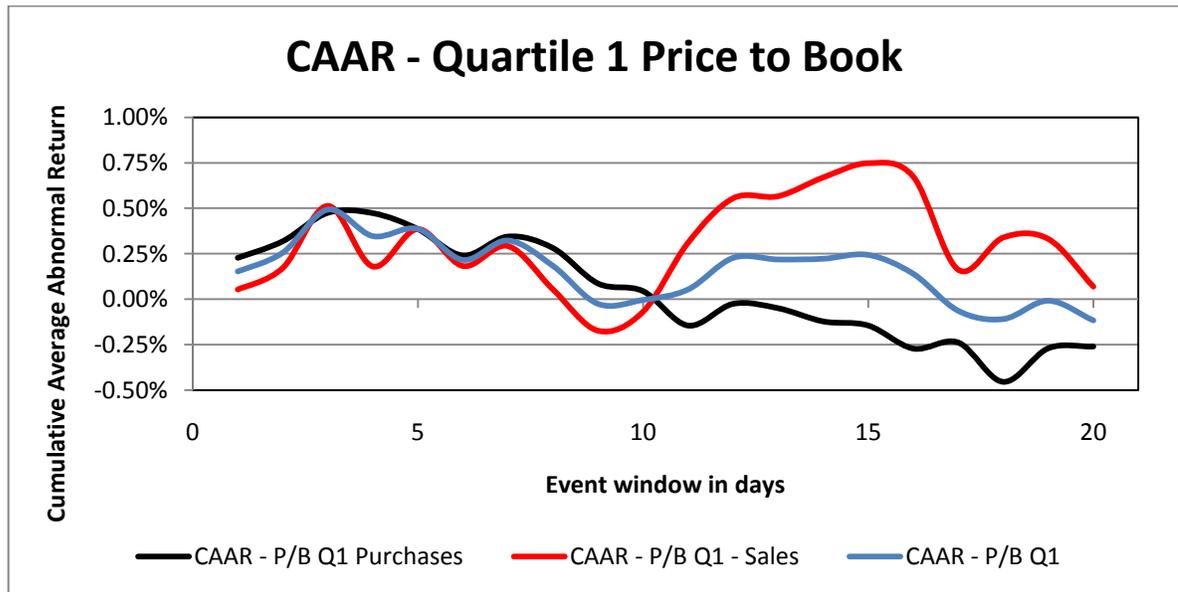
Accept / Reject null hypothesis	P/B Q1		P/B Q2		P/B Q3		P/B Q4	
	Number of days	% of event window						
Accept	20	100%	18	90%	18	90%	20	100%
Reject	0	0%	2	10%	2	10%	0	0%
All	20	100%	20	100%	20	100%	20	100%

Appendix 10 shows the detailed CAARs for each day following the trade. It also shows the day-to-day results of the hypothesis testing performed using the T-test.

The result shows that the CAARs for sales transactions when split by price to book quartiles are not statistically significant.

Figure 6 shows the CAARs for 20 days following the director trade for all transactions where the price to book was in the first quartile.

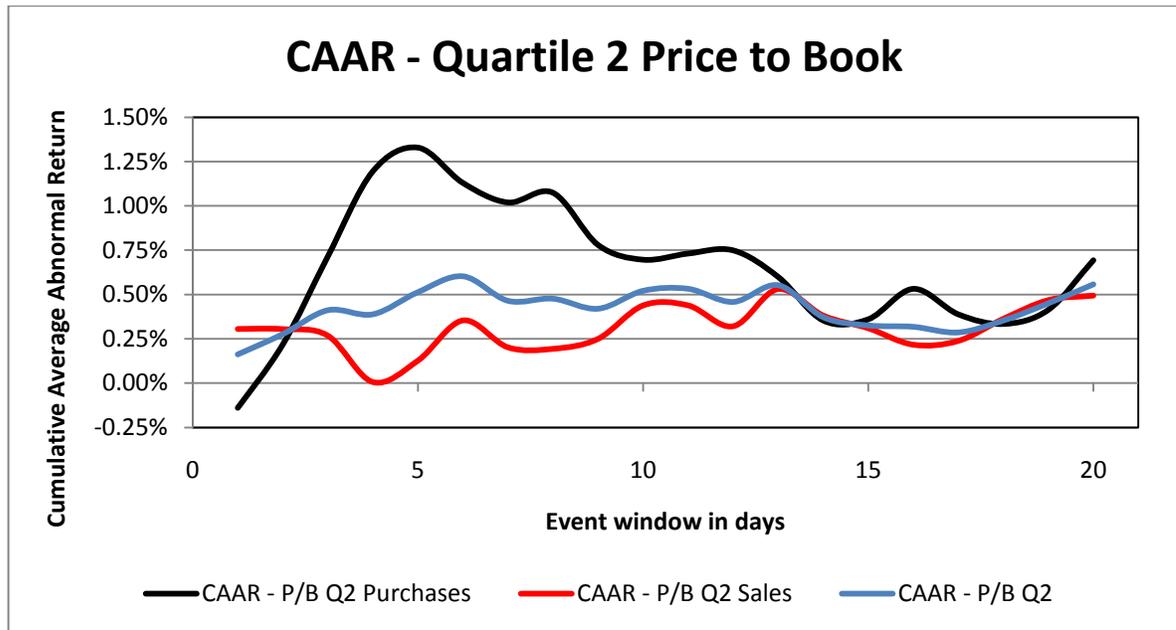
Figure 6: Post transaction CAAR - Price to book quartile 1



While the initial CAARs for purchase and sales transactions in the first quartile of the price to book ratio are similar, a divergence occurs over the course of the event window, with purchases exhibiting a negative CAAR and sales exhibiting a slightly positive CAAR. If trading in a contrarian manner generated abnormal returns, the CAAR for purchases would be higher than the CAAR for sales in this price to book quartile. This result therefore exhibits the opposite of what is expected.

Figure 7 shows the CAARs for 20 days following the director trade for all transactions where the price to book was in the second quartile.

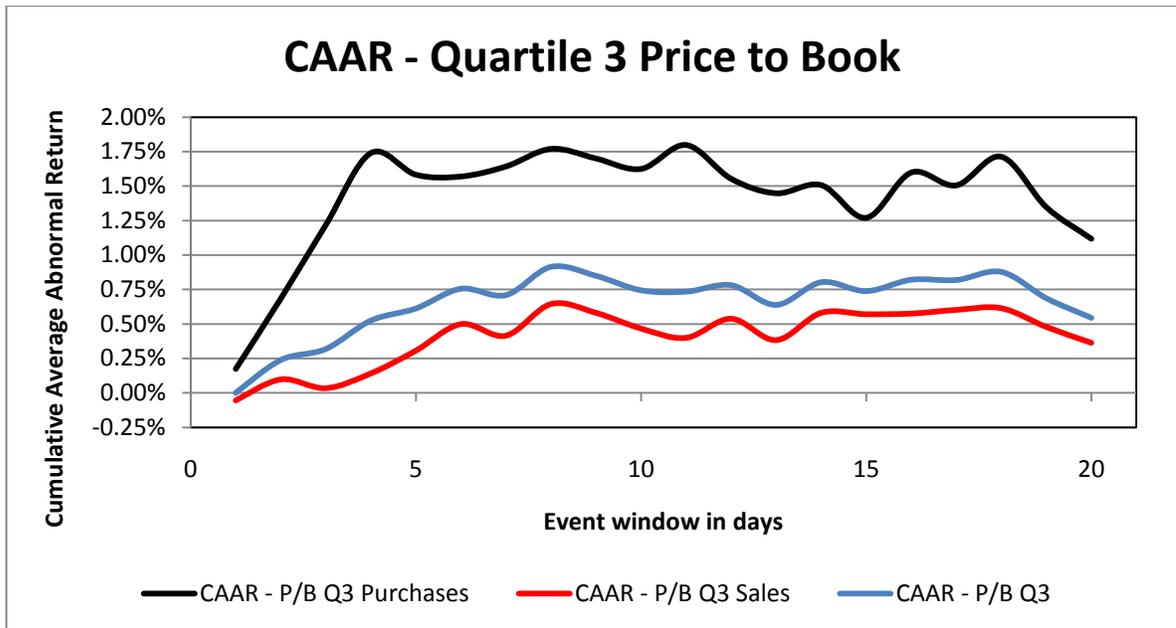
Figure 7: Post transaction CAAR - Price to book quartile 2



If contrarian-trading strategies generate abnormal returns, the CAARs for purchases would be greater than the CAARs for sales in quartile two. As figure 7 shows, the CAARs for purchases are higher than the CAARs for sales during most of the event window, which agrees with the expected result. The outperformance of purchases over sales does however dissipate over the event window.

Figure 8 shows the CAARs for 20 days following the director trade for all transactions where the price to book was in the third quartile.

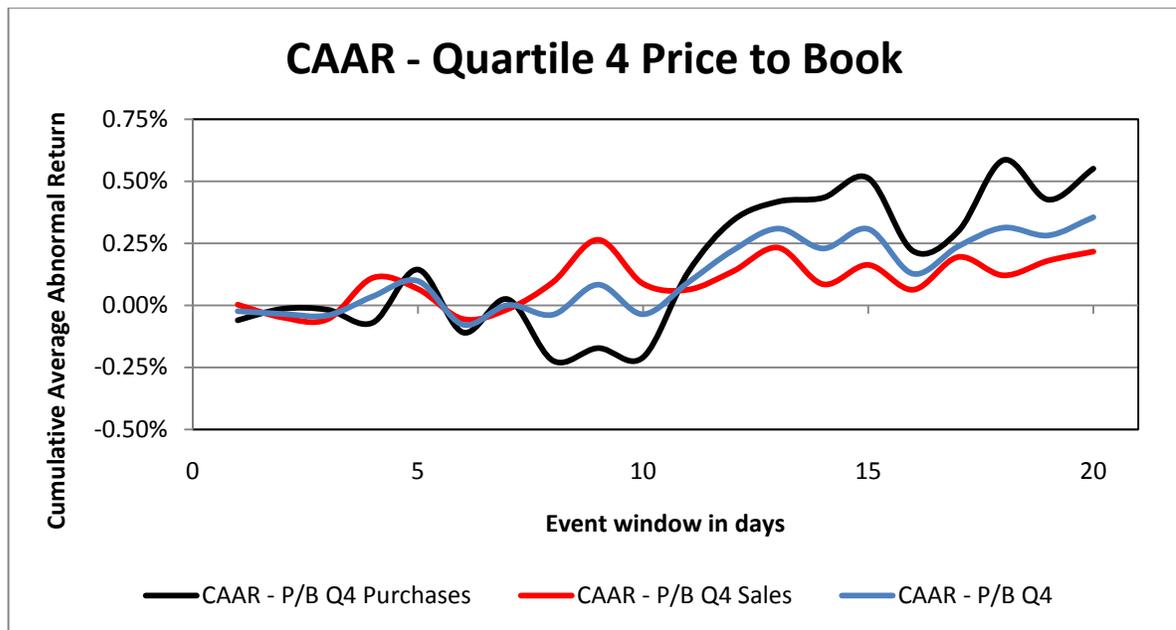
Figure 8: Post transaction CAAR - Price to book quartile 3



The expectation in quartile three is that the CAARs for sales transactions should exceed those for purchases. However, the observation is the opposite, with CAARs for purchases being consistently higher.

Figure 9 shows the CAARs for 20 days following the director trade for all transactions where the price to book was in the fourth quartile.

Figure 9: Post transaction CAAR - Price to book quartile 4



While the CAARs in quartile four are initially similar, a divergence occurs after 11 days with purchases having a higher CAAR than sales. This is the opposite of what would be expected as directors would be expected to earn higher returns from sales transactions where the price to book ratio was high.

5.4 Hypothesis 4

The aim of the fourth hypothesis was to determine if outsiders could earn abnormal returns by following directors' contrarian trades. Testing this involves a comparison of the CAARs post the director trade, comparing the CAAR on the 20th day to the CAAR on the fifth day. A positive difference would imply that the abnormal returns earned by directors last long enough for outsiders to take advantage of. Table 14 provides the results of the hypothesis tests.

Table 14: Results of hypothesis test for differences in CAARs

Direction of trade	Null hypothesis (H0)	Alternative Hypothesis	Probability	Reject H0 at 0.05
All	Difference = 0	Difference \neq 0	0.680594	No
	Difference = 0	Difference < 0	0.340297	No
	Difference = 0	Difference > 0	0.659703	No
Purchases	Difference = 0	Difference \neq 0	0.217787	No
	Difference = 0	Difference < 0	0.108893	No
	Difference = 0	Difference > 0	0.891107	No
Sales	Difference = 0	Difference \neq 0	0.666981	No
	Difference = 0	Difference < 0	0.666509	No
	Difference = 0	Difference > 0	0.333491	No

The results of the hypothesis tests show that there is no statistically significant difference between the CAAR for day five and the CAAR for day 20. This observation holds for all transactions, purchase transactions and sales transactions.

6 Chapter 6: Discussion of results

6.1 Introduction

This chapter will discuss the results observed in chapter five and will attempt to answer whether contrarian trading by directors provides a credible signal to outside investors for future abnormal returns. The structure of the key aspects discussed is according to the following themes:

- The use of contrarian trading strategies by directors;
- The signalling provided to the market by director trades;
- The returns earned by directors on their trades; and
- The opportunity for outsiders to earn abnormal returns by following director trades.

6.2 The use of contrarian trading strategies by directors

The momentum reversal and the value mispricing angles represent two angles to view contrarian trading strategies. The momentum reversal view, sometimes referred to as the winner versus loser view, says that a contrarian trader would purchase shares that have recently underperformed, or losers, and sell shares that have recently outperformed, or winners (Lakonishok & Lee, 2001; Jeng *et al.* 2003; Jenter, 2005). A rational trader would however only employ a contrarian strategy of buying losers and selling winners if they hold the view that in future the trend will reverse, whereby previous losers become new winners and previous winners become new losers. The fundamental assumption behind

this view is that there has been recent momentum in the share price, which is unjustifiable. This view of contrarian trading enables the study of short-term contrarian behaviour. While the expectation is that directors as a group would buy losers and sell winners, it does not follow that an individual director would do so, unless the person is a director in multiple companies.

The results observed in chapter five indicate that directors do cater for momentum reversal in their trading strategies, buying previous losers and selling previous winners. For all transactions, the pre-trade CAARs were negative, implying that directors buy when the share price has exhibited recent weakness and sell when the share has exhibited recent strength. Throughout the event window, the observed pre-trade CAAR for sales is more negative than the pre-trade CAAR for purchases. This implies that that necessary short-term underperformance required before directors enter into sales transactions is higher.

The second angle is more concerned with the mispricing of the share price relative to the fundamental value. This angle uses the price to book ratio, and says that contrarian traders can make abnormal profits by purchasing shares with low price to book values and selling shares with high price to book values. This view of contrarian trading can aid in the study of long-term contrarian behaviour, as an assumption of mispricing of value either implies that the rest of the market does not see the mispricing, or else does not believe in it. As compared to the rest of the market, directors should possess superior information about their companies. Based on this, it would be logical to expect directors to be in a better position to identify the mispricing of their company values and hence trade in a

contrarian manner. This would imply that directors are long-term contrarians, buying when the price to book is low and selling when the price to book is high.

From a value mispricing perspective, this study used the price to book ratio to determine if directors trade in a contrarian manner. This study finds that the average price to book ratio for purchases is higher than the price to book ratio for sales, which would imply that directors of South African companies do not trade in a contrarian manner. Using the median of the price to book ratio to strip out the potential distortion caused by outliers, the results show the median of purchases being lower than the median for sales, which is more in line with the expectation that directors are contrarian investors. The mixed results would seem to indicate that directors are contrarian at certain times, but are not consistently so. The analysis of the various quartiles of the price to book confirms this observation, with directors following a contrarian trading strategy at lower levels of the price to book, but seemingly following a momentum strategy at higher levels of the price to book.

These observations are inconsistent with the reviewed literature (Lakonishok and Lee, 2001; Jeng *et al.* 2003; Jenter, 2005), and with what has been observed in other markets. A potential explanation for this behaviour by South African company directors is that, at lower levels of the price to book, directors have more confidence that the mispricing will be corrected, and hence trade in a contrarian manner. At higher levels of the price to book however, the directors seem not to have confidence that the momentum will reverse, and are therefore more cautious about going against the market trend, in effect buying

winners and selling losers. This basis for this behaviour seems to be the momentum persistence observation made by Jegadeesh and Titman (2001).

6.3 The signalling provided to outsiders by director trades

The relevant literature on director signalling has two conflicting views. The first view put forward by Lakonishok and Lee (2001) suggests that the signals provided by director trades are not informational, and hence markets under-react to them. The second view proposed by Fidrmuc *et al.* (2006), says that there is informational content in director trades as suggested by the immediate movement in the share price following director transactions. It is worth noting however that the presence or lack of a reaction by the market does not necessarily point to the informational content of the trade, but simply the perception of informativeness held by the market.

The results observed in this study indicate that outside investors in the South African market do react to director trades. This reaction is however only valid for director purchases, with the cumulative return reaching 1.0118% five days after the director trade. On the other hand, the reaction to director sales is a statistically and economically insignificant -0.1563%. These results are in line with the results observed in the USA and UK by Fidrmuc *et al.* (2006), where the reaction to director purchases was an economically significant 3.12% and the reaction to director sales was an economically insignificant -0.37%.

It is worth pointing out that while Lakonishok and Lee (2001) did not identify any market reaction to director trades, the under-reaction hypothesis they propose is still valid for sales transaction for this study. It is thus important to understand what may be causing outsiders to react to director purchases but not sales. Rogers (2008) postulates that there is an asymmetry in the quality of managerial disclosures whereby director purchases tend to be preceded by lower quality disclosures and sales tend to be preceded by higher quality disclosures. This may lead outsiders to consider purchases more informational as they offer new information over and above that provided by the preceding lower quality disclosures. At the same time, the higher quality of disclosures preceding sales transactions may lead outsiders to think there is no additional information inherent in the director trade.

Piotroski and Roulstone (2004) also make the point that director trades help to disseminate information that is more firm specific as compared to other outsiders such as security analysts. One may therefore argue that this informational content is worth more when directors are purchasing, as non-firm specific reasons such as portfolio rebalancing could be the reason for sales transactions.

6.4 The returns earned by directors on their trades

6.4.1 The observed overall returns

The third hypothesis was concerned with whether directors earn abnormal returns on their trades. The results show that directors do in fact earn statistically significant

abnormal returns. The CAARs for all transactions over the event window were positive, peaking at 0.43% after 13 days. Unpacking the sample further, the results show that abnormal returns related to director purchases peak at 0.72% after five days, and for director sales, the abnormal returns peak at 0.44%, 15 days after the trade.

While the returns seem economically insignificant, it is important to contrast this with the abnormal returns observed by Nair (2008), which showed that over a 252 days event window (one year), the CAARs from director purchases and sales were 0.33% and 0.29% respectively. This implies that the bulk of the abnormal returns for directors occur in the first few weeks following the trade, which is an important consideration for outsiders who plan to mimic director trading with the expectation of future excess returns.

The excess abnormal returns from purchases over sales are consistent with the findings of Friederich *et al.* (2002), who observed that higher abnormal returns tend to follow purchase transactions as opposed to sales transactions. Hillier and Marshall (2002) concluded that the excess abnormal returns of purchases over sales relate to directors increasing their holdings and therefore increasing outsiders' confidence in the prospects of the company, whereas sales transactions were not informative. An interesting observation is that the results of this study agree with those of Nair (2008) but disagree with the results of Mordant and Muller (2003), whereby they observe returns from sales being higher than the returns from purchases.

The main difference between this study and Mordant and Muller's study is that their study was conducted soon after insider trading laws were promulgated in South Africa. It may be the case that in the earlier years of director trade reporting, outside investors considered sales more informational as they sent negative signals to risk-averse investors. In addition, the use of derivative instruments and share incentive schemes was not as popular, meaning that sales transactions by directors were more likely to have a connection with future performance expectations as opposed to portfolio rebalancing.

On the other hand, it is important to note that for this study, the initial excess returns of purchases over sales dissipate over the event window. The returns from purchase transactions go up at a faster rate in the early part of the event window and then start to decline after the fifth day, whereas the returns from sales transactions increase steadily over the event window, and draw level after 13 days. The earlier observation whereby there was a clear reaction to director purchases but not to sales transactions may be responsible for this initial difference.

At this stage, it would appear that the driver of the abnormal returns to directors is the reaction of outsiders as opposed to contrarian strategies followed, or superior information possessed by directors. The level of the price to book ratio splits the sample and enables the study to scrutinise these abnormal returns further, with the transactions divided into four categories according to the price to book quartiles. If directors traded in a contrarian manner, they should make more purchases in the lower quartiles and sell more in the higher quartiles. In addition, higher post transaction returns in the extreme quartiles

would indicate that there is value in following a contrarian strategy. One would therefore expect to see the highest CAARs for purchases in quartile one and for sales in quartile four. The next two sub-sections discuss the observed returns for purchases and sales transactions.

6.4.2 The observed returns from purchase transactions

The results of this study confirm that for purchases, directors do trade more in the lowest price to book quartile than in any other quartile. A surprising observation is that the quartile with the second highest number of purchase transactions is the fourth quartile. Directors therefore purchase most in the extreme quartiles, which may suggest that at very low price to book values, directors purchase in a contrarian manner, but at extremely high values of the price to book, directors follow the momentum strategy.

What was of interest however were the abnormal returns made in the various quartiles. Directors realised higher abnormal returns for purchase transactions corresponding to the middle two quartiles as opposed to the extreme quartiles. A few observations follow from this.

The fact that the post-transaction CAARs were highest in the middle two price to book quartiles may suggest that outsiders perceive that the motivation of directors to purchase in the lowest and highest quartiles is more related to pure contrarian and momentum strategies as opposed to superior information. Outsiders may therefore discard this information, as they may not hold the same contrarian or momentum views, and in turn

only follow directors in the middle two quartiles where they believe director trades are more informational.

A comparison of the returns across the middle quartiles shows that abnormal returns emanating from transactions in the third quartile were higher than those in the second quartile were. This is against expectations as third quartile transactions are less contrarian. This unexpected finding, may suggest that outsiders use director trading information to confirm views already held, and in so doing, drive the returns to directors and strengthen the momentum effects, which is in line with the finding by Xiang *et al.* (2002). The generated momentum profits are in line with what Jegadeesh and Titman (2001) have observed, where previous winners remain winners and previous losers remain losers.

This observation is further strengthened when comparing the returns from purchases in quartile one to those in quartile four. While the expectation would be that directors earn higher returns on purchase transactions from the first quartile, the results indicate that the actual returns exhibit the opposite effect. In addition, the returns from purchases in the first quartile are negative after ten days. This finding is consistent with the under-reaction hypothesis proposed by Basu (1977) and Figelman (2007) which suggests that due to the slow interpretation of news, investors do not act on the information provided in a rational manner. In this case, outsiders ignore the buy signals provided, in effect driving the share price further from the fundamental value through intermediate term momentum trading (Basu, 1977; Figelman, 2007).

An interesting observation from the analysis of purchase transactions was that there was an inverse relationship between the buying frequency of directors and the returns earned. The price to book quartiles with the highest number of purchase transactions resulted in the lowest returns for directors. This may suggest that outsiders perceive excessive trading by directors to be a negative indicator, or alternatively, that infrequent trading by directors, when it does take place, is a better indicator of future outperformance.

6.4.3 The observed returns from sales transactions

The results of this study show that directors sell more in the middle price to book quartiles (quartiles two and three), than in the extreme quartiles (quartiles one and four). This is the opposite of the observation with director purchase transactions. The observation of CAARs from purchases suggested that directors make the highest returns in the quartiles with a lower frequency of transactions. If this view holds for sales, one would expect to see directors making the highest returns in the extreme quartiles. This is not the case however, as the returns from sales transactions have no discernable pattern linked to the various price to book quartiles. This suggests that there is no link between returns to directors from sales transactions and any contrarian or momentum strategy. As previously mentioned, outsiders do not seem to react to director sales, and this lack of a reaction may be the primary factor behind the observed random distribution of returns across price to book quartiles.

6.5 Opportunities for outsiders to earn abnormal returns

While directors of South African companies earn abnormal returns from their trades, this information would only be valuable for outsiders if they could also earn abnormal returns through a mimicking strategy. For this to be possible, the abnormal returns would have to last long enough post the director trade to enable outsiders to use this information. To test this, the difference in the CAARs between the fifth day and the 20th day after the director trade was calculated and tested for statistical significance.

The results showed that this difference is not statistically different from zero, implying that outsiders in the South African market cannot take advantage of the information provided by directors to earn excess returns. These results are important in light of the observed period in which directors make most of their abnormal returns. This finding suggests that not only do outsiders not make excess returns, but also that they are actually responsible for the abnormal returns that accrue to directors. The requirement for directors to report their trades may therefore be inadvertently benefiting them, which is consistent with the view by Bris (2005), that the enforcement of insider trading rules increases both the incidence and profitability of insider trading.

6.6 Summary

This chapter discussed the results observed in chapter five, and generated the following findings:

- On a short-term basis, all transactions analysed, including purchases and sales had a negative pre-trade CAAR. This implied that in the short-term, directors bought previous loser shares and sold previous winner shares;
- The average price to book ratio for purchase transactions was higher than the average price to book ratio for sales transactions, which was against expectations. The median price to book ratio, which strips out the effects of outliers, was more in line with expectations. The quartile analysis showed that directors are not consistently contrarian, preferring to trade in a contrarian manner at lower price to book values and to follow the momentum at higher price to book values. Directors had a tendency to purchase shares with extremely high and extremely low price to book values;
- Outsiders were shown to react to director purchases but not to director sales, implying that they found director purchases to be informational while director sales were not perceived to contain useful information;
- The reaction of outsiders to director trades seemed to be selective, concentrating on transactions within certain price to book quartiles and ignoring other transactions.
- Directors earned statistically significant abnormal returns, which were greater for purchases than for sales. The abnormal returns earned were concentrated in the first few weeks following the trade;

- The following of director purchase transactions by outsiders seemed to be the primary reason for the existence of abnormal returns for directors. The trading of outsiders seemed to strengthen momentum effects, which further benefited directors. The post transaction returns suggested that outsiders have preconceived views on shares and used director purchasing information to confirm those views. Outsiders seemed to follow directors more strongly where the frequency of director trades was low;
- There was no clear pattern between the price to book ratios and the returns earned by directors from sales transactions; and
- Outsiders did not make abnormal returns themselves, by following director trades.

7 Chapter 7: Conclusion

7.1 Introduction

The purpose of this study was to establish whether contrarian trading by directors of South African companies provides a credible signal to outside investors for future abnormal returns. The stated objectives of this study were to determine if:

- Directors employ contrarian trading strategies;
- The market reacts to directors' trades;
- Directors earn abnormal returns on their trades; and
- Outsiders can benefit from mimicking directors' contrarian trading.

The concluding chapter will provide a summary of the key insights drawn from the research, relative to the stated objectives. Secondly, this chapter will provide recommendations to the main stakeholders based on the key findings from the study. This chapter will conclude by providing ideas for future research.

7.2 Summary of key findings

The literature reviewed shows that directors trade in a contrarian manner. This study shows that directors of listed South African companies also trade in a contrarian manner. Contrary to expectation however, this study shows that the directors are not consistently contrarian. At low levels of the price to book ratio, the directors do trade in a contrarian

manner, but this does not hold at high levels of the price to book, where directors tend to follow the momentum.

By analysing the response of outsiders to director trades, this study shows that outside investors do consider director trades informational. Outsiders seem to ignore the signals sent through director sales transactions however and only follow purchase transactions.

Directors of listed South African companies earn abnormal returns from their trades. These abnormal returns are stronger for purchase transactions than they are for sales transactions. The generation of abnormal returns for directors takes place within the first few weeks following the trade. The main driver of the abnormal returns accruing to directors seems to be the following of their trades by outsiders. This study also shows that directors earn the highest abnormal returns when they trade infrequently.

Outside investors do not earn abnormal returns by following directors. As noted above, their following of directors seems to generate the abnormal returns for directors.

7.3 Recommendations to stakeholders

7.3.1 Directors

Directors of listed South African companies already benefit from their trading activities, especially when they purchase their company shares. Trading in a contrarian manner does not however yield higher excess returns. Should directors wish to make higher returns from their purchase transactions, they should focus on trading when the price to book

ratio is not extremely low or extremely high. Directors would also benefit more from their trades if they adopted a low trading frequency, high volume approach.

7.3.2 Outside investors

Outside investors do not benefit from mimicking director trades. In fact, the herding behaviour of outsiders seems to be responsible for the transfer of value from themselves to directors. They would do well to incorporate the signals sent by directors through their trades but this should be in conjunction with other firm valuation techniques.

7.4 Ideas for future research

The summary below provides a few ideas for future research in the area of contrarian trading by directors.

- A similar study using smaller market capitalisation shares could add value. As these shares are not as widely followed, there may be opportunities for outsiders to benefit from mimicking director trades. This study could also use an extended event window to determine if any abnormal profits are available post the first month;
- A more detailed study on the frequency of director trades and the relationship to returns generated may yield valuable insights to directors. This study may also consider the effect that the frequency and quality of managerial disclosures has on director trade timing;
- A qualitative study on the factors that influence directors to trade may be of value to outside investors;

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9 Appendices

9.1 Appendix 1 - Director trading data

Date	Director	Action	Volume	Price	Value	Type	Share Code
25-Nov-02	Bradley, E le R	Buy	85,000	3200	2,720,000.00	Indirectly Beneficial	SBK
25-Nov-02	Bradley, E le R	Buy	15,000	11200	1,680,000.00	Directly Beneficial	SOL
16-Jul-03	Rumble, Keith C	Sell	10,000	28100	2,810,000.00	Directly Beneficial	IMP
01-Sep-03	Booyesen, Steve F	Buy	61,611	2356	1,451,555.16	Directly Beneficial	ASA
03-Sep-03	Gordon, Donald	Buy	65,000	7652	4,973,800.00	Directly Beneficial	CSO
30-Aug-04	Wiese, Christoffel H	Buy	75,000	975	731,250.00	Directly Beneficial	SHP
03-Nov-04	Joffe, Brian	Sell	194,444	4750	9,236,090.00	Indirectly Non Beneficial	BVT
31-Jul-08	Moosa, M Valli	Buy	11,572	96500	11,166,980.00	Directly Beneficial	AMS
03-Oct-08	Ruck, Myles J D	Sell	52,587	9650	5,074,645.50	Directly Beneficial	SBK
05-Mar-10	Gule, Wilson Mangisi	Sell	16,379	7399	1,211,882.21	Directly Beneficial	ARI

9.2 Appendix 2 - Daily share prices data

Date	High	Low	Open	Close	Volume	Share Code
2010/04/14	3720	3671	3680	3720	2364239	ABL
2010/04/13	3680	3641	3645	3660	3451558	ABL
2004/12/20	7440	7340	7410	7440	1294849	ASA
2004/12/17	7500	7380	7420	7432	2581389	ASA
2006/04/25	5940	5740	5850	5865	6168425	MTN
2006/04/24	5975	5840	5930	5850	2652195	MTN
2003/07/08	6650	6585	6585	6650	1398788	REM
2003/07/07	6530	6460	6500	6530	1146752	REM
2009/07/01	5850	5721	5800	5730	2031776	VOD
2009/06/30	5770	5580	5635	5720	2756755	VOD

9.3 Appendix 3 - Annual beta ratios

Company	Share Code	Alpha	Unleveraged Beta	Leveraged Beta	Year
ABIL	ABL	0.0208	-0.3167	-0.5772	2003
ABIL	ABL	-0.0091	0.2038	0.3992	2004
ARCMITTAL	ACL	-0.0445	1.9428	2.1012	2003
ARCMITTAL	ACL	-0.0338	0.7896	0.7945	2004
FIRSTRAND	FSR	0.0181	0.0813	0.7948	2007
FIRSTRAND	FSR	-0.0262	0.0242	0.3146	2008
NASPERS	NPN	-0.0067	0.6855	0.9896	2006
NASPERS	NPN	0.0113	0.8529	0.9321	2007
PICKNPAY	PIK	0.0093	0.4404	0.5019	2007
PICKNPAY	PIK	-0.0293	0.2102	0.2764	2008

9.4 Appendix 4 - Annual price to book ratios

Company	Share code	Year	Price to book ratio
ABSA	ASA	2009	1.79
ABSA	ASA	2008	1.54
ASPEN	APN	2005	8.37
ASPEN	APN	2004	4.40
EXXARO	EXX	2006	2.36
EXXARO	EXX	2005	4.25
KUMBA	KIO	2009	12.10
KUMBA	KIO	2008	7.43
OLDMUTUAL	OML	2008	0.40
OLDMUTUAL	OML	2007	1.17

9.5 Appendix 5 – All share index prices

Date	High	Low	Open	Close
24-Mar-03	8216.96	8001.76	8139.31	8026.83
25-Mar-03	8026.83	7869.65	8026.83	7932.57
09-Sep-04	11285.12	11167.86	11183.74	11253.61
10-Sep-04	11325.09	11203.41	11253.61	11226.82
14-Feb-07	26392.31	26023.35	26023.35	26311.42
15-Feb-07	26521.1	26311.42	26311.42	26521.1
15-Oct-07	31395.31	31164.38	31225.85	31164.38
16-Oct-07	31175.95	30840.44	31164.38	31033.42
12-May-09	21932.82	21695.16	21861.99	21930.52
13-May-09	21930.52	21220.69	21930.52	21289.67

9.6 Appendix 6 – Pre transaction CAARs and hypothesis test results

Day	All		Purchases		Sales	
	CAAR	Accept / Reject	CAAR	Accept / Reject	CAAR	Accept / Reject
-20	-2.0212%	Reject	-0.9270%	Reject	-2.7027%	Reject
-19	-2.1125%	Reject	-1.0882%	Reject	-2.7504%	Reject
-18	-2.1316%	Reject	-1.2706%	Reject	-2.6679%	Reject
-17	-2.1332%	Reject	-1.3707%	Reject	-2.6081%	Reject
-16	-2.1296%	Reject	-1.4898%	Reject	-2.5281%	Reject
-15	-2.1255%	Reject	-1.5123%	Reject	-2.5074%	Reject
-14	-2.0006%	Reject	-1.5140%	Reject	-2.3037%	Reject
-13	-1.9440%	Reject	-1.6347%	Reject	-2.1365%	Reject
-12	-1.9048%	Reject	-1.6244%	Reject	-2.0794%	Reject
-11	-1.8038%	Reject	-1.4635%	Reject	-2.0158%	Reject
-10	-1.7901%	Reject	-1.4386%	Reject	-2.0090%	Reject
-9	-1.7020%	Reject	-1.3418%	Reject	-1.9264%	Reject
-8	-1.5396%	Reject	-1.0130%	Reject	-1.8676%	Reject
-7	-1.5118%	Reject	-0.9321%	Reject	-1.8728%	Reject
-6	-1.3327%	Reject	-0.7097%	Reject	-1.7208%	Reject
-5	-1.0800%	Reject	-0.6029%	Reject	-1.3772%	Reject
-4	-0.9037%	Reject	-0.5884%	Reject	-1.1001%	Reject
-3	-0.6533%	Reject	-0.6120%	Reject	-0.6791%	Reject
-2	-0.5155%	Reject	-0.5106%	Reject	-0.5186%	Reject
-1	-0.1314%	Reject	-0.0612%	Accept	-0.1751%	Reject

9.7 Appendix 7 – Pure cumulative returns and hypothesis test results

Day	All		Purchases		Sales	
	Cumulative Return	Accept / Reject	Cumulative Return	Accept / Reject	Cumulative Return	Accept / Reject
1	0.0708%	Accept	0.1030%	Accept	0.0508%	Accept
2	0.1076%	Accept	0.2710%	Accept	0.0058%	Accept
3	0.1776%	Accept	0.5985%	Reject	-0.0846%	Accept
4	0.2373%	Reject	0.8966%	Reject	-0.1734%	Accept
5	0.2920%	Reject	1.0118%	Reject	-0.1563%	Accept

9.8 Appendix 8 – Post transaction CAARs and hypothesis test results

Day	All		Purchases		Sales	
	CAAR	Accept / Reject	CAAR	Accept / Reject	CAAR	Accept / Reject
1	0.0732%	Accept	0.0682%	Accept	0.0763%	Accept
2	0.1869%	Reject	0.2715%	Reject	0.1342%	Accept
3	0.2997%	Reject	0.5192%	Reject	0.1629%	Accept
4	0.3291%	Reject	0.6903%	Reject	0.1042%	Accept
5	0.4080%	Reject	0.7153%	Reject	0.2167%	Accept
6	0.3827%	Reject	0.5522%	Reject	0.2771%	Accept
7	0.3818%	Reject	0.6142%	Reject	0.2371%	Accept
8	0.3938%	Reject	0.5591%	Reject	0.2909%	Accept
9	0.3390%	Reject	0.4269%	Accept	0.2842%	Accept
10	0.3138%	Reject	0.3720%	Accept	0.2776%	Accept
11	0.3592%	Reject	0.4254%	Accept	0.3180%	Accept
12	0.4278%	Reject	0.4877%	Reject	0.3904%	Reject
13	0.4326%	Reject	0.4498%	Accept	0.4219%	Reject
14	0.4123%	Reject	0.3851%	Accept	0.4293%	Reject
15	0.4080%	Reject	0.3600%	Accept	0.4380%	Reject
16	0.3583%	Reject	0.3264%	Accept	0.3783%	Accept
17	0.3250%	Reject	0.3142%	Accept	0.3317%	Accept
18	0.3635%	Reject	0.3300%	Accept	0.3844%	Accept
19	0.3560%	Reject	0.3148%	Accept	0.3817%	Accept
20	0.3359%	Reject	0.3718%	Accept	0.3136%	Accept

9.9 Appendix 9 – Post purchase CAARs and hypothesis test results

Day	P/B Q1		P/B Q2		P/B Q3		P/B Q4	
	CAAR	Accept / Reject	CAAR	Accept / Reject	CAAR	Accept / Reject	CAAR	Accept / Reject
1	0.2281%	Accept	-0.1396%	Accept	0.1739%	Accept	-0.0603%	Accept
2	0.3192%	Accept	0.2179%	Accept	0.6839%	Reject	-0.0141%	Accept
3	0.4759%	Reject	0.7148%	Reject	1.2190%	Reject	-0.0181%	Accept
4	0.4740%	Accept	1.1956%	Reject	1.7405%	Reject	-0.0698%	Accept
5	0.3863%	Accept	1.3294%	Reject	1.5833%	Reject	0.1440%	Accept
6	0.2409%	Accept	1.1298%	Reject	1.5702%	Reject	-0.1093%	Accept
7	0.3452%	Accept	1.0197%	Reject	1.6430%	Reject	0.0242%	Accept
8	0.2818%	Accept	1.0746%	Reject	1.7709%	Reject	-0.2232%	Accept
9	0.0868%	Accept	0.7802%	Accept	1.7009%	Reject	-0.1726%	Accept
10	0.0448%	Accept	0.6966%	Accept	1.6254%	Reject	-0.2098%	Accept
11	-0.1450%	Accept	0.7314%	Accept	1.7989%	Reject	0.1333%	Accept
12	-0.0252%	Accept	0.7494%	Accept	1.5538%	Reject	0.3424%	Accept
13	-0.0494%	Accept	0.5996%	Accept	1.4485%	Reject	0.4181%	Accept
14	-0.1221%	Accept	0.3535%	Accept	1.5078%	Reject	0.4336%	Accept
15	-0.1446%	Accept	0.3602%	Accept	1.2705%	Reject	0.5128%	Accept
16	-0.2715%	Accept	0.5322%	Accept	1.5992%	Reject	0.2185%	Accept
17	-0.2383%	Accept	0.3883%	Accept	1.5061%	Reject	0.2988%	Accept
18	-0.4548%	Accept	0.3340%	Accept	1.7139%	Reject	0.5853%	Accept
19	-0.2698%	Accept	0.4138%	Accept	1.3474%	Reject	0.4260%	Accept
20	-0.2602%	Accept	0.6937%	Accept	1.1179%	Accept	0.5511%	Accept

9.10 Appendix 10 – Post sale CAARs and hypothesis test results

Day	P/B Q1		P/B Q2		P/B Q3		P/B Q4	
	CAAR	Accept / Reject	CAAR	Accept / Reject	CAAR	Accept / Reject	CAAR	Accept / Reject
1	0.0538%	Accept	0.3051%	Reject	-0.0546%	Accept	0.0021%	Accept
2	0.1721%	Accept	0.3043%	Reject	0.0980%	Accept	-0.0500%	Accept
3	0.5132%	Accept	0.2676%	Accept	0.0344%	Accept	-0.0565%	Accept
4	0.1802%	Accept	0.0061%	Accept	0.1416%	Accept	0.1104%	Accept
5	0.3859%	Accept	0.1267%	Accept	0.3069%	Accept	0.0654%	Accept
6	0.1829%	Accept	0.3533%	Accept	0.4996%	Reject	-0.0559%	Accept
7	0.2922%	Accept	0.2017%	Accept	0.4158%	Accept	-0.0158%	Accept
8	0.0541%	Accept	0.1932%	Accept	0.6455%	Reject	0.0931%	Accept
9	-0.1726%	Accept	0.2492%	Accept	0.5816%	Accept	0.2639%	Accept
10	-0.0684%	Accept	0.4377%	Accept	0.4673%	Accept	0.0866%	Accept
11	0.3108%	Accept	0.4381%	Accept	0.3998%	Accept	0.0626%	Accept
12	0.5547%	Accept	0.3204%	Accept	0.5388%	Accept	0.1368%	Accept
13	0.5662%	Accept	0.5301%	Accept	0.3836%	Accept	0.2322%	Accept
14	0.6692%	Accept	0.3808%	Accept	0.5816%	Accept	0.0844%	Accept
15	0.7475%	Accept	0.3094%	Accept	0.5714%	Accept	0.1625%	Accept
16	0.6741%	Accept	0.2165%	Accept	0.5763%	Accept	0.0623%	Accept
17	0.1623%	Accept	0.2379%	Accept	0.6030%	Accept	0.1944%	Accept
18	0.3394%	Accept	0.3623%	Accept	0.6152%	Accept	0.1203%	Accept
19	0.3312%	Accept	0.4678%	Accept	0.4790%	Accept	0.1796%	Accept
20	0.0696%	Accept	0.4931%	Accept	0.3639%	Accept	0.2163%	Accept